Carmen Johnson
18-12 4/12/12

# APPENDIX II – GEOSYNTHETICS

**Section 1 – Cells 1 and 2 Geosynthetic Clay Liner (GCL) Testing**
**Section 2 – Cells 1 and 2 HDPE Geomembrane Testing**
**Section 3 – Cells 1 and 2 Geocomposite Testing**
**Section 4 – Bills of Lading / Shipment Lists**
**Section 5 – Cell 1 Secondary HDPE Geomembrane CQA Forms**
**Section 6 – Cell 1 Primary HDPE Geomembrane CQA Forms**
**Section 7 – Cell 2 Secondary HDPE Geomembrane CQA Forms**
**Section 8 – Cell 2 Primary HDPE Geomembrane CQA Forms**
**Section 9 – Tensiometer Load Cell Calibrations**
**Section 10 – Cell 1 Leachate Collection System and Leak Detection System Piping As-Built**
**Section 11 – Cell 2 Leachate Collection System and Leak Detection System Piping As-Built**
**Section 12 – Cells 1 and 2 LCS/LDS Camera Inspection**

# ZONING COMPLIANCE CERTIFICATE

## Certificate of Occupancy

ISSUED BY

## CATAWBA COUNTY PLANNING, PARKS & DEVELOPMENT

| | |
|---|---|
| **TYPE OF WORK** | **Other** |
| **PERMIT NO** | **ZONC-7-10-9707** |
| **PIN NUMBER** | 461803426350 |
| **SITE ADDRESS** | 3590 MARSHALL RD, Terrell, NC |
| **TYPE OF USE** | |

This certificate is issued pursuant to the requirements of Chapter 44 of Catawba County Code of Ordinances. It is specifically understood that this certificate becomes null and void when changes in construction, occupancy or use are made without department approval.

| APPLICANT | PARCEL OWNER |
|---|---|
| DUKE ENERGY CAROLINAS LLC<br>PO BOX 1007<br>CHARLOTTE NC 28201-1007 | |

**PROJECT DESCRIPTION:** Marshall Steam Station expansion of landfill operations per site plan dated 6-15-10 and received on 7-19-10 and the response letter with the same date. Site plan includes 100 foot setback from right-of-way of Island Point Road for placement of waste materials and a series of screening and buffering measures along Island Point Road and the residential property along the eastern boundary of the landfill operations.
Also included in this permit review is a phasing plan and closure plan. The landfill operation is an accessory use to Marshall Steam Station and will only include material generated on-site.

**Zoning Official**

**Finaled Date** 01-Nov-2010 **Print Date** 11/1/2010

# APPENDIX II – GEOSYNTHETICS
# Section 1 – Cells 1 and 2 GCL Testing

## Manufacturer's Quality Control (MQC) Test Results
## Conformance Test Results

# GCL Manufacturer's Quality Control (MQC) Test Results

Date: 5/6/2010
Purchase Order: 13180
ORDER NUMBER: 000260170

Gregg Abney
ESI
7943 Pecue Lane
Baton Rouge, LA 70809
gabney@esiliners.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to ESI.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

**GEOSYNTHETIC CLAY LINER**
**MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME: Duke Energy-Marshall Steam Plant
CUSTOMER P.O.: 13180
ORDER NUMBER: 000260170
PREPARED FOR: ESI

**CONTENTS:**

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

CETCO

## PRODUCT CERTIFICATIONS

PROJECT NAME: Duke Energy-Marshall Steam Plant
CUSTOMER P.O.: 13180
ORDER NUMBERS: 000260170
PREPARED FOR: ESI

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

### GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

| Test Method | Test Method Property | Test Frequency | Certified Value |
|---|---|---|---|
| ASTM D 5891 | Bentonite Fluid Loss | 1 per 50 Tons | 18 ml Max |
| ASTM D 5993 | Bentonite Mass/Area | 40,000 sq ft (4000 sq m) | 0.75 lb /sq ft Min |
| ASTM D 5890 | Bentonite Swell Index | 1 per 50 Tons | 24 ml/2g Min |
| ASTM D 6768 | GCL Grab Strength | 200,000 sq ft (20,000 sq m) | 30 lbs/in MARV |
| ASTM D 6243 | GCL Hydrated Internal Shear Strength | Periodic | 500 psf typ @ 200 psf normal load |
| ASTM D 5887 | GCL Hydraulic Conductivity | Weekly | 5.0E-9 cm/s Max |
| ASTM D 5887 | GCL Index Flux | Weekly | 1.0E-8 m3/m2/s Max |
| ASTM D 6496 | GCL Peel Strength | 40,000 sq ft (4000 sq m) | 3.5 lbs/in Min |

### SPECIALLY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT ST

| Test Method | Test Method Property | Requested Frequency | Requested Value | Requested Conditions |
|---|---|---|---|---|
| ASTM D4632* | Grab Strength*modified with 4-inch grips | 1/200,000sf | 90 lbs | Standard |
| ASTM D4632* | Peel Strength*modified with 4-inch grips | 1/40,000sf | 15lbs | Standard |

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility. All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

## NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King
Quality Assurance Coordinator

CETCO

## GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000260170

| | GCL | | | | | | | Geotextiles | | | | Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CV-BENTOMAT ST | | | | | | | N/W-WHITE | | | WOVEN | CV-CG 50 |
| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
| 000260170 | 201018CV | 1745 | 150 | 15 | 2948 | 2250 | 1745 | 201018CV | 00001582 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1746 | 150 | 15 | 2966 | 2250 | 1745 | 201018CV | 00001582 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1747 | 150 | 15 | 2754 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1748 | 150 | 15 | 2712 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1749 | 150 | 15 | 2708 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1750 | 150 | 15 | 2688 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1751 | 150 | 15 | 2678 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1752 | 150 | 15 | 2694 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1753 | 150 | 15 | 2698 | 2250 | 1745 | 201018CV | 00001583 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1754 | 150 | 15 | 2694 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1755 | 150 | 15 | 2688 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1756 | 150 | 15 | 2684 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1757 | 150 | 15 | 2687 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1758 | 150 | 15 | 2700 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1759 | 150 | 15 | 2614 | 2250 | 1745 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1760 | 150 | 15 | 2652 | 2250 | 1760 | 201018CV | 00001584 | 00001578 | 2020590115 | 958067A |
| 000260170 | 201018CV | 1762 | 150 | 15 | 2654 | 2250 | 1760 | 201018CV | 00001584 | 00001578 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1763 | 150 | 15 | 2648 | 2250 | 1760 | 201018CV | 00001584 | 00001578 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1764 | 150 | 15 | 2610 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1765 | 150 | 15 | 2624 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1766 | 150 | 15 | 2620 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1767 | 150 | 15 | 2614 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1768 | 150 | 15 | 2592 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1769 | 150 | 15 | 2616 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067A |
| 000260170 | 201018CV | 1770 | 150 | 15 | 2622 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1771 | 150 | 15 | 2630 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1772 | 150 | 15 | 2620 | 2250 | 1760 | 201017CV | 00001441 | 00001439 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1773 | 150 | 15 | 2626 | 2250 | 1760 | 201018CV | 00001592 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1774 | 150 | 15 | 2634 | 2250 | 1760 | 201018CV | 00001592 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1775 | 150 | 15 | 2668 | 2250 | 1775 | 201018CV | 00001592 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1776 | 150 | 15 | 2672 | 2250 | 1775 | 201018CV | 00001592 | 00001586 | 2020590583 | 958067B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201018CV | 1777 | 150 | 15 | 2650 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1778 | 150 | 15 | 2640 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1779 | 150 | 15 | 2634 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020590583 | 958067B |
| 000260170 | 201018CV | 1780 | 150 | 15 | 2608 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1781 | 150 | 15 | 2612 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1782 | 150 | 15 | 2614 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1783 | 150 | 15 | 2616 | 2250 | 1775 | 201018CV | 00001594 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1784 | 150 | 15 | 2616 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1785 | 150 | 15 | 2612 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1786 | 150 | 15 | 2614 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1787 | 150 | 15 | 2618 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1788 | 150 | 15 | 2610 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1789 | 150 | 15 | 2634 | 2250 | 1775 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1790 | 150 | 15 | 2780 | 2250 | 1790 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1791 | 150 | 15 | 2744 | 2250 | 1790 | 201018CV | 00001591 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1792 | 150 | 15 | 2696 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1793 | 150 | 15 | 2664 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1794 | 150 | 15 | 2668 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1795 | 150 | 15 | 2672 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1796 | 150 | 15 | 2672 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1797 | 150 | 15 | 2668 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1798 | 150 | 15 | 2670 | 2250 | 1790 | 201018CV | 00001590 | 00001586 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1799 | 150 | 15 | 2666 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1800 | 150 | 15 | 2660 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1801 | 150 | 15 | 2662 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1802 | 150 | 15 | 2660 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1803 | 150 | 15 | 2668 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1804 | 150 | 15 | 2674 | 2250 | 1790 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1805 | 150 | 15 | 2712 | 2250 | 1805 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1806 | 150 | 15 | 2678 | 2250 | 1805 | 201017CV | 00001421 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1807 | 150 | 15 | 2656 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1808 | 150 | 15 | 2672 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1809 | 150 | 15 | 2682 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1810 | 150 | 15 | 2674 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020724376 | 958067B |
| 000260170 | 201018CV | 1811 | 150 | 15 | 2696 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1812 | 150 | 15 | 2678 | 2250 | 1805 | 201017CV | 00001422 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1813 | 150 | 15 | 2680 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1814 | 150 | 15 | 2684 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1815 | 150 | 15 | 2688 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201018CV | 1816 | 150 | 15 | 2684 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1817 | 150 | 15 | 2682 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1818 | 150 | 15 | 2664 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 958067B |
| 000260170 | 201018CV | 1819 | 150 | 15 | 2652 | 2250 | 1805 | 201017CV | 00001423 | 00001421 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1820 | 150 | 15 | 2680 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1821 | 150 | 15 | 2658 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1822 | 150 | 15 | 2646 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1823 | 150 | 15 | 2652 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1824 | 150 | 15 | 2642 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1825 | 150 | 15 | 2636 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1826 | 150 | 15 | 2640 | 2250 | 1820 | 201017CV | 00001425 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1827 | 150 | 15 | 2644 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1828 | 150 | 15 | 2656 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1829 | 150 | 15 | 2642 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1830 | 150 | 15 | 2648 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1831 | 150 | 15 | 2656 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1832 | 150 | 15 | 2670 | 2250 | 1820 | 201017CV | 00001428 | 00001425 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1833 | 150 | 15 | 2684 | 2250 | 1820 | 201018CV | 00001551 | 00001550 | 2020593023 | 9569943A |
| 000260170 | 201018CV | 1834 | 150 | 15 | 2690 | 2250 | 1834 | 201018CV | 00001551 | 00001550 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1835 | 150 | 15 | 2684 | 2250 | 1834 | 201018CV | 00001551 | 00001550 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1836 | 150 | 15 | 2688 | 2250 | 1834 | 201018CV | 00001551 | 00001550 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1837 | 150 | 15 | 2674 | 2250 | 1834 | 201018CV | 00001551 | 00001550 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1838 | 150 | 15 | 2674 | 2250 | 1834 | 201018CV | 00001551 | 00001550 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1839 | 150 | 15 | 2660 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020593023 | 956943A |
| 000260170 | 201018CV | 1840 | 150 | 15 | 2676 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1841 | 150 | 15 | 2676 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1842 | 150 | 15 | 2682 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1843 | 150 | 15 | 2654 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1844 | 150 | 15 | 2702 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1845 | 150 | 15 | 2684 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1846 | 150 | 15 | 2684 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1847 | 150 | 15 | 2684 | 2250 | 1834 | 201018CV | 00001553 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1848 | 150 | 15 | 2678 | 2250 | 1834 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1849 | 150 | 15 | 2683 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1850 | 150 | 15 | 2674 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1851 | 150 | 15 | 2658 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1852 | 150 | 15 | 2656 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1853 | 150 | 15 | 2666 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |
| 000260170 | 201018CV | 1854 | 150 | 15 | 2666 | 2250 | 1849 | 201018CV | 00001560 | 00001553 | 2020590130 | 956943A |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201018CV | 1855 | 150 | 15 | 2674 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1856 | 150 | 15 | 2668 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1857 | 150 | 15 | 2668 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1858 | 150 | 15 | 2668 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1859 | 150 | 15 | 2692 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1860 | 150 | 15 | 2680 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1861 | 150 | 15 | 2700 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1862 | 150 | 15 | 2686 | 2250 | 1849 | 2020822246 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1863 | 150 | 15 | 2688 | 2250 | 1849 | 2020816444 | | | 2020590130 | 956943A |
| 000260170 | 201018CV | 1864 | 150 | 15 | 2716 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943A |
| 000260170 | 201018CV | 1865 | 150 | 15 | 2692 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943A |
| 000260170 | 201018CV | 1866 | 150 | 15 | 2682 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943A |
| 000260170 | 201018CV | 1867 | 150 | 15 | 2701 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943A |
| 000260170 | 201018CV | 1868 | 150 | 15 | 2700 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1869 | 150 | 15 | 2706 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1870 | 150 | 15 | 2708 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1871 | 150 | 15 | 2716 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1872 | 150 | 15 | 2718 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1873 | 150 | 15 | 2720 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1874 | 150 | 15 | 2732 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1875 | 150 | 15 | 2702 | 2250 | 1864 | 2020816444 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1876 | 150 | 15 | 2710 | 2250 | 1864 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1877 | 150 | 15 | 2688 | 2250 | 1864 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1878 | 150 | 15 | 2702 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1879 | 150 | 15 | 2736 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1880 | 150 | 15 | 2732 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1881 | 150 | 15 | 2722 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1882 | 150 | 15 | 2730 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1883 | 150 | 15 | 2720 | 2250 | 1878 | 2020822239 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1884 | 150 | 15 | 2714 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1885 | 150 | 15 | 2712 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1886 | 150 | 15 | 2694 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1887 | 150 | 15 | 2694 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1888 | 150 | 15 | 2686 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1889 | 150 | 15 | 2682 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1890 | 150 | 15 | 2686 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1891 | 150 | 15 | 2676 | 2250 | 1878 | 2020822243 | | | 2020618373 | 956943B |
| 000260170 | 201018CV | 1893 | 150 | 15 | 2712 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1894 | 150 | 15 | 2748 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201018CV | 1895 | 150 | 15 | 2734 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1897 | 150 | 15 | 2694 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1898 | 150 | 15 | 2680 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1899 | 150 | 15 | 2690 | 2250 | 1893 | 2020822238 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1900 | 150 | 15 | 2692 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1901 | 150 | 15 | 2686 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1902 | 150 | 15 | 2470 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1904 | 150 | 15 | 2644 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1905 | 150 | 15 | 2668 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1906 | 150 | 15 | 2658 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1907 | 150 | 15 | 2656 | 2250 | 1893 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1908 | 150 | 15 | 2644 | 2250 | 1908 | 2020822241 | | | 2020662100 | 956943B |
| 000260170 | 201018CV | 1909 | 150 | 15 | 2656 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1910 | 150 | 15 | 2664 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1911 | 150 | 15 | 2648 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1912 | 150 | 15 | 2646 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1913 | 150 | 15 | 2650 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1914 | 150 | 15 | 2644 | 2250 | 1908 | 201018CV | 00001552 | 00001550 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1915 | 150 | 15 | 2652 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1916 | 150 | 15 | 2652 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | 2020662100 | 956943B |
| 000260170 | 201018CV | 1917 | 150 | 15 | 2650 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1918 | 150 | 15 | 2652 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1919 | 150 | 15 | 2654 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1920 | 150 | 15 | 2648 | 2250 | 1908 | 201018CV | 00001617 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1921 | 150 | 15 | 2650 | 2250 | 1908 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1922 | 150 | 15 | 2660 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1923 | 150 | 15 | 2654 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1924 | 150 | 15 | 2694 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1925 | 150 | 15 | 2658 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1926 | 150 | 15 | 2664 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1927 | 150 | 15 | 2670 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1928 | 150 | 15 | 2662 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1929 | 150 | 15 | 2664 | 2250 | 1922 | 201018CV | 00001555 | 00001553 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1930 | 150 | 15 | 2666 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1931 | 150 | 15 | 2664 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1932 | 150 | 15 | 2656 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1933 | 150 | 15 | 2634 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1934 | 150 | 15 | 2660 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1935 | 150 | 15 | 2666 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201018CV | 1936 | 150 | 15 | 2666 | 2250 | 1922 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1937 | 150 | 15 | 2664 | 2250 | 1937 | 201018CV | 00001618 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1938 | 150 | 15 | 2662 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1939 | 150 | 15 | 2664 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1940 | 150 | 15 | 2668 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1941 | 150 | 15 | 2674 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA014463-9 | 958069A |
| 000260170 | 201018CV | 1942 | 150 | 15 | 2662 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1943 | 150 | 15 | 2664 | 2250 | 1937 | 201018CV | 00001619 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1944 | 150 | 15 | 2638 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1945 | 150 | 15 | 2644 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1946 | 150 | 15 | 2654 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1947 | 150 | 15 | 2648 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1948 | 150 | 15 | 2652 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1949 | 150 | 15 | 2684 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1950 | 150 | 15 | 2668 | 2250 | 1937 | 201018CV | 00001620 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1951 | 150 | 15 | 2672 | 2250 | 1937 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1952 | 150 | 15 | 2702 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1953 | 150 | 15 | 2664 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1954 | 150 | 15 | 2668 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1955 | 150 | 15 | 2670 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1956 | 150 | 15 | 2646 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1957 | 150 | 15 | 2670 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1958 | 150 | 15 | 2660 | 2250 | 1952 | 201018CV | 00001621 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1959 | 150 | 15 | 2664 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1960 | 150 | 15 | 2650 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1961 | 150 | 15 | 2662 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1962 | 150 | 15 | 2660 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1963 | 150 | 15 | 2662 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1964 | 150 | 15 | 2668 | 2250 | 1952 | 201018CV | 00001622 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1965 | 150 | 15 | 2722 | 2250 | 1952 | 201018CV | 00001624 | 00001617 | WEA013730-14 | 958069A |
| 000260170 | 201018CV | 1966 | 150 | 15 | 2724 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-14 | 958069B |
| 000260170 | 201018CV | 1967 | 150 | 15 | 2668 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-14 | 958069B |
| 000260170 | 201018CV | 1968 | 150 | 15 | 2664 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-13 | 958069B |
| 000260170 | 201018CV | 1969 | 150 | 15 | 2668 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-13 | 958069B |
| 000260170 | 201018CV | 1970 | 150 | 15 | 2664 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-13 | 958069B |
| 000260170 | 201018CV | 1971 | 150 | 15 | 2792 | 2250 | 1966 | 201018CV | 00001624 | 00001617 | WEA013730-13 | 958069B |
| 000260170 | 201018CV | 1972 | 150 | 15 | 2898 | 2250 | 1966 | 201011CV | 00000882 | 00000878 | WEA013730-13 | 958069B |

Total sq ft: **504000**

Total Number of Rolls Certified: **224**

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## GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000260170 have been tested in our production facility lab.

| Product | Lot # Tested | Roll # Tested | Mass Area | Grab Strength | Peel Strength 6496 | Grab 4632 Modified | Peel 4632 Modified |
|---|---|---|---|---|---|---|---|
| | ASTM Test Method: | | D 5993 | D 6768 | D 6496 | D4632* | D4632* |
| | Required Value: | | 0.75 lb /sq ft Min | 30 lbs/in MARV | 3.5 lbs/in Min | 90 lbs | 15lbs |
| CV-BENTOMAT ST | 201018CV | 1745 | 0.94 | 70.6 | 5.5 | 282.5 | 28.6 |
| CV-BENTOMAT ST | 201018CV | 1760 | 0.81 | 70.6 | 5.3 | 282.5 | 27.7 |
| CV-BENTOMAT ST | 201018CV | 1775 | 0.86 | 70.6 | 4.9 | 282.5 | 25.0 |
| CV-BENTOMAT ST | 201018CV | 1790 | 0.87 | 70.6 | 7.1 | 282.5 | 39.6 |
| CV-BENTOMAT ST | 201018CV | 1805 | 0.90 | 70.6 | 8.2 | 282.5 | 39.2 |
| CV-BENTOMAT ST | 201018CV | 1820 | 0.86 | 70.6 | 7.4 | 282.5 | 36.2 |
| CV-BENTOMAT ST | 201018CV | 1834 | 0.85 | 70.7 | 5.7 | 282.8 | 27.0 |
| CV-BENTOMAT ST | 201018CV | 1849 | 0.81 | 70.7 | 5.1 | 282.8 | 24.8 |
| CV-BENTOMAT ST | 201018CV | 1864 | 0.82 | 70.7 | 3.6 | 282.8 | 18.6 |
| CV-BENTOMAT ST | 201018CV | 1878 | 0.82 | 70.7 | 6.6 | 282.8 | 31.2 |
| CV-BENTOMAT ST | 201018CV | 1893 | 0.89 | 70.7 | 5.6 | 282.8 | 27.4 |
| CV-BENTOMAT ST | 201018CV | 1908 | 0.84 | 70.7 | 4.6 | 282.8 | 22.5 |
| CV-BENTOMAT ST | 201018CV | 1922 | 0.84 | 89.8 | 4.7 | 359.0 | 25.8 |
| CV-BENTOMAT ST | 201018CV | 1937 | 0.83 | 89.8 | 7.7 | 359.0 | 39.4 |
| CV-BENTOMAT ST | 201018CV | 1952 | 0.87 | 89.8 | 6.2 | 359.0 | 30.0 |
| CV-BENTOMAT ST | 201018CV | 1966 | 0.83 | 89.8 | 5.0 | 359.0 | 27.0 |

modified ASTM D 4632 using 4 inch grips.

## BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000260170
has been tested by American Colloid Company and yielded the following test results.

| Clay Lot # | Moist | Swell | Fluid Loss |
|---|---|---|---|
| ASTM Test Method: | D 2216 | D 5890 | D 5891 |
| Required Value: | 12% Max | 24 ml/2g Min | 18 ml Max |
| 958069A | 11.60 | 24.00 | 16.00 |
| 958069B | 11.60 | 25.00 | 16.20 |
| 958067A | 11.20 | 25.00 | 16.40 |
| 958067B | 11.20 | 24.00 | 16.80 |
| 956943A | 9.20 | 24.00 | 17.80 |
| 956943B | 9.20 | 24.00 | 10.40 |

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## GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000260170 was manufactured with geotextiles which were tested with the following results.

**BASE GEOTEXTILE**

| Material | Roll Number | Mass Area oz/yd2 | Grab Strength lbs |
|---|---|---|---|
| PPX 82TEX | 2020590115 | 3.4 | 178.1 |
| PPX 82TEX | 2020590130 | 3.5 | 150.9 |
| PPX 82TEX | 2020590583 | 3.5 | 161.3 |
| PPX 82TEX | 2020593023 | 3.4 | 153.9 |
| PPX 82TEX | 2020618373 | 3.5 | 170.0 |
| PPX 82TEX | 2020662100 | 3.5 | 168.1 |
| PPX 82TEX | 2020724376 | 3.3 | 163.6 |
| MTX 1213 | WEA013730-13 | 3.5 | 185.6 |
| MTX 1213 | WEA013730-14 | 3.5 | 185.6 |
| MTX 1213 | WEA014463-9 | 3.5 | 197.5 |

**COVER GEOTEXTILE**

| Material | Roll Number | Mass Area oz/yd2 | Grab Strength lbs |
|---|---|---|---|
| PPX 650 | 2020816444 | 6.4 | 142.4 |
| PPX 650 | 2020822238 | 6.9 | 144.9 |
| PPX 650 | 2020822239 | 6.9 | 144.9 |
| PPX 650 | 2020822241 | 7.4 | 156.7 |
| PPX 650 | 2020822243 | 7.4 | 156.7 |
| PPX 650 | 2020822246 | 7.5 | 155.6 |
| CV-NON-WOVEN | 00000878 | 6.8 | 34.5 |
| CV-NON-WOVEN | 00001421 | 6.8 | 32.7 |
| CV-NON-WOVEN | 00001425 | 6.8 | 29.5 |
| CV-NON-WOVEN | 00001439 | 6.4 | 26.7 |
| CV-NON-WOVEN | 00001550 | 6.7 | 38.3 |
| CV-NON-WOVEN | 00001553 | 6.8 | 34.0 |
| CV-NON-WOVEN | 00001578 | 6.5 | 32.4 |
| CV-NON-WOVEN | 00001586 | 6.9 | 37.0 |
| CV-NON-WOVEN | 00001617 | 7.5 | 33.9 |

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

**CETCO** 218 Industrial Park Dr Cartersville, GA 30121 **Computation Sheet: GRI Accredited ASTM D-5887, Index Flux**

**Sample:** ST
**Lot #:** 201018CV
**Roll#:** 1694
**Project # :** CETCO QC

**Permeability equation :** ((0.879*Thickness)/(2*Pi*r^2*Time))*ln(Change in Head)

**Flux equation :** ((Inflow+Outflow)/200)/Pi*r^2/Time

**Initial Thickness:** 0.81 cm. **Hydration :** 48 hrs **Permeant :** De-aired Water

**Test Position:** 1 **Initial Head :** 2 psi 140.6 cm. **Analyst :** MM **Date:** 5/5/10

**Cell Size:** 4 in. **Max. Effective Stress:** 5 psi 34.5 kPa **Requested by :** **Date Started:** 4/26/10

**Final Thickness:** 0.89 cm. *** indicates value meets Flux Ratio ASTM termination criteria**

**Conversions :** 1 psi = 2.307 feet of head 1 foot of head = 30.48 cm 1 psi = 70.32 cm Flux (English) = Flux * 9.2366E+10

| Date | Time (min) | Reading In | X | Reading Out | Y | X-Y | Head (cm) | H (cm) | Initial K (cm/sec) | Initial Flux ($m^3/m^2/sec$) | | Avg Flux ($m^3/m^2/sec$) | Final K (cm/sec) | Final Flux (Gal/Acre /Day) | Inflow to Outflow Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/4/10 | 0 | 1.0 | 23.0 | 24.0 | 0.0 | 23.0 | 140.63 | 163.63 | | | | | | | |
| | 129 | 1.7 | 22.3 | 23.5 | 0.5 | 21.8 | 140.63 | 162.43 | 4.18E-09 | 9.56E-09 | | | 4.59E-9 | | 1.40 |
| | 422 | 2.5 | 21.5 | 23.0 | 1.0 | 20.5 | 140.63 | 161.13 | 2.01E-09 | 4.56E-09 | | | 2.21E-9 | | 1.60 |
| 5/5/10 | 1338 | 4.6 | 19.4 | 21.3 | 2.7 | 16.7 | 140.63 | 157.33 | 1.91E-09 | 4.26E-09 | * | | 2.10E-9 | | 1.24 |
| | 1692 | 5.5 | 18.5 | 20.5 | 3.5 | 15.0 | 140.63 | 155.63 | 2.25E-09 | 4.94E-09 | * | | 2.47E-9 | | 1.13 |
| | 1919 | 6.0 | 18.0 | 20.0 | 4.0 | 14.0 | 140.63 | 154.63 | 2.08E-09 | 4.53E-09 | * | **4.58E-09** | 2.28E-9 | 423 | 1.00 |

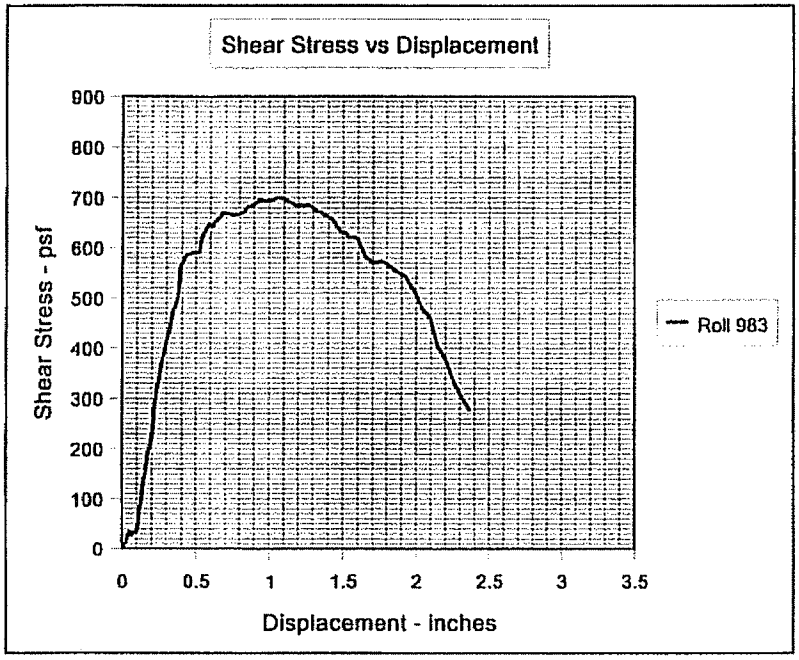
**Final Flux 4.6E-9 $m^3/m^2/sec$ #**

**Final Hydraulic Conductivity 2.3E-9 cm/s**

# INTERNAL SHEAR TEST RESULTS

ASTM D-6243

| | | | |
|---|---|---|---|
| Client: | CETCO | Date: | 03/26/10 |
| Project: | | Project No.: | 10LG2101.01 |
| Material Description: | GCL - Non-woven - Light<br>vs<br>GCL - Woven - Dark | Perf'd By: | MLB |
| | | Chk'd By: | JB |



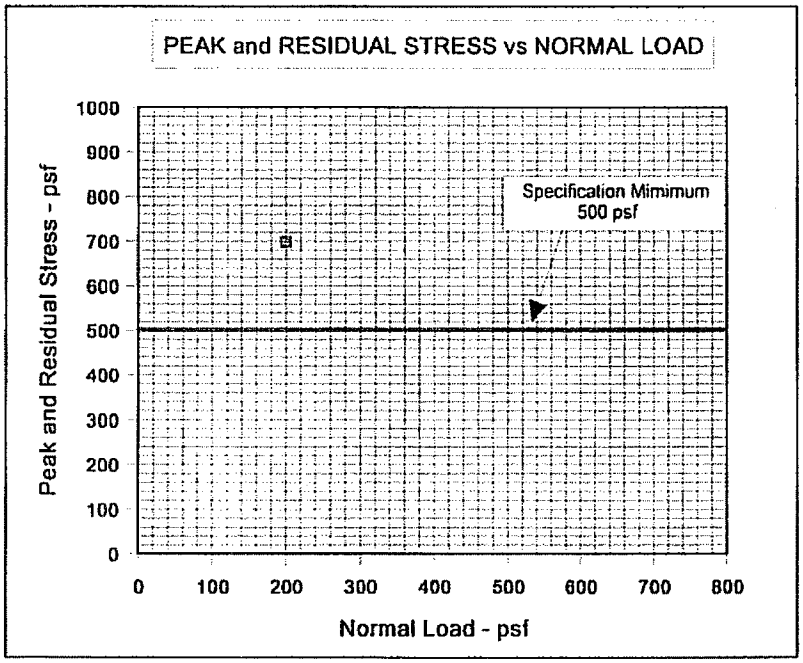

Top Box : GCL - Bentomat ST
MD : Virgin Material
Light Non-woven Side

Bottom Box : GCL - Bentomat ST
MD : Virgin Material
Dark Woven Side

Roll No. : 983 Lot No 1012CV

**CURVE DATA**

| | Normal Load psf | Peak Strength psf | Spec Pk minimum psf |
|---|---|---|---|
| Roll 983 | 200 | 699 | 500 |




Displacement Rate: 0.04 in/min
Inundation: Yes 48 hours

Comments:
1. GCLs hydrated under a 200 psf normal load for 48 hours

*JLT Laboratories, Inc.*

FIGURE - GCL Internal

**2010 WEEKLY QA DATA**
**BENTOMAT ST**
**Production Facility: Cartersville, GA**

| Week | Lot/Roll # | Permeability (cm/sec) | Flux ($m^3/m^2/sec$) | | Week | Lot/Roll # | Permeability (cm/sec) | Flux ($m^3/m^2/sec$) |
|---|---|---|---|---|---|---|---|---|
| 1 | 201003CV/00002 | $7.1 \times 10^{-9}$ | $3.1 \times 10^{-9}$ | | 28 | | | |
| 2 | None produced | | | | 29 | | | |
| 3 | None produced | | | | 30 | | | |
| 4 | None produced | | | | 31 | | | |
| 5 | 201005CV/00052 | $2.0 \times 10^{-9}$ | $4.2 \times 10^{-9}$ | | 32 | | | |
| 6 | 201006CV/00182 | $2.9 \times 10^{-9}$ | $6.0 \times 10^{-9}$ | | 33 | | | |
| 7 | 201007CV/00251 | $2.1 \times 10^{-9}$ | $5.2 \times 10^{-9}$ | | 34 | | | |
| 8 | 201008CV/00255 | $1.6 \times 10^{-9}$ | $3.7 \times 10^{-9}$ | | 35 | | | |
| 9 | 201009CV/00257 | $1.6 \times 10^{-9}$ | $3.7 \times 10^{-9}$ | | 36 | | | |
| 10 | 201010CV/00488 | $1.7 \times 10^{-9}$ | $4.0 \times 10^{-9}$ | | 37 | | | |
| 11 | 201011CV/00688 | $1.7 \times 10^{-9}$ | $3.5 \times 10^{-9}$ | | 38 | | | |
| 12 | 201012CV/00983 | $2.6 \times 10^{-9}$ | $6.0 \times 10^{-9}$ | | 39 | | | |
| 13 | 201013CV/01083 | $2.9 \times 10^{-9}$ | $6.1 \times 10^{-9}$ | | 40 | | | |
| 14 | 201014CV/01154 | $1.7 \times 10^{-9}$ | $3.7 \times 10^{-9}$ | | 41 | | | |
| 15 | 201015CV/01323 | $1.1 \times 10^{-9}$ | $2.3 \times 10^{-9}$ | | 42 | | | |
| 16 | None produced | | | | 43 | | | |
| 17 | None produced | | | | 44 | | | |
| 18 | 201018CV/01694 | $2.3 \times 10^{-9}$ | $4.6 \times 10^{-9}$ | | 45 | | | |
| 19 | 201019CV/02023 | $1.3 \times 10^{-9}$ | $2.9 \times 10^{-9}$ | | 46 | | | |
| 20 | 201020CV/02074 | $1.4 \times 10^{-9}$ | $3.4 \times 10^{-9}$ | | 47 | | | |
| 21 | 201021CV/02373 | $1.0 \times 10^{-9}$ | $2.1 \times 10^{-9}$ | | 48 | | | |
| 22 | 201022CV/03283 | $1.4 \times 10^{-9}$ | $3 \times 10^{-9}$ | | 49 | | | |
| 23 | | | | | 50 | | | |
| 24 | | | | | 51 | | | |
| 25 | | | | | 52 | | | |
| 26 | | | | | 53 | | | |
| 27 | | | | | | | | |

All testing is performed according to ASTM D5887 using 5psi confining pressure and 2psi head pressure.

CETCO®

GAI-LAP accredited

Date: 6/14/2010
Purchase Order: 13180
ORDER NUMBER: 000260170

Gregg Abney
ESI
7943 Pecue Lane
Baton Rouge, LA 70809
gabney@esiliners.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to ESI.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

**GEOSYNTHETIC CLAY LINER**
**MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME: Duke Energy-Marshall Steam Plant
CUSTOMER P.O.: 13180
ORDER NUMBER: 000260170
PREPARED FOR: ESI

**CONTENTS:**

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

CETCO

## PRODUCT CERTIFICATIONS

PROJECT NAME: Duke Energy-Marshall Steam Plant
CUSTOMER P.O.: 13180
ORDER NUMBERS: 000260170
PREPARED FOR: ESI

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

### GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

| Test Method | Test Method Property | Test Frequency | Certified Value |
|---|---|---|---|
| ASTM D 5891 | Bentonite Fluid Loss | 1 per 50 Tons | 18 ml Max |
| ASTM D 5993 | Bentonite Mass/Area | 40,000 sq ft (4000 sq m) | 0.75 lb /sq ft Min |
| ASTM D 5890 | Bentonite Swell Index | 1 per 50 Tons | 24 ml/2g Min |
| ASTM D 6768 | GCL Grab Strength | 200,000 sq ft (20,000 sq m) | 30 lbs/in MARV |
| ASTM D 6243 | GCL Hydrated Internal Shear Strength | Periodic | 500 psf typ @ 200 psf normal load |
| ASTM D 5887 | GCL Hydraulic Conductivity | Weekly | 5.0E-9 cm/s Max |
| ASTM D 5887 | GCL Index Flux | Weekly | 1.0E-8 m3/m2/s Max |
| ASTM D 6496 | GCL Peel Strength | 40,000 sq ft (4000 sq m) | 3.5 lbs/in Min |

### SPECIALLY REQUESTED CERTIFIED PROPERTIES FOR THIS ORDER OF BENTOMAT ST

| Test Method | Test Method Property | Requested Frequency | Requested Value | Requested Conditions |
|---|---|---|---|---|
| ASTM D4632* | Grab Strength*modified with 4-inch grips | 1/200,000sf | 90 lbs | Standard |
| ASTM D4632* | Peel Strength*modified with 4-inch grips | 1/40,000sf | 15lbs | Standard |

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility. All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

## NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GETCO

## GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 000260170

| | GCL | | | | | | | | Geotextiles | | | Clay |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CV-BENTOMAT ST | | | | | | | | N/W-WHITE | | WOVEN | CV-CG 50 |
| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
| 000260170 | 201024CV | 4071 | 150 | 15 | 2906 | 2250 | 4071 | 201023CV | 00002223 | 00002219 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4072 | 150 | 15 | 2830 | 2250 | 4071 | 201023CV | 00002223 | 00002219 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4073 | 150 | 15 | 2808 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4074 | 150 | 15 | 2720 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4075 | 150 | 15 | 2700 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4076 | 150 | 15 | 2730 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4077 | 150 | 15 | 2722 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4078 | 150 | 15 | 2732 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4079 | 150 | 15 | 2726 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4080 | 150 | 15 | 2736 | 2250 | 4071 | 201024CV | 00002321 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4081 | 150 | 15 | 2732 | 2250 | 4071 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4082 | 150 | 15 | 2732 | 2250 | 4071 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4083 | 150 | 15 | 2730 | 2250 | 4071 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4084 | 150 | 15 | 2740 | 2250 | 4071 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4085 | 150 | 15 | 2732 | 2250 | 4071 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4086 | 150 | 15 | 2760 | 2250 | 4086 | 201024CV | 00002322 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4087 | 150 | 15 | 2732 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963167B |
| 000260170 | 201024CV | 4088 | 150 | 15 | 2738 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4089 | 150 | 15 | 2736 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4090 | 150 | 15 | 2752 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4091 | 150 | 15 | 2744 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4092 | 150 | 15 | 2740 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4093 | 150 | 15 | 2758 | 2250 | 4086 | 201024CV | 00002323 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4094 | 150 | 15 | 2742 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4095 | 150 | 15 | 2752 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015039-12 | 963169A |
| 000260170 | 201024CV | 4096 | 150 | 15 | 2748 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4097 | 150 | 15 | 2766 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4098 | 150 | 15 | 2764 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4099 | 150 | 15 | 2768 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4100 | 150 | 15 | 2766 | 2250 | 4086 | 201024CV | 00002324 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4101 | 150 | 15 | 2802 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201024CV | 4102 | 150 | 15 | 2766 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4103 | 150 | 15 | 2760 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4104 | 150 | 15 | 2766 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4105 | 150 | 15 | 2760 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4106 | 150 | 15 | 2752 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4107 | 150 | 15 | 2742 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4108 | 150 | 15 | 2738 | 2250 | 4101 | 201024CV | 00002325 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4109 | 150 | 15 | 2732 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4110 | 150 | 15 | 2730 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4111 | 150 | 15 | 2740 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4112 | 150 | 15 | 2736 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4113 | 150 | 15 | 2750 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4114 | 150 | 15 | 2744 | 2250 | 4101 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4115 | 150 | 15 | 2772 | 2250 | 4115 | 201024CV | 00002326 | 00002320 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4117 | 150 | 15 | 2760 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4118 | 150 | 15 | 2768 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4119 | 150 | 15 | 2748 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4120 | 150 | 15 | 2760 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4121 | 150 | 15 | 2736 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-9 | 963169A |
| 000260170 | 201024CV | 4122 | 150 | 15 | 2752 | 2250 | 4115 | 201023CV | 00002262 | 00002258 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4123 | 150 | 15 | 2754 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4124 | 150 | 15 | 2736 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4125 | 150 | 15 | 2738 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4127 | 150 | 15 | 2746 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4128 | 150 | 15 | 2776 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4129 | 150 | 15 | 2782 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4130 | 150 | 15 | 2786 | 2250 | 4115 | 201024CV | 00002340 | 00002338 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4131 | 150 | 15 | 2796 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4132 | 150 | 15 | 2746 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4133 | 150 | 15 | 2762 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4134 | 150 | 15 | 2752 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4135 | 150 | 15 | 2762 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4136 | 150 | 15 | 2756 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4137 | 150 | 15 | 2754 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169A |
| 000260170 | 201024CV | 4138 | 150 | 15 | 2730 | 2250 | 4131 | 201024CV | 00002347 | 00002347 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4139 | 150 | 15 | 2726 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4140 | 150 | 15 | 2736 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4141 | 150 | 15 | 2712 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4143 | 150 | 15 | 2720 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201024CV | 4144 | 150 | 15 | 2710 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4145 | 150 | 15 | 2700 | 2250 | 4131 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4146 | 150 | 15 | 2750 | 2250 | 4146 | 201024CV | 00002335 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4147 | 150 | 15 | 2730 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4148 | 150 | 15 | 2720 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-10 | 963169B |
| 000260170 | 201024CV | 4149 | 150 | 15 | 2732 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4150 | 150 | 15 | 2736 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4151 | 150 | 15 | 2728 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4152 | 150 | 15 | 2738 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4153 | 150 | 15 | 2730 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4154 | 150 | 15 | 2744 | 2250 | 4146 | 201024CV | 00002334 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4155 | 150 | 15 | 2732 | 2250 | 4146 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4156 | 150 | 15 | 2734 | 2250 | 4146 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4157 | 150 | 15 | 2726 | 2250 | 4146 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4158 | 150 | 15 | 2734 | 2250 | 4146 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4159 | 150 | 15 | 2726 | 2250 | 4146 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4160 | 150 | 15 | 2798 | 2250 | 4160 | 201024CV | 00002333 | 00002328 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4161 | 150 | 15 | 2730 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4162 | 150 | 15 | 2728 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4163 | 150 | 15 | 2706 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4164 | 150 | 15 | 2712 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4165 | 150 | 15 | 2708 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4166 | 150 | 15 | 2704 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4167 | 150 | 15 | 2690 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4168 | 150 | 15 | 2696 | 2250 | 4160 | 201024CV | 00002351 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4169 | 150 | 15 | 2698 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4170 | 150 | 15 | 2690 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4171 | 150 | 15 | 2696 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4172 | 150 | 15 | 2700 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4173 | 150 | 15 | 2696 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4174 | 150 | 15 | 2695 | 2250 | 4160 | 201024CV | 00002352 | 00002347 | WEA015073-8 | 963169B |
| 000260170 | 201024CV | 4175 | 150 | 15 | 2712 | 2250 | 4175 | 201024CV | 00002352 | 00002347 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4177 | 150 | 15 | 2694 | 2250 | 4175 | 201024CV | 00002327 | 00002320 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4178 | 150 | 15 | 2704 | 2250 | 4175 | 201024CV | 00002327 | 00002320 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4179 | 150 | 15 | 2714 | 2250 | 4175 | 201024CV | 00002327 | 00002320 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4180 | 150 | 15 | 2690 | 2250 | 4175 | 201024CV | 00002327 | 00002320 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4182 | 150 | 15 | 2698 | 2250 | 4175 | 201024CV | 00002327 | 00002320 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4183 | 150 | 15 | 2706 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4184 | 150 | 15 | 2718 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963169B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201024CV | 4185 | 150 | 15 | 2708 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4186 | 150 | 15 | 2720 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4187 | 150 | 15 | 2714 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963169B |
| 000260170 | 201024CV | 4188 | 150 | 15 | 2716 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4189 | 150 | 15 | 2738 | 2250 | 4175 | 201024CV | 00002353 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4190 | 150 | 15 | 2724 | 2250 | 4175 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4191 | 150 | 15 | 2720 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4192 | 150 | 15 | 2710 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4193 | 150 | 15 | 2716 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4194 | 150 | 15 | 2724 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4195 | 150 | 15 | 2732 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4196 | 150 | 15 | 2726 | 2250 | 4191 | 201024CV | 00002354 | 00002347 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4197 | 150 | 15 | 2724 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4198 | 150 | 15 | 2732 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4199 | 150 | 15 | 2730 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4200 | 150 | 15 | 2710 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA014114-6 | 963171A |
| 000260170 | 201024CV | 4201 | 150 | 15 | 2712 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4202 | 150 | 15 | 2738 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4203 | 150 | 15 | 2730 | 2250 | 4191 | 201024CV | 00002328 | 00002328 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4204 | 150 | 15 | 2734 | 2250 | 4191 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4205 | 150 | 15 | 2732 | 2250 | 4205 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4206 | 150 | 15 | 2730 | 2250 | 4205 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4207 | 150 | 15 | 2730 | 2250 | 4205 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4208 | 150 | 15 | 2732 | 2250 | 4205 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4210 | 150 | 15 | 2748 | 2250 | 4205 | 201024CV | 00002355 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4211 | 150 | 15 | 2766 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4212 | 150 | 15 | 2744 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4213 | 150 | 15 | 2749 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4214 | 150 | 15 | 2752 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4215 | 150 | 15 | 2762 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4216 | 150 | 15 | 2754 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4217 | 150 | 15 | 2754 | 2250 | 4205 | 201024CV | 00002356 | 00002347 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4218 | 150 | 15 | 2748 | 2250 | 4205 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4219 | 150 | 15 | 2742 | 2250 | 4205 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4220 | 150 | 15 | 2756 | 2250 | 4220 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4221 | 150 | 15 | 2748 | 2250 | 4220 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4222 | 150 | 15 | 2766 | 2250 | 4220 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4223 | 150 | 15 | 2760 | 2250 | 4220 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4224 | 150 | 15 | 2758 | 2250 | 4220 | 201024CV | 00002357 | 00002357 | WEA015039-6 | 963171A |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201024CV | 4225 | 150 | 15 | 2756 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4226 | 150 | 15 | 2758 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4227 | 150 | 15 | 2746 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA015039-6 | 963171A |
| 000260170 | 201024CV | 4228 | 150 | 15 | 2774 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4229 | 150 | 15 | 2780 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4230 | 150 | 15 | 2768 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4231 | 150 | 15 | 2764 | 2250 | 4220 | 201023CV | 00002219 | 00002219 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4232 | 150 | 15 | 2764 | 2250 | 4220 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4233 | 150 | 15 | 2786 | 2250 | 4220 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4234 | 150 | 15 | 2768 | 2250 | 4220 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4235 | 150 | 15 | 2810 | 2250 | 4235 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4236 | 150 | 15 | 2790 | 2250 | 4235 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171A |
| 000260170 | 201024CV | 4237 | 150 | 15 | 2786 | 2250 | 4235 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4238 | 150 | 15 | 2788 | 2250 | 4235 | 201024CV | 00002358 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4239 | 150 | 15 | 2776 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4240 | 150 | 15 | 2766 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4241 | 150 | 15 | 2778 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4242 | 150 | 15 | 2776 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4243 | 150 | 15 | 2756 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4244 | 150 | 15 | 2772 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4245 | 150 | 15 | 2758 | 2250 | 4235 | 201024CV | 00002359 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4246 | 150 | 15 | 2748 | 2250 | 4235 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4247 | 150 | 15 | 2752 | 2250 | 4235 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4248 | 150 | 15 | 2738 | 2250 | 4235 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4249 | 150 | 15 | 2770 | 2250 | 4249 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4250 | 150 | 15 | 2744 | 2250 | 4249 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4251 | 150 | 15 | 2742 | 2250 | 4249 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4252 | 150 | 15 | 2754 | 2250 | 4249 | 201024CV | 00002360 | 00002357 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4253 | 150 | 15 | 2744 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA014113-17 | 963171B |
| 000260170 | 201024CV | 4254 | 150 | 15 | 2740 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4255 | 150 | 15 | 2750 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4256 | 150 | 15 | 2740 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4257 | 150 | 15 | 2736 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4258 | 150 | 15 | 2688 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4259 | 150 | 15 | 2680 | 2250 | 4249 | 201023CV | 00002266 | 00002258 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4260 | 150 | 15 | 2768 | 2250 | 4249 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4261 | 150 | 15 | 2744 | 2250 | 4249 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4262 | 150 | 15 | 2734 | 2250 | 4249 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4263 | 150 | 15 | 2736 | 2250 | 4249 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |

| Order | GCL Lot # | GCL Roll # | Length | Width | weight | sq ft | Roll # Tested | Cap Lot # | Cap Roll # | Roll # Tested | Base Roll # | Clay Lot # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 000260170 | 201024CV | 4264 | 150 | 15 | 2750 | 2250 | 4264 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4265 | 150 | 15 | 2740 | 2250 | 4264 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4266 | 150 | 15 | 2740 | 2250 | 4264 | 201024CV | 00002362 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4267 | 150 | 15 | 2744 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4268 | 150 | 15 | 2746 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4269 | 150 | 15 | 2744 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4270 | 150 | 15 | 2746 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4271 | 150 | 15 | 2734 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4272 | 150 | 15 | 2740 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4273 | 150 | 15 | 2730 | 2250 | 4264 | 201024CV | 00002361 | 00002357 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4274 | 150 | 15 | 2736 | 2250 | 4264 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4275 | 150 | 15 | 2744 | 2250 | 4264 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4276 | 150 | 15 | 2738 | 2250 | 4264 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4277 | 150 | 15 | 2698 | 2250 | 4264 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4278 | 150 | 15 | 2696 | 2250 | 4264 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4279 | 150 | 15 | 2740 | 2250 | 4279 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4280 | 150 | 15 | 2690 | 2250 | 4279 | 201024CV | 00002386 | 00002386 | WEA015039-8 | 963171B |
| 000260170 | 201024CV | 4281 | 150 | 15 | 2696 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963171B |
| 000260170 | 201024CV | 4282 | 150 | 15 | 2710 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963171B |
| 000260170 | 201024CV | 4283 | 150 | 15 | 2698 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963171B |
| 000260170 | 201024CV | 4284 | 150 | 15 | 2696 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963171B |
| 000260170 | 201024CV | 4285 | 150 | 15 | 2702 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963171B |
| 000260170 | 201024CV | 4286 | 150 | 15 | 2694 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4287 | 150 | 15 | 2692 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4288 | 150 | 15 | 2690 | 2250 | 4279 | 201024CV | 00002380 | 00002377 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4289 | 150 | 15 | 2688 | 2250 | 4279 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4290 | 150 | 15 | 2694 | 2250 | 4279 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4291 | 150 | 15 | 2700 | 2250 | 4279 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4292 | 150 | 15 | 2682 | 2250 | 4279 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4293 | 150 | 15 | 2692 | 2250 | 4293 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4294 | 150 | 15 | 2696 | 2250 | 4293 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4295 | 150 | 15 | 2688 | 2250 | 4293 | 201024CV | 00002369 | 00002367 | WEA015039-11 | 963174A |
| 000260170 | 201024CV | 4296 | 150 | 15 | 2694 | 2250 | 4293 | 201024CV | 00002365 | 00002357 | WEA015039-11 | 963174A |

Total sq ft: **495000**

Total Number of Rolls Certified: **220**

## GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000260170 have been tested in our production facility lab.

| Product | Lot # Tested | Roll # Tested | Mass Area | Grab Strength | Peel Strength 6496 | Grab 4632 Modified | Grab 4632 Modified |
|---|---|---|---|---|---|---|---|
| | ASTM Test Method: | | D 5993 | D 6768 | D 6496 | D4632* | D4632* |
| | Required Value: | | 0.75 lb /sq ft Min | 30 lbs/in MARV | 3.5 lbs/in Min | 90 lbs | 90lbs |
| CV-BENTOMAT ST | 201024CV | 4071 | 0.80 | 65.9 | 6.5 | 263.5 | 32.1 |
| CV-BENTOMAT ST | 201024CV | 4086 | 0.88 | 65.9 | 6.2 | 263.5 | 32.2 |
| CV-BENTOMAT ST | 201024CV | 4101 | 0.84 | 65.9 | 6.3 | 263.5 | 31.2 |
| CV-BENTOMAT ST | 201024CV | 4115 | 0.83 | 65.9 | 4.3 | 263.5 | 23.2 |
| CV-BENTOMAT ST | 201024CV | 4131 | 0.82 | 65.9 | 4.5 | 263.5 | 23.2 |
| CV-BENTOMAT ST | 201024CV | 4146 | 0.83 | 65.9 | 5.9 | 263.5 | 31.3 |
| CV-BENTOMAT ST | 201024CV | 4160 | 0.84 | 37.3 | 8.9 | 149.1 | 47.7 |
| CV-BENTOMAT ST | 201024CV | 4175 | 0.83 | 37.3 | 8.9 | 149.1 | 42.1 |
| CV-BENTOMAT ST | 201024CV | 4191 | 0.82 | 37.3 | 9.1 | 149.1 | 44.8 |
| CV-BENTOMAT ST | 201024CV | 4205 | 0.88 | 37.3 | 8.6 | 149.1 | 41.9 |
| CV-BENTOMAT ST | 201024CV | 4220 | 0.88 | 37.3 | 7.8 | 149.1 | 36.1 |
| CV-BENTOMAT ST | 201024CV | 4235 | 0.88 | 37.3 | 6.5 | 149.1 | 30.8 |
| CV-BENTOMAT ST | 201024CV | 4249 | 0.88 | 89.2 | 5.8 | 356.8 | 28.8 |
| CV-BENTOMAT ST | 201024CV | 4264 | 0.89 | 89.2 | 5.1 | 356.8 | 25.7 |
| CV-BENTOMAT ST | 201024CV | 4279 | 0.86 | 89.2 | 4.6 | 356.8 | 21.4 |
| CV-BENTOMAT ST | 201024CV | 4293 | 0.89 | 89.2 | 5.3 | 356.8 | 27.2 |

modified ASTM D 4632 using 4 inch grips.

## BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000260170
has been tested by American Colloid Company and yielded the following test results.

| Clay Lot # | Moist | Swell | Fluid Loss |
|---|---|---|---|
| ASTM Test Method: | D 2216 | D 5890 | D 5891 |
| Required Value: | 12% Max | 24 ml/2g Min | 18 ml Max |
| 963171A | 10.00 | 27.00 | 15.40 |
| 963171B | 10.00 | 25.00 | 15.40 |
| 963169A | 10.40 | 26.00 | 14.80 |
| 963169B | 11.20 | 25.00 | 14.00 |
| 963167B | 10.00 | 24.00 | 13.80 |
| 963174A | 10.80 | 25.00 | 14.60 |

CETCO

## GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000260170 was manufactured with geotextiles which were tested with the following results.

| BASE GEOTEXTILE | | | | COVER GEOTEXTILE | | | |
|---|---|---|---|---|---|---|---|
| Material | Roll Number | Mass Area oz/yd2 | Grab Strength lbs | Material | Roll Number | Mass Area oz/yd2 | Grab Strength lbs |
| MATTEX | WEA014113-17 | 3.5 | 191.4 | CV-NON-WOVEN | 00002219 | 6.7 | 47.3 |
| MATTEX | WEA014114-6 | 3.5 | 192.1 | CV-NON-WOVEN | 00002258 | 6.5 | 41.9 |
| MATTEX | WEA015039-11 | 3.5 | 189.4 | CV-NON-WOVEN | 00002320 | 7.0 | 57.5 |
| MATTEX | WEA015039-12 | 3.5 | 189.4 | CV-NON-WOVEN | 00002328 | 6.8 | 51.5 |
| MATTEX | WEA015039-6 | 3.5 | 193.8 | CV-NON-WOVEN | 00002338 | 6.8 | 49.8 |
| MATTEX | WEA015039-8 | 3.5 | 191.1 | CV-NON-WOVEN | 00002347 | 6.5 | 41.8 |
| MATTEX | WEA015073-10 | 3.5 | 194.3 | CV-NON-WOVEN | 00002357 | 6.6 | 44.6 |
| MATTEX | WEA015073-8 | 3.4 | 196.9 | CV-NON-WOVEN | 00002367 | 6.7 | 40.0 |
| MATTEX | WEA015073-9 | 3.4 | 196.9 | CV-NON-WOVEN | 00002377 | 6.5 | 44.3 |
| | | | | CV-NON-WOVEN | 00002386 | 6.7 | 46.7 |

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

# GCL Conformance Test Results

GRIME

# CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-01
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1745

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 72.5 | 58.4 | 1.44 | 1.16 | 0.070 | 1.37 | 1.09 | 26 | 1.22 |
| | 2 | 59.3 | 47.5 | 1.17 | 0.94 | 0.070 | 1.10 | 0.87 | 27 | 0.98 |
| | 3 | 69.1 | 55.4 | 1.37 | 1.10 | 0.070 | 1.30 | 1.03 | 26 | 1.15 |
| | 4 | 61.2 | 48.7 | 1.21 | 0.97 | 0.070 | 1.14 | 0.90 | 28 | 1.00 |
| | 5 | 62.3 | 49.9 | 1.24 | 0.99 | 0.070 | 1.17 | 0.92 | 27 | 1.03 |
| | | | | | | | AVERAGE: | 0.96 ✓ | 27 | 1.08 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 70.2 | 77.0 | 73.6 | 74.7 | 74.1 | 73.9 ✓ | 2.46 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 7.9 | 3.7 | 6.1 | 5.6 | 6.9 | 6.1 ✓ | 1.55 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 5-25-10

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5/25/2010

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-02
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1790

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 54.7 | 42.9 | 1.08 | 0.85 | 0.070 | 1.01 | 0.78 | 30 | 0.87 |
| | 2 | 58.8 | 46.6 | 1.17 | 0.92 | 0.070 | 1.10 | 0.85 | 28 | 0.96 |
| | 3 | 59.4 | 46.8 | 1.18 | 0.93 | 0.070 | 1.11 | 0.86 | 29 | 0.96 |
| | 4 | 61.4 | 48.6 | 1.22 | 0.96 | 0.070 | 1.15 | 0.89 | 29 | 1.00 |
| | 5 | 48.9 | 38.5 | 0.97 | 0.76 | 0.070 | 0.90 | 0.69 | 30 | 0.78 |
| | | | | | | | AVERAGE: | 0.82 | 29 | 0.91 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 25.5 | 27.4 | 30.1 | 30.0 | 32.2 | 29.0 | 2.61 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 4.5 | 5.9 | 7.3 | 7.7 | 6.6 | 6.4 | 1.26 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 5-25-10

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-03
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1834

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 56.6 | 45.5 | 1.12 | 0.90 | 0.070 | 1.05 | 0.83 | 27 | 0.93 |
| | 2 | 62.5 | 50.0 | 1.24 | 0.99 | 0.070 | 1.17 | 0.92 | 27 | 1.03 |
| | 3 | 58.0 | 46.5 | 1.15 | 0.92 | 0.070 | 1.08 | 0.85 | 27 | 0.95 |
| | 4 | 62.9 | 50.8 | 1.25 | 1.01 | 0.070 | 1.18 | 0.94 | 26 | 1.05 |
| | 5 | 58.7 | 47.5 | 1.16 | 0.94 | 0.070 | 1.09 | 0.87 | 26 | 0.98 |
| | | | | | | | AVERAGE: | 0.88 | 26 | 0.99 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 80.1 | 69.1 | 71.1 | 72.8 | 81.7 | 74.9 | 5.59 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 8.0 | 7.3 | 7.6 | 6.6 | 9.0 | 7.7 | 0.88 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 5-25-10

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-04
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1878

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 69.2 | 55.3 | 1.37 | 1.10 | 0.070 | 1.30 | 1.03 | 27 | 1.15 |
| | 2 | 63.7 | 50.4 | 1.26 | 1.00 | 0.070 | 1.19 | 0.93 | 28 | 1.04 |
| | 3 | 66.0 | 51.6 | 1.31 | 1.02 | 0.070 | 1.24 | 0.95 | 30 | 1.07 |
| | 4 | 61.1 | 48.8 | 1.21 | 0.97 | 0.070 | 1.14 | 0.90 | 27 | 1.00 |
| | 5 | 61.0 | 48.4 | 1.21 | 0.96 | 0.070 | 1.14 | 0.89 | 28 | 1.00 |
| | | | | | | | AVERAGE: | 0.94 | 28 | 1.05 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 92.9 | 97.6 | 85.0 | 97.2 | 96.2 | 93.8 | 5.21 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 7.0 | 6.5 | 7.9 | 6.7 | 6.5 | 6.9 | 0.61 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 5-25-10

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INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-05
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1922

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 55.7 | 44.1 | 1.10 | 0.87 | 0.070 | 1.03 | 0.80 | 29 | 0.90 |
| | 2 | 63.5 | 49.9 | 1.26 | 0.99 | 0.070 | 1.19 | 0.92 | 29 | 1.03 |
| | 3 | 59.9 | 47.5 | 1.19 | 0.94 | 0.070 | 1.12 | 0.87 | 28 | 0.98 |
| | 4 | 60.8 | 48.2 | 1.21 | 0.95 | 0.070 | 1.14 | 0.88 | 28 | 0.99 |
| | 5 | 53.0 | 42.2 | 1.05 | 0.84 | 0.070 | 0.98 | 0.77 | 28 | 0.86 |
| | | | | | | | AVERAGE: | 0.85 | 29 | 0.95 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 99.5 | 100.8 | 100.6 | 102.2 | 95.5 | 99.7 | 2.55 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 7.0 | 5.7 | 7.3 | 7.7 | 7.4 | 7.0 | 0.80 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-11
LAB ID NO.: L10017-11-06
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 1966

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 58.4 | 45.9 | 1.16 | 0.91 | 0.070 | 1.09 | 0.84 | 29 | 0.94 |
| | 2 | 50.9 | 40.9 | 1.01 | 0.81 | 0.070 | 0.94 | 0.74 | 27 | 0.83 |
| | 3 | 65.6 | 52.7 | 1.30 | 1.04 | 0.070 | 1.23 | 0.97 | 26 | 1.09 |
| | 4 | 59.9 | 48.1 | 1.19 | 0.95 | 0.070 | 1.12 | 0.88 | 27 | 0.99 |
| | 5 | 47.8 | 38.3 | 0.95 | 0.76 | 0.070 | 0.88 | 0.69 | 27 | 0.77 |
| | | | | | | | AVERAGE: | 0.83 ✓ | 27 | 0.92 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 95.6 | 86.7 | 98.0 | 96.7 | 100.3 | 95.5 ✓ | 5.22 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 5.2 | 7.8 | 7.2 | 8.2 | 5.2 | 6.7 ✓ | 1.43 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. Info: .

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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

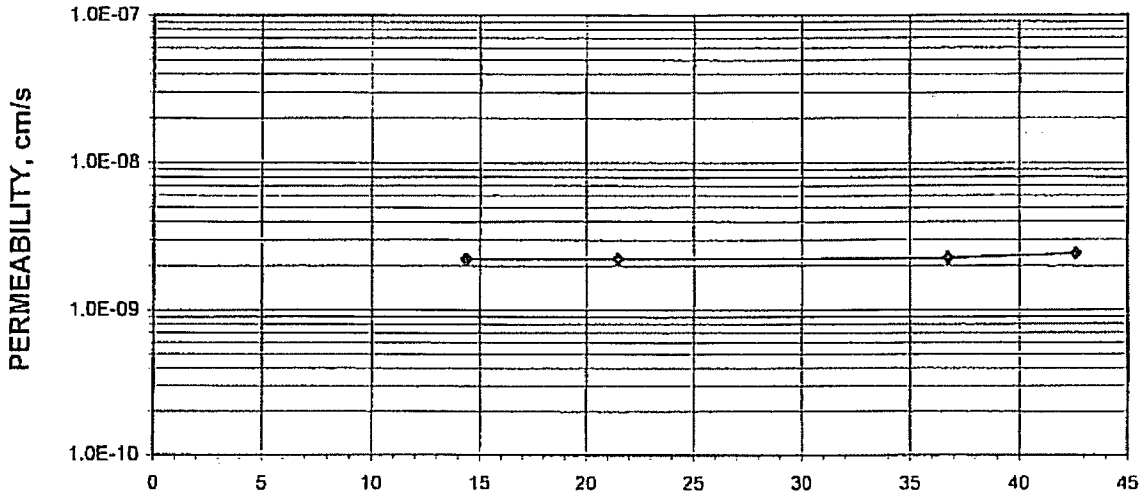
geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-06 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1966 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

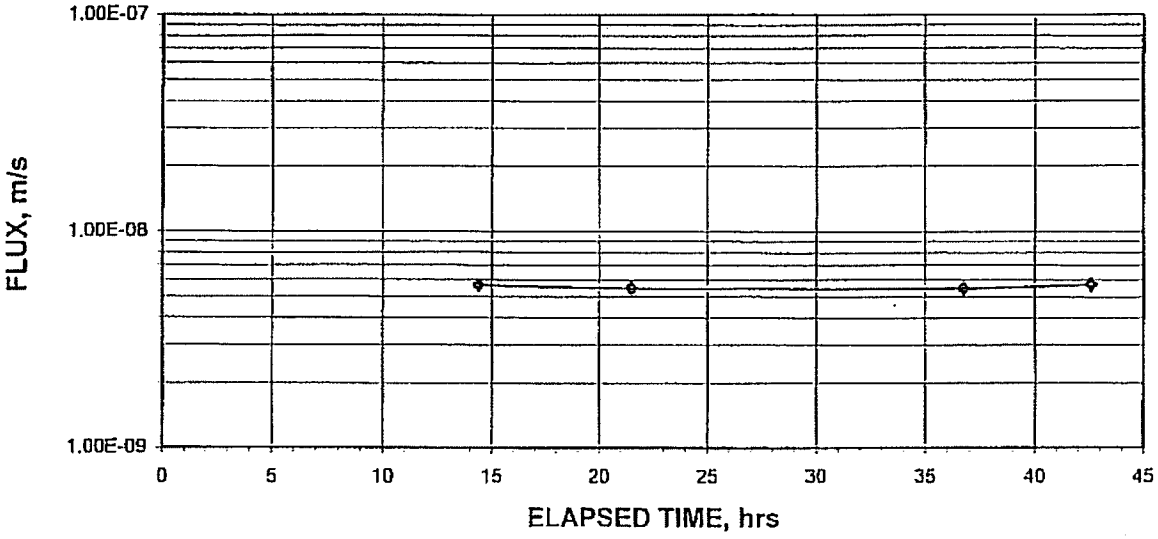
**AVERAGE FLUX = 5.55E-09 m/s**

**AVERAGE PERMEABILITY = 2.31E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**




Checked By: bB Date: 6-1-10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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-06 | Tested by: JO | Date: 5/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-1-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 1966 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 10 | 26 |
| Wt. of Tare & GCL[2] (gm.) | 71.73 | 94.77 |
| Wt. of Tare & Dry GCL [2] (gm.) | 59.66 | 48.84 |
| Wt. of Tare (gm.) | 10.89 | 10.74 |
| Wt. of Water (gm.) | 12.07 | 45.93 |
| Wt. of Dry GCL (gm.) [2] | 48.77 | 38.10 |
| GCL Moisture Content (%) | **24.7** | **120.6** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 46.57 | 82.33 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.181 | 0.280 |
| Clay Component Thickness 2 (in.) [1] | 0.172 | 0.271 |
| Clay Component Thickness 3 (in.) [1] | 0.156 | 0.268 |
| Average Clay Component Thickness (in.) | na | 0.273 |
| Average Clay Component Thickness (mm) | na | **6.934** |
| Specimen Dia. (in ) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$ ) [2] | 5,742 | 10,152 |
| Mass/Unit Area of GCL(psf ) [2] | 1.18 | 2.08 |
| Mass/Unit Area of Dry GCL(gm./m$^2$ ) [2] | 4,603 | |
| Mass/Unit Area of Dry GCL(psf ) [2] | 0.94 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.


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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-06 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 1966 |
| Sample No. | NA |

| Pressure Heads (Constant) | | Final Sample Dimensions | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.693 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | **78.50** |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.871 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.863 |

**AVERAGE FLUX = 5.55E-09 m/s**
**AVERAGE PERMEABILITY = 2.31E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/23/2010 | 0.0 | 0.0 | 0.0 | NA | 167.6 | 22.4 | NA | NA |
| 5/24/2010 | 14.4 | 2.8 | 1.8 | NA | 162.3 | 22.7 | 5.65E-09 | 2.23E-09 |
| 5/24/2010 | 21.5 | 4.0 | 2.8 | 1.43 | 159.7 | 22.6 | 5.48E-09 | 2.22E-09 |
| 5/25/2010 | 36.7 | 6.5 | 5.0 | 1.16 | 154.3 | 22.6 | 5.46E-09 | 2.27E-09 |
| 5/25/2010 | 42.6 | 7.5 | 5.9 | 1.13 | 152.1 | 22.5 | 5.71E-09 | 2.44E-09 |

Checked By: KR Date: 6-1-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

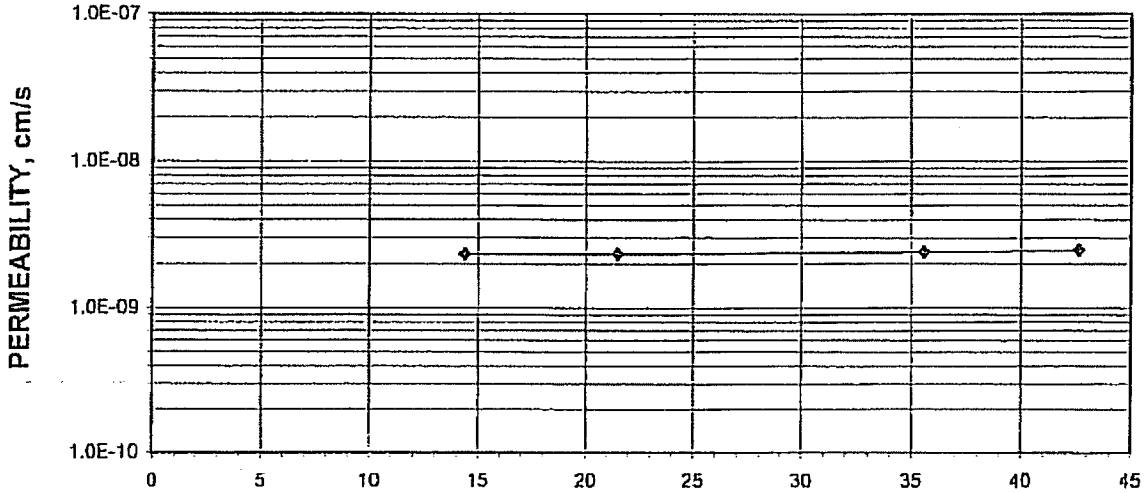
geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-05 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1922 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

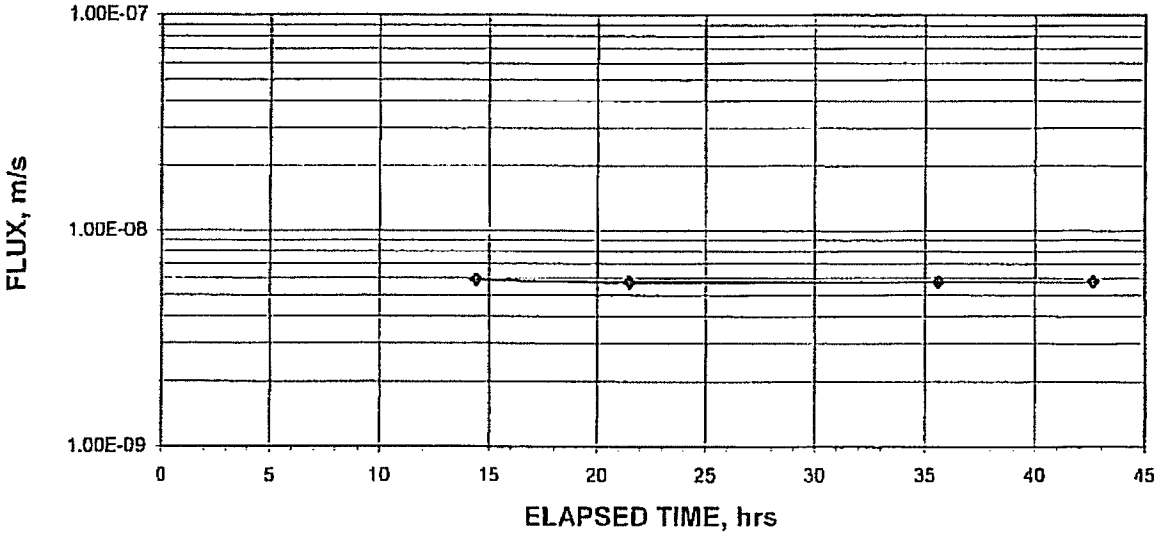
**AVERAGE FLUX = 5.76E-09 m/s**

**AVERAGE PERMEABILITY = 2.41E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**




Checked By: KAB Date: 6-1-10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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-05 | Tested by: JO | Date: 5/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-1-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 1922 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 62 | 41 |
| Wt. of Tare & GCL[2] (gm.) | 70.00 | 87.94 |
| Wt. of Tare & Dry GCL [2] (gm.) | 58.01 | 49.10 |
| Wt. of Tare (gm.) | 10.80 | 10.83 |
| Wt. of Water (gm.) | 11.99 | 38.84 |
| Wt. of Dry GCL (gm.) [2] | 47.21 | 38.27 |
| GCL Moisture Content (%) | **25.4** | **101.5** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 49.46 | 79.47 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.171 | 0.282 |
| Clay Component Thickness 2 (in.) [1] | 0.162 | 0.272 |
| Clay Component Thickness 3 (in.) [1] | 0.153 | 0.270 |
| Average Clay Component Thickness (in.) | na | 0.275 |
| Average Clay Component Thickness (mm) | na | **6.977** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,099 | 9,799 |
| Mass/Unit Area of GCL(psf) [2] | 1.25 | 2.01 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 4,863 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.00 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.


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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-05 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 1922 |
| Sample No. | NA |

| **Pressure Heads (Constant)** | | **Final Sample Dimensions** | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.698 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | **78.50** |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.874 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.853 |

**AVERAGE FLUX = 5.76E-09 m/s**
**AVERAGE PERMEABILITY = 2.41E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/23/2010 | 0.0 | 0.0 | 0.0 | NA | 167.9 | 22.4 | NA | NA |
| 5/24/2010 | 14.4 | 3.0 | 1.8 | NA | 162.4 | 22.7 | 5.90E-09 | 2.34E-09 |
| 5/24/2010 | 21.5 | 4.3 | 2.8 | 1.54 | 159.7 | 22.6 | 5.73E-09 | 2.34E-09 |
| 5/25/2010 | 35.6 | 6.8 | 4.9 | 1.23 | 154.4 | 22.6 | 5.77E-09 | 2.41E-09 |
| 5/25/2010 | 42.6 | 8.0 | 6.0 | 1.16 | 151.7 | 22.5 | 5.79E-09 | 2.49E-09 |

Checked By: HB Date: 6-1-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-04 | Tested by: JO | Date: 5/14/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 5-24-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentimat ST | | |
| Roll I.D.: | 1878 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 51 | 40 |
| Wt. of Tare & GCL[2] (gm.) | 76.76 | 103.68 |
| Wt. of Tare & Dry GCL [2] (gm.) | 63.41 | 49.68 |
| Wt. of Tare (gm.) | 10.87 | 10.85 |
| Wt. of Water (gm.) | 13.35 | 54.00 |
| Wt. of Dry GCL (gm.) [2] | 52.54 | 38.83 |
| GCL Moisture Content (%) | 25.4 | 139.1 |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 50.51 | 96.29 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.160 | 0.280 |
| Clay Component Thickness 2 (in.) [1] | 0.152 | 0.287 |
| Clay Component Thickness 3 (in.) [1] | 0.140 | 0.273 |
| Average Clay Component Thickness (in.) | na | 0.280 |
| Average Clay Component Thickness (mm) | na | 7.112 |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,228 | 11,873 |
| Mass/Unit Area of GCL(psf) [2] | 1.27 | 2.43 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 4,966 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.02 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-04 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentimat ST |
| Roll I.D.: | 1878 |
| Sample No. | NA |

| **Pressure Heads (Constant)** | | **Final Sample Dimensions** | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.711 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | **78.50** |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.856 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.855 |

**AVERAGE FLUX = 4.99E-09 m/s**
**AVERAGE PERMEABILITY = 2.56E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/17/2010 | 0.0 | 0.0 | 0.0 | NA | 166.6 | 20.3 | NA | NA |
| 5/18/2010 | 20.5 | 4.4 | 2.2 | NA | 158.9 | 21.9 | 5.69E-09 | 2.37E-09 |
| 5/20/2010 | 68.3 | 15.8 | 9.3 | 1.70 | 137.4 | 22.0 | 6.85E-09 | 3.13E-09 |
| 5/20/2010 | 74.7 | 16.7 | 10.6 | 1.46 | 134.8 | 20.5 | 6.10E-09 | 3.14E-09 |
| 5/21/2010 | 90.7 | 18.8 | 12.6 | 0.91 | 130.1 | 22.3 | 4.53E-09 | 2.30E-09 |
| 5/21/2010 | 94.0 | 19.2 | 13.0 | 1.04 | 129.1 | 22.5 | 4.33E-09 | 2.23E-09 |

Checked By: KB Date: 5-24-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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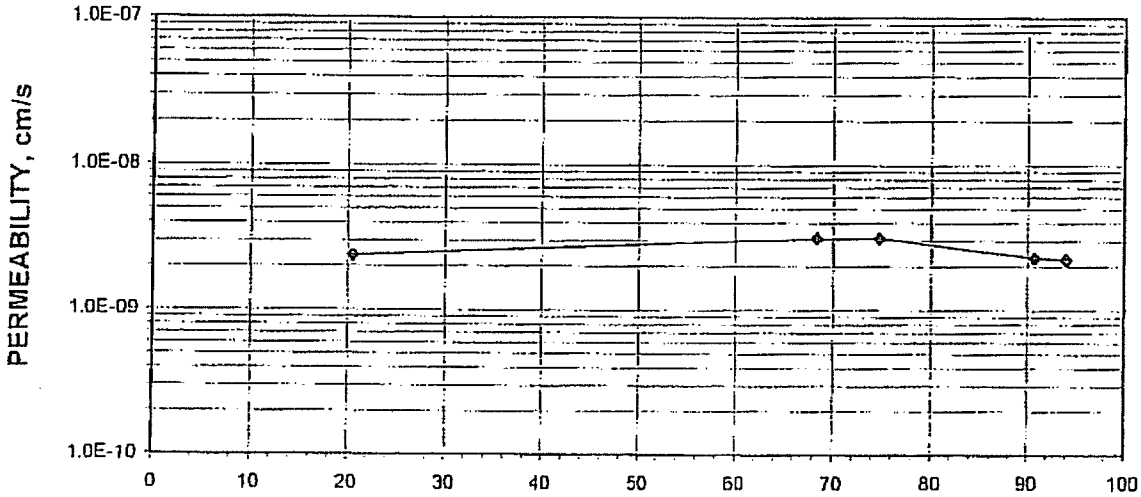
INTEGRITY IN TESTING

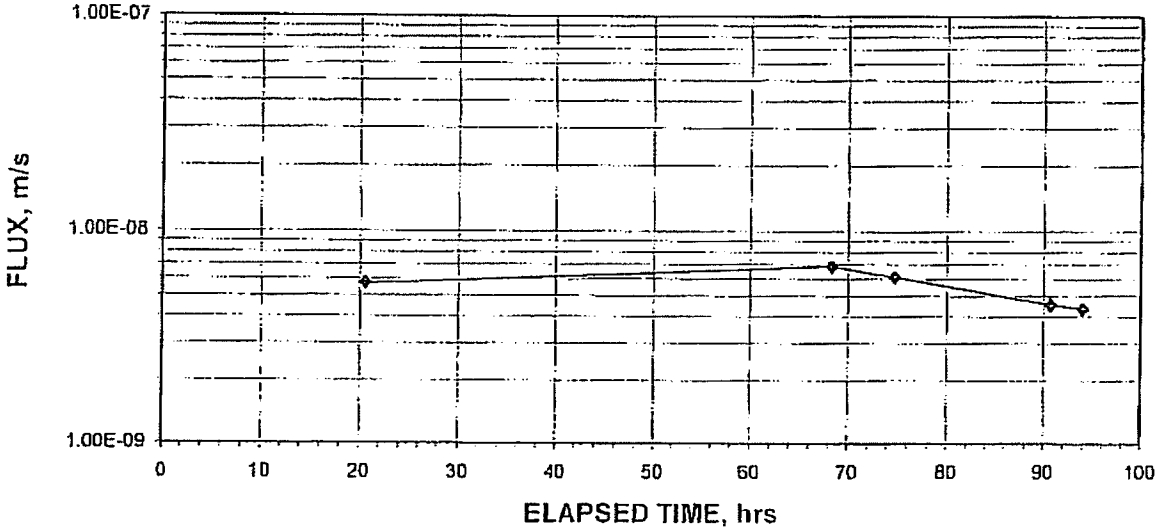
| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-04 | Material | CETCO Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1878 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

AVERAGE FLUX = 4.99E-09 m/s
AVERAGE PERMEABILITY = 2.56E-09 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME




Checked By: KB Date: 5-24-10



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## INPUT BURETTE NO. AND CONDITIONS

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| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-04 | Material | Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | [illegible] |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Sample No. | NA |
| Project No. | L10017-11 | | |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Pressure Head (cm) | 140.6 |

**INFLOW (HEADWATER) BURETTE**

| | |
|---|---|
| BURETTE No. | G 1202 |
| BURETTE FACTOR | 1 |
| INFLOW AREA ($cm^2$), a-in | 0.856 |
| VOLUME CORR. FACTOR | 0.939 |
| SLOPE | 1.167 |
| INTERCEPT | 65.6 |

**OUTFLOW (HEADWATER) BURETTE**

| | |
|---|---|
| BURETTE No. | G 1203 |
| BURETTE FACTOR | 1 |
| OUTFLOW AREA ($cm^2$), a-out | 0.855 |
| VOLUME CORR. FACTOR | 0.943 |
| SLOPE | 1.163 |
| INTERCEPT | 65.6 |

| DATE | TIME | | INFLOW G1202 | OUTFLOW G1203 | FLOW ( 0 flow) | TEMP. |
|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (div.) | (div.) | ( 1 stop) | (°C) |
| 5/17/2010 | 13 | 24 | 1.8 | 24.2 | 0 | 20.3 |
| 5/18/2010 | 9 | 56 | 6.2 | 22.0 | 0 | 21.9 |
| 5/20/2010 | 9 | 44 | 17.6 | 14.9 | 0 | 22.0 |
| 5/20/2010 | 16 | 7 | 18.5 | 13.6 | 0 | 20.5 |
| 5/21/2010 | 8 | 7 | 20.6 | 11.6 | 0 | 22.3 |
| 5/21/2010 | 11 | 23 | 21.0 | 11.2 | 1 | 22.5 |

Checked By: Date:





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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-03 | Tested by: JO | Date: 5/14/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 5-24-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentimat ST | | |
| Roll I.D.: | 1834 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 45 | 51 |
| Wt. of Tare & GCL[2] (gm.) | 69.98 | 103.62 |
| Wt. of Tare & Dry GCL [2] (gm.) | 58.92 | 51.71 |
| Wt. of Tare (gm.) | 10.91 | 10.83 |
| Wt. of Water (gm.) | 11.06 | 51.91 |
| Wt. of Dry GCL (gm.) [2] | 48.01 | 40.88 |
| GCL Moisture Content (%) | 23.0 | 127.0 |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 52.80 | 97.41 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.158 | 0.282 |
| Clay Component Thickness 2 (in.) [1] | 0.152 | 0.269 |
| Clay Component Thickness 3 (in.) [1] | 0.142 | 0.274 |
| Average Clay Component Thickness (in.) | na | 0.275 |
| Average Clay Component Thickness (mm) | na | 6.985 |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,510 | 12,011 |
| Mass/Unit Area of GCL(psf) [2] | 1.33 | 2.46 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 5,291 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.08 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-03 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentimat ST |
| Roll I.D.: | 1834 |
| Sample No. | NA |

| **Pressure Heads (Constant)** | | **Final Sample Dimensions** | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.699 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | **78.50** |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.874 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.853 |

**AVERAGE FLUX = 4.82E-09 m/s**
**AVERAGE PERMEABILITY = 1.97E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/17/2010 | 0.0 | 0.0 | 0.0 | NA | 168.7 | 20.3 | NA | NA |
| 5/17/2010 | 3.3 | 1.0 | 0.5 | NA | 167.0 | 20.4 | 8.04E-09 | 3.31E-09 |
| 5/18/2010 | 20.5 | 4.7 | 2.4 | 1.96 | 160.5 | 21.9 | 5.75E-09 | 2.34E-09 |
| 5/18/2010 | 27.5 | 5.6 | 3.4 | 1.59 | 158.3 | 22.4 | 4.86E-09 | 2.02E-09 |
| 5/19/2010 | 44.5 | 8.1 | 5.2 | 1.21 | 153.3 | 21.5 | 4.45E-09 | 1.93E-09 |
| 5/19/2010 | 44.5 | 8.1 | 5.2 | 1.39 | 167.3 | 21.5 | NA | NA |
| 5/19/2010 | 48.0 | 8.6 | 5.7 | 1.00 | 166.2 | 22.0 | 5.15E-09 | 2.06E-09 |
| 5/20/2010 | 65.0 | 11.1 | 8.0 | 1.07 | 160.6 | 22.0 | 4.98E-09 | 2.03E-09 |
| 5/21/2010 | 87.5 | 13.8 | 10.8 | 1.02 | 154.2 | 22.3 | 4.34E-09 | 1.83E-09 |

Checked By: JB Date: 5-24-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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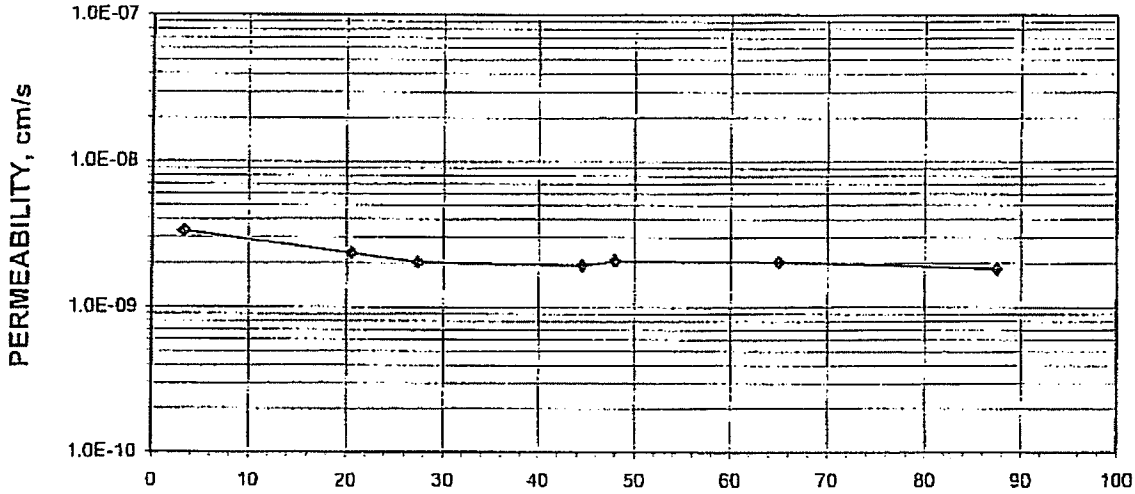
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-03 | Material | CETCO Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1834 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

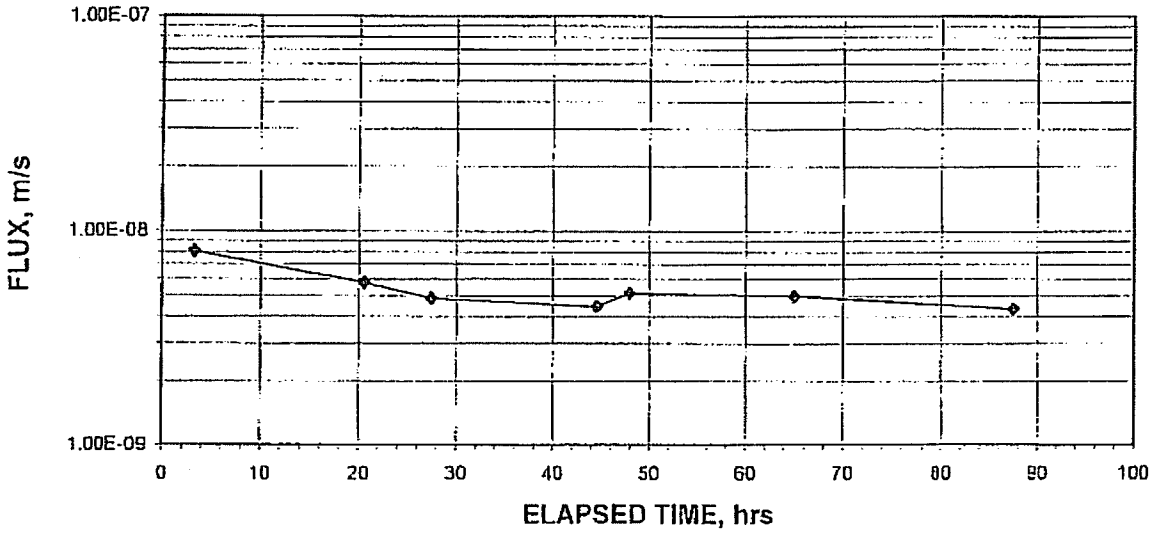
**AVERAGE FLUX = 4.82E-09 m/s**

**AVERAGE PERMEABILITY = 1.97E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**




Checked By: NB Date: 5-24-10



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## INPUT BURETTE NO. AND CONDITIONS

Geotechnics

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-03 | Material | Geotech Bentmat ST |
| Client | S & ME, Inc. | Roll I.D.: | [illegible] |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Sample No. | NA |
| Project No. | L10017-11 | | |

| Pressure Heads (Constant) | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Pressure Head (cm) | 140.6 |

### INFLOW (HEADWATER) BURETTE

| | |
|---|---|
| BURETTE No. | G 1196 |
| BURETTE FACTOR | 1 |
| INFLOW AREA ($cm^2$), a-in | 0.874 |
| VOLUME CORR. FACTOR | 0.962 |
| SLOPE | 1.150 |
| INTERCEPT | 65.3 |

### OUTFLOW (HEADWATER) BURETTE

| | |
|---|---|
| BURETTE No. | G 1197 |
| BURETTE FACTOR | 1 |
| OUTFLOW AREA ($cm^2$), a-out | 0.853 |
| VOLUME CORR. FACTOR | 1.018 |
| SLOPE | 1.173 |
| INTERCEPT | 65.2 |

| DATE | TIME | | INFLOW G1196 | OUTFLOW G1197 | FLOW ( 0 flow) | TEMP. |
|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (div.) | (div.) | ( 1 stop) | (°C) |
| 5/17/2010 | 13 | 18 | 0.2 | 24.1 | 0 | 20.3 |
| 5/17/2010 | 16 | 36 | 1.2 | 23.6 | 0 | 20.4 |
| 5/18/2010 | 9 | 50 | 4.9 | 21.7 | 0 | 21.9 |
| 5/18/2010 | 16 | 45 | 5.8 | 20.7 | 0 | 22.4 |
| 5/19/2010 | 9 | 50 | 8.3 | 18.9 | 1 | 21.5 |
| 5/19/2010 | 13 | 10 | 0.9 | 23.6 | 0 | 21.5 |
| 5/19/2010 | 16 | 36 | 1.4 | 23.1 | 0 | 22.0 |
| 5/20/2010 | 9 | 40 | 3.9 | 20.8 | 0 | 22.0 |
| 5/21/2010 | 8 | 5 | 6.6 | 18.0 | 0 | 22.3 |

Checked By: Date:





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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-02 | Tested by: JO | Date: 5/14/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 5-24-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentimat ST | | |
| Roll I.D.: | 1790 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 62 | 45 |
| Wt. of Tare & GCL[2] (gm.) | 81.34 | 75.58 |
| Wt. of Tare & Dry GCL [2] (gm.) | 66.85 | 38.74 |
| Wt. of Tare (gm.) | 10.75 | 10.91 |
| Wt. of Water (gm.) | 14.49 | 36.84 |
| Wt. of Dry GCL (gm.) [2] | 56.10 | 27.83 |
| GCL Moisture Content (%) | **25.8** | **132.4** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 38.38 | 70.88 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.157 | 0.224 |
| Clay Component Thickness 2 (in.) [1] | 0.146 | 0.219 |
| Clay Component Thickness 3 (in.) [1] | 0.138 | 0.220 |
| Average Clay Component Thickness (in.) | na | 0.221 |
| Average Clay Component Thickness (mm) | na | 5.613 |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 4,732 | 8,740 |
| Mass/Unit Area of GCL(psf) [2] | 0.97 | 1.79 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 3,761 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 0.77 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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geotechnics
INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-02 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentimat ST |
| Roll I.D.: | 1790 |
| Sample No. | NA |

| **Pressure Heads (Constant)** | | **Final Sample Dimensions** | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.561 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | **78.50** |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.871 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.863 |

**AVERAGE FLUX = 6.75E-09 m/s**
**AVERAGE PERMEABILITY = 2.52E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/17/2010 | 0.0 | 0.0 | 0.0 | NA | 161.1 | 20.3 | NA | NA |
| 5/17/2010 | 3.3 | 1.6 | 0.8 | NA | 158.4 | 20.4 | 1.29E-08 | 4.49E-09 |
| 5/18/2010 | 20.5 | 5.6 | 3.7 | 1.51 | 150.4 | 21.9 | 7.08E-09 | 2.47E-09 |
| 5/19/2010 | 44.6 | 9.7 | 7.7 | 1.17 | 141.0 | 21.5 | 5.95E-09 | 2.22E-09 |
| 5/19/2010 | 44.6 | 9.7 | 7.7 | 1.03 | 160.4 | 22.0 | NA | NA |
| 5/20/2010 | 61.7 | 13.9 | 11.9 | 1.00 | 150.7 | 22.0 | 8.72E-09 | 3.01E-09 |
| 5/20/2010 | 68.1 | 15.2 | 13.1 | 1.02 | 147.8 | 20.5 | 6.91E-09 | 2.57E-09 |
| 5/21/2010 | 84.3 | 18.4 | 16.2 | 1.05 | 140.5 | 22.3 | 6.85E-09 | 2.53E-09 |
| 5/21/2010 | 87.3 | 19.0 | 16.7 | 1.06 | 139.3 | 22.5 | 6.49E-09 | 2.46E-09 |

Checked By: KB Date: 5-24-10



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# GCL INDEX FLUX & PERMEABILITY TEST

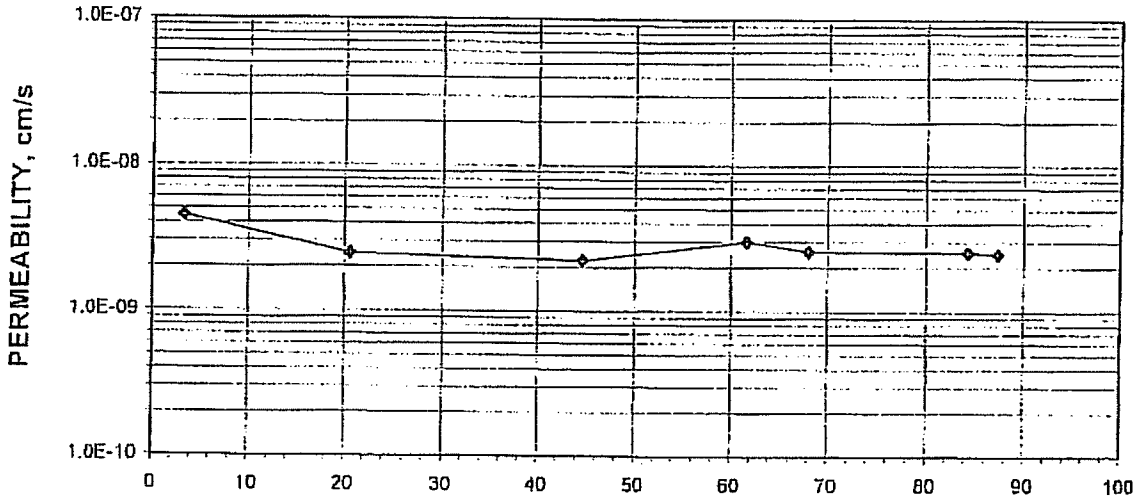
ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

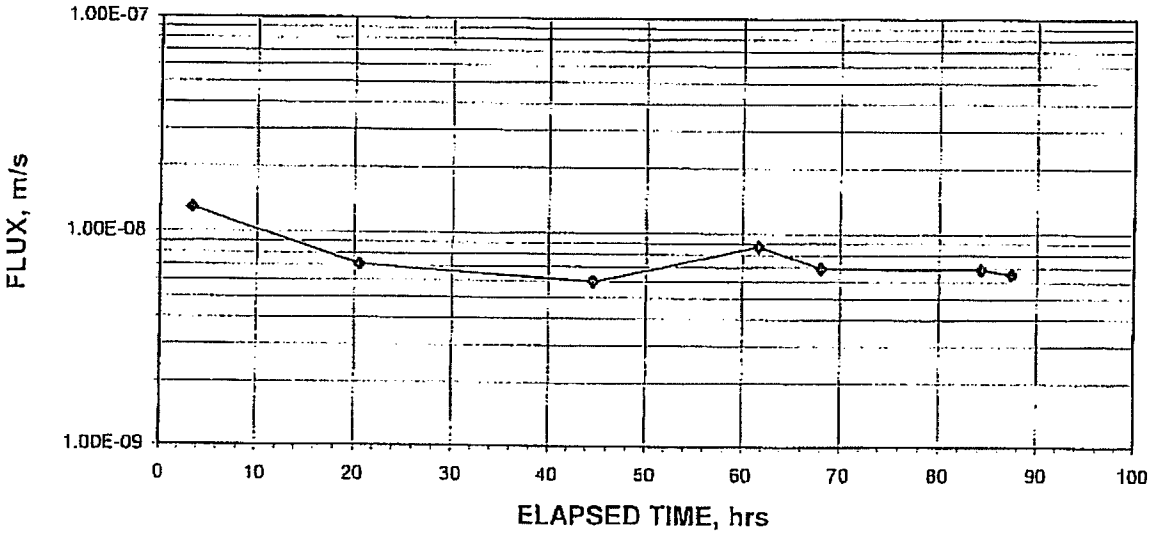
| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-02 | Material | CETCO Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1790 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

AVERAGE FLUX = 6.75E-09 m/s
AVERAGE PERMEABILITY = 2.52E-09 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME




Checked By: KB Date: 5-24-10



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## INPUT BURETTE NO. AND CONDITIONS

Geotechnics
Bentimat ST
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-02 | Material | Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | NA |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Sample No. | NA |
| Project No. | L10017-11 | | |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Pressure Head (cm) | 140.6 |

**INFLOW (HEADWATER) BURETTE**

| | |
|---|---|
| BURETTE No. | G 1198 |
| BURETTE FACTOR | 1 |
| INFLOW AREA ($cm^2$), a-in | 0.871 |
| VOLUME CORR. FACTOR | 1.067 |
| SLOPE | 1.154 |
| INTERCEPT | 65.4 |

**OUTFLOW (HEADWATER) BURETTE**

| | |
|---|---|
| BURETTE No. | G 1199 |
| BURETTE FACTOR | 1 |
| OUTFLOW AREA ($cm^2$), a-out | 0.863 |
| VOLUME CORR. FACTOR | 0.955 |
| SLOPE | 1.158 |
| INTERCEPT | 65.4 |

| DATE | TIME | | INFLOW G1198 | OUTFLOW G1199 | FLOW ( 0 flow) | TEMP. |
|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (div.) | (div.) | ( 1 stop) | (°C) |
| 5/17/2010 | 13 | 20 | 5.9 | 23.6 | 0 | 20.3 |
| 5/17/2010 | 16 | 38 | 7.5 | 22.8 | 0 | 20.4 |
| 5/18/2010 | 9 | 52 | 11.5 | 19.9 | 0 | 21.9 |
| 5/19/2010 | 9 | 56 | 15.6 | 15.9 | 1 | 21.5 |
| 5/19/2010 | 16 | 38 | 3.3 | 20.4 | 0 | 22.0 |
| 5/20/2010 | 9 | 41 | 7.5 | 16.2 | 0 | 22.0 |
| 5/20/2010 | 16 | 5 | 8.8 | 15.0 | 0 | 20.5 |
| 5/21/2010 | 8 | 21 | 12.0 | 11.9 | 0 | 22.3 |
| 5/21/2010 | 11 | 21 | 12.6 | 11.4 | 0 | 22.5 |

Checked By: VK Date:





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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-01 | Tested by: JO | Date: 5/14/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: HB | Date: 5-24-10 |
| Project No. | L10017-11 | | |
| Material | CETCO Bentimat ST | | |
| Roll I.D.: | 1745 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 24 | 5 |
| Wt. of Tare & GCL[2] (gm.) | 73.89 | 107.65 |
| Wt. of Tare & Dry GCL [2] (gm.) | 61.10 | 51.61 |
| Wt. of Tare (gm.) | 10.66 | 10.79 |
| Wt. of Water (gm.) | 12.79 | 56.04 |
| Wt. of Dry GCL (gm.) [2] | 50.44 | 40.82 |
| GCL Moisture Content (%) | **25.4** | **137.3** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 54.92 | 103.96 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.170 | 0.288 |
| Clay Component Thickness 2 (in.) [1] | 0.164 | 0.272 |
| Clay Component Thickness 3 (in.) [1] | 0.158 | 0.281 |
| Average Clay Component Thickness (in.) | na | 0.280 |
| Average Clay Component Thickness (mm) | na | **7.120** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,772 | 12,818 |
| Mass/Unit Area of GCL(psf) [2] | 1.39 | 2.62 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 5,402 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.11 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-11-01 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-11 |
| Material | CETCO Bentimat ST |
| Roll I.D.: | 1745 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.712 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | **78.50** |
| Inflow Burette Area ($cm^2$), a-in | 0.825 |
| Outflow Burette Area ($cm^2$), a-out | 0.860 |

**AVERAGE FLUX = 4.97E-09 m/s**
**AVERAGE PERMEABILITY = 2.39E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 5/17/2010 | 0.0 | 0.0 | 0.0 | NA | 167.1 | 20.3 | NA | NA |
| 5/17/2010 | 3.3 | 0.5 | 0.5 | NA | 166.0 | 20.4 | 5.33E-09 | 2.22E-09 |
| 5/18/2010 | 20.5 | 4.4 | 2.6 | 1.69 | 159.0 | 21.9 | 6.17E-09 | 2.53E-09 |
| 5/18/2010 | 27.5 | 5.4 | 4.1 | 1.36 | 156.1 | 22.4 | 6.40E-09 | 2.68E-09 |
| 5/19/2010 | 44.6 | 9.1 | 6.7 | 1.15 | 148.7 | 21.5 | 6.50E-09 | 2.87E-09 |
| 5/19/2010 | 51.3 | 9.7 | 7.9 | 1.13 | 146.6 | 22.0 | 4.75E-09 | 2.14E-09 |
| 5/20/2010 | 68.3 | 12.3 | 10.5 | 0.84 | 140.6 | 22.0 | 5.40E-09 | 2.50E-09 |
| 5/20/2010 | 74.7 | 13.2 | 11.4 | 1.00 | 138.5 | 20.5 | 4.98E-09 | 2.46E-09 |
| 5/21/2010 | 90.7 | 15.3 | 13.4 | 1.03 | 133.7 | 22.3 | 4.53E-09 | 2.20E-09 |

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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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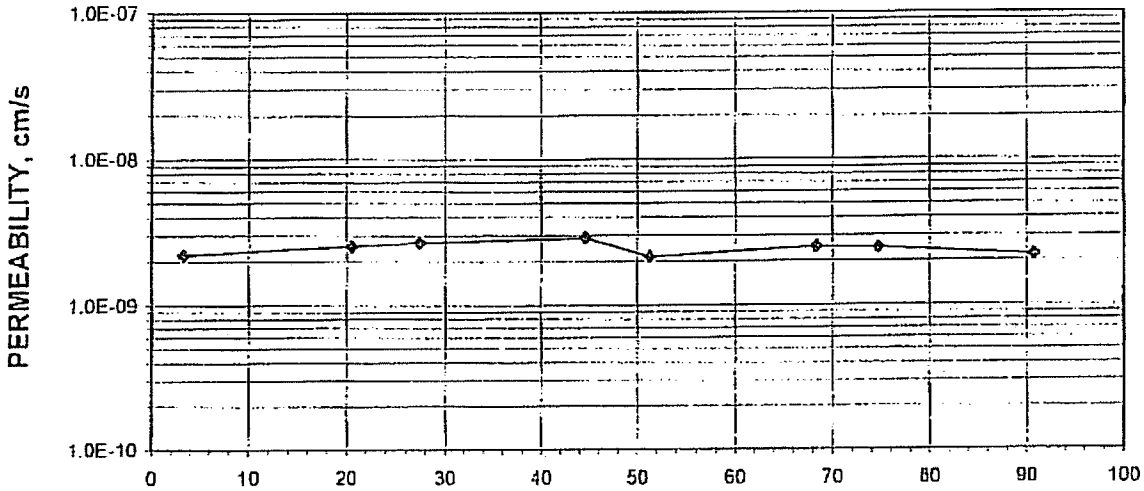
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-01 | Material | CETCO Bentimat ST |
| Client | S & ME, Inc. | Roll I.D.: | 1745 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-11 | Sample No. | NA |

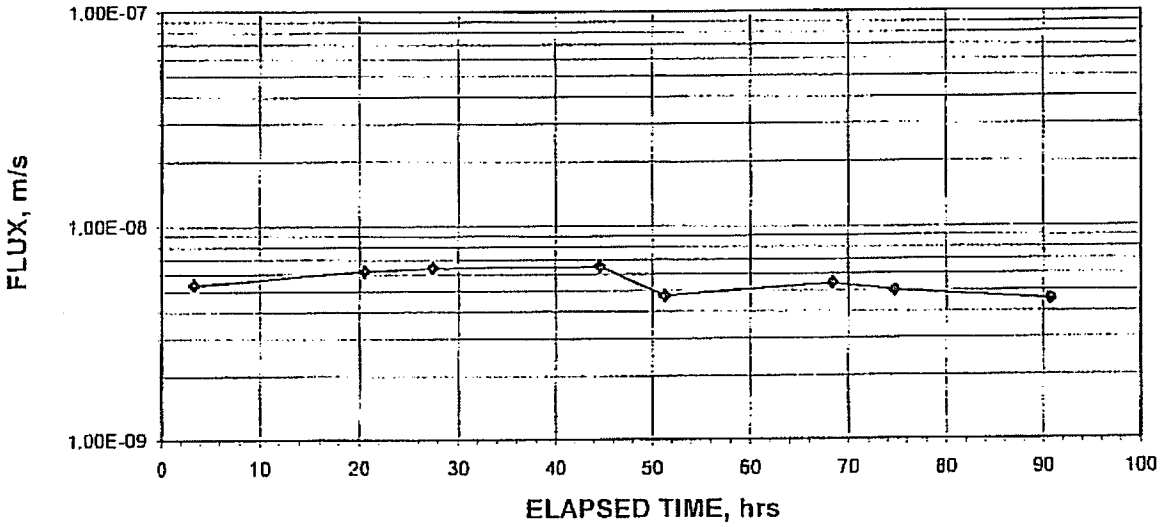
AVERAGE FLUX = 4.97E-09 ✓ m/s

AVERAGE PERMEABILITY = 2.39E-09 ✓ cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME




Checked By: KB Date: 5-24-10



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## INPUT BURETTE NO. AND CONDITIONS

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| | | | |
|---|---|---|---|
| Lab ID No. | L10017-11-01 | Material | [illegible] |
| Client | S & ME, Inc. | Roll I.D.: | [illegible] |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Sample No. | NA |
| Project No. | L10017-11 | | |

| Pressure Heads (Constant) | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Pressure Head (cm) | 140.6 |

### INFLOW (HEADWATER) BURETTE

| | |
|---|---|
| BURETTE No. | G 1200 |
| BURETTE FACTOR | 1 |
| INFLOW AREA ($cm^2$), a-in | 0.825 |
| VOLUME CORR. FACTOR | 1.062 |
| SLOPE | 1.167 |
| INTERCEPT | 65.4 |

### OUTFLOW (HEADWATER) BURETTE

| | |
|---|---|
| BURETTE No. | G 1201 |
| BURETTE FACTOR | 1 |
| OUTFLOW AREA ($cm^2$), a-out | 0.860 |
| VOLUME CORR. FACTOR | 0.995 |
| SLOPE | 1.163 |
| INTERCEPT | 65.5 |

| DATE | TIME | | INFLOW G1200 | OUTFLOW G1201 | FLOW ( 0 flow) | TEMP. |
|---|---|---|---|---|---|---|
| (mm/dd/yy) | (hr) | (min) | (div.) | (div.) | ( 1 stop) | (°C) |
| 5/17/2010 | 13 | 22 | 1.7 | 24.6 | 0 | 20.3 |
| 5/17/2010 | 16 | 41 | 2.2 | 24.1 | 0 | 20.4 |
| 5/18/2010 | 9 | 54 | 6.1 | 22.0 | 0 | 21.9 |
| 5/18/2010 | 16 | 49 | 7.1 | 20.5 | 0 | 22.4 |
| 5/19/2010 | 9 | 58 | 10.8 | 17.9 | 0 | 21.5 |
| 5/19/2010 | 16 | 40 | 11.4 | 16.7 | 0 | 22.0 |
| 5/20/2010 | 9 | 42 | 14.0 | 14.1 | 0 | 22.0 |
| 5/20/2010 | 16 | 6 | 14.9 | 13.2 | 0 | 20.5 |
| 5/21/2010 | 8 | 6 | 17.0 | 11.2 | 1 | 22.3 |

Checked By: Date:





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INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-01
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4071

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 55.0 | 45.3 | 1.09 | 0.90 | 0.070 | 1.02 | 0.83 | 23 | 0.93 |
| | 2 | 51.9 | 43.3 | 1.03 | 0.86 | 0.070 | 0.96 | 0.79 | 22 | 0.88 |
| | 3 | 56.3 | 46.7 | 1.12 | 0.93 | 0.070 | 1.05 | 0.86 | 22 | 0.96 |
| | 4 | 60.0 | 50.2 | 1.19 | 0.99 | 0.070 | 1.12 | 0.92 | 21 | 1.04 |
| | 5 | 59.4 | 49.6 | 1.18 | 0.98 | 0.070 | 1.11 | 0.91 | 21 | 1.02 |
| | | | | | | | AVERAGE: | 0.86 | 22 | 0.97 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 66.7 | 68.1 | 70.7 | 68.9 | 68.2 | 68.5 | 1.44 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 6.9 | 7.2 | 7.5 | 7.7 | 7.8 | 7.4 | 0.35 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. Info: .

CHECKED BY: BF DATE: 6-22-10

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INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-02
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4115

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 64.1 | 54.4 | 1.27 | 1.08 | 0.070 | 1.20 | 1.01 | 19 | 1.13 |
| | 2 | 56.6 | 48.5 | 1.12 | 0.96 | 0.070 | 1.05 | 0.89 | 18 | 1.00 |
| | 3 | 58.2 | 49.6 | 1.15 | 0.98 | 0.070 | 1.08 | 0.91 | 19 | 1.02 |
| | 4 | 56.7 | 48.5 | 1.12 | 0.96 | 0.070 | 1.05 | 0.89 | 18 | 1.00 |
| | 5 | 67.0 | 57.4 | 1.33 | 1.14 | 0.070 | 1.26 | 1.07 | 18 | 1.19 |
| | | | | | | | AVERAGE: | 0.95 | 18 | 1.07 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 75.3 | 69.8 | 69.6 | 81.7 | 73.7 | 74.0 | 4.94 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 5.9 | 7.1 | 6.5 | 5.1 | 3.9 | 5.7 | 1.24 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 6-22-10

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INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-03
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4160

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 65.4 | 51.2 | 1.30 | 1.01 | 0.070 | 1.23 | 0.94 | 30 | 1.06 |
| | 2 | 59.6 | 47.7 | 1.18 | 0.95 | 0.070 | 1.11 | 0.88 | 27 | 0.98 |
| | 3 | 57.6 | 46.5 | 1.14 | 0.92 | 0.070 | 1.07 | 0.85 | 26 | 0.95 |
| | 4 | 56.9 | 45.6 | 1.13 | 0.90 | 0.070 | 1.06 | 0.83 | 27 | 0.93 |
| | 5 | 65.8 | 52.0 | 1.31 | 1.03 | 0.070 | 1.24 | 0.96 | 29 | 1.08 |
| | | | | | | | AVERAGE: | 0.89 | 28 | 1.00 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 35.7 | 35.5 | 36.1 | 35.5 | 36.1 | 35.8 | 0.31 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 10.2 | 12.2 | 12.9 | 10.6 | 12.7 | 11.7 | 1.23 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 6-22-10

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-04
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4205

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| **BENTONITE CONTENT** ASTM D3776 & ASTM D5993 | 1 | 56.2 | 44.9 | 1.11 | 0.89 | 0.070 | 1.04 | 0.82 | 27 | 0.92 |
| | 2 | 55.5 | 44.6 | 1.10 | 0.88 | 0.070 | 1.03 | 0.81 | 27 | 0.91 |
| | 3 | 52.9 | 41.7 | 1.05 | 0.83 | 0.070 | 0.98 | 0.76 | 29 | 0.85 |
| | 4 | 66.1 | 50.9 | 1.31 | 1.01 | 0.070 | 1.24 | 0.94 | 32 | 1.05 |
| | 5 | 60.6 | 49.0 | 1.20 | 0.97 | 0.070 | 1.13 | 0.90 | 25 | 1.01 |
| | | | | | | | **AVERAGE:** | **0.85** | **28** | **0.95** |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| **TENSILE STRENGTH** | D 6768 | MD-lbs/in | 76.6 | 80.2 | 79.7 | 79.1 | 82.2 | **79.5** | 2.02 |
| **PEEL STRENGTH** | D 6496 | MD-lbs/in | 8.8 | 9.0 | 9.3 | 9.8 | 9.4 | **9.2** | 0.38 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-05
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4249

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 63.3 | 51.1 | 1.26 | 1.01 | 0.070 | 1.19 | 0.94 | 26 | 1.06 |
| | 2 | 62.3 | 49.8 | 1.24 | 0.99 | 0.070 | 1.17 | 0.92 | 27 | 1.03 |
| | 3 | 57.3 | 45.4 | 1.13 | 0.90 | 0.070 | 1.06 | 0.83 | 28 | 0.93 |
| | 4 | 59.8 | 47.4 | 1.19 | 0.94 | 0.070 | 1.12 | 0.87 | 28 | 0.97 |
| | 5 | 68.1 | 54.4 | 1.35 | 1.08 | 0.070 | 1.28 | 1.01 | 27 | 1.13 |
| | | | | | | | AVERAGE: | 0.91 | 27 | 1.02 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 101.9 | 103.3 | 97.2 | 96.7 | 94.1 | 98.6 | 3.81 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 9.6 | 6.9 | 7.6 | 7.3 | 6.1 | 7.5 | 1.28 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 6-22-10

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6/22/2010

# CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL No. 1
PROJECT NO.: L10017-14
LAB ID NO.: L10017-14-06
MATERIAL: CETCO BENTOMAT ST
ROLL NO: 4293

| | SPECIMEN | TOTAL WT. AS REC'D grams | TOTAL WT. DRY grams | TOTAL WT. AS REC'D psf | TOTAL WT. DRY psf | WT. BACKING psf (1) | AS REC'D Bent Cont psf | DRY Bent Cont psf | MOISTURE CONTENT % | Bent Cont 12% m.c. psf |
|---|---|---|---|---|---|---|---|---|---|---|
| BENTONITE CONTENT ASTM D3776 & ASTM D5993 | 1 | 64.2 | 50.1 | 1.27 | 0.99 | 0.070 | 1.20 | 0.92 | 31 | 1.03 |
| | 2 | 58.2 | 45.9 | 1.15 | 0.91 | 0.070 | 1.08 | 0.84 | 29 | 0.94 |
| | 3 | 65.5 | 50.9 | 1.30 | 1.01 | 0.070 | 1.23 | 0.94 | 31 | 1.05 |
| | 4 | 60.1 | 47.8 | 1.19 | 0.95 | 0.070 | 1.12 | 0.88 | 28 | 0.98 |
| | 5 | 52.9 | 42.2 | 1.05 | 0.84 | 0.070 | 0.98 | 0.77 | 28 | 0.86 |
| | | | | | | | AVERAGE: | 0.87 | 29 | 0.97 |

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVG | STD |
|---|---|---|---|---|---|---|---|---|---|
| TENSILE STRENGTH | D 6768 | MD-lbs/in | 105.7 | 107.8 | 103.5 | 102.3 | 100.3 | 103.9 | 2.94 |
| PEEL STRENGTH | D 6496 | MD-lbs/in | 4.6 | 8.3 | 5.9 | 7.3 | 5.6 | 6.3 | 1.44 |

* NOTES:1) Weight of carrier (geotextile) provided by CETCO spec. info: .

CHECKED BY: BF DATE: 6-22-10

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6/22/2010

# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-01 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4071 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 6 | 39 |
| Wt. of Tare & GCL[2] (gm.) | 67.94 | 80.39 |
| Wt. of Tare & Dry GCL [2] (gm.) | 58.56 | 41.47 |
| Wt. of Tare (gm.) | 10.89 | 10.83 |
| Wt. of Water (gm.) | 9.38 | 38.92 |
| Wt. of Dry GCL (gm.) [2] | 47.67 | 30.64 |
| GCL Moisture Content (%) | 19.7 | **127.0** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 39.42 | 74.78 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.153 | 0.238 |
| Clay Component Thickness 2 (in.) [1] | 0.148 | 0.229 |
| Clay Component Thickness 3 (in.) [1] | 0.137 | 0.221 |
| Average Clay Component Thickness (in.) | na | 0.229 |
| Average Clay Component Thickness (mm) | na | **5.825** |
| Spacimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 4,861 | 9,221 |
| Mass/Unit Area of GCL(psf) [2] | 1.00 | 1.89 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 4,061 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 0.83 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-14-01 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4071 |
| Sample No. | NA |

| Pressure Heads (Constant) | | Final Sample Dimensions | |
|---|---|---|---|
| | | Sample Length (cm), L | 0.583 |
| Top Cap (psi) | 75.0 | Sample Diameter (cm) | 10.16 |
| Bottom Cap (psi) | 77.0 | Sample Area ($cm^2$), A | 78.50 |
| Cell (psi) | 80.0 | Inflow Burette Area ($cm^2$), a-in | 0.874 |
| Total Head (cm) | 140.6 | Outflow Burette Area ($cm^2$), a-out | 0.853 |

**AVERAGE FLUX = 7.13E-09 m/s**
**AVERAGE PERMEABILITY = 2.68E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 168.2 | 23.0 | NA | NA |
| 6/24/2010 | 6.6 | 1.5 | 1.5 | NA | 164.7 | 22.8 | 8.10E-09 | 2.66E-09 |
| 6/25/2010 | 22.4 | 4.9 | 4.6 | 1.07 | 157.1 | 22.7 | 7.26E-09 | 2.47E-09 |
| 6/25/2010 | 28.8 | 6.3 | 5.9 | 1.09 | 154.0 | 22.4 | 7.48E-09 | 2.65E-09 |
| 6/26/2010 | 50.9 | 10.9 | 10.2 | 1.07 | 143.7 | 22.5 | 7.13E-09 | 2.63E-09 |
| 6/28/2010 | 96.0 | 19.7 | 18.7 | 1.05 | 123.6 | 23.0 | 6.79E-09 | 2.77E-09 |

Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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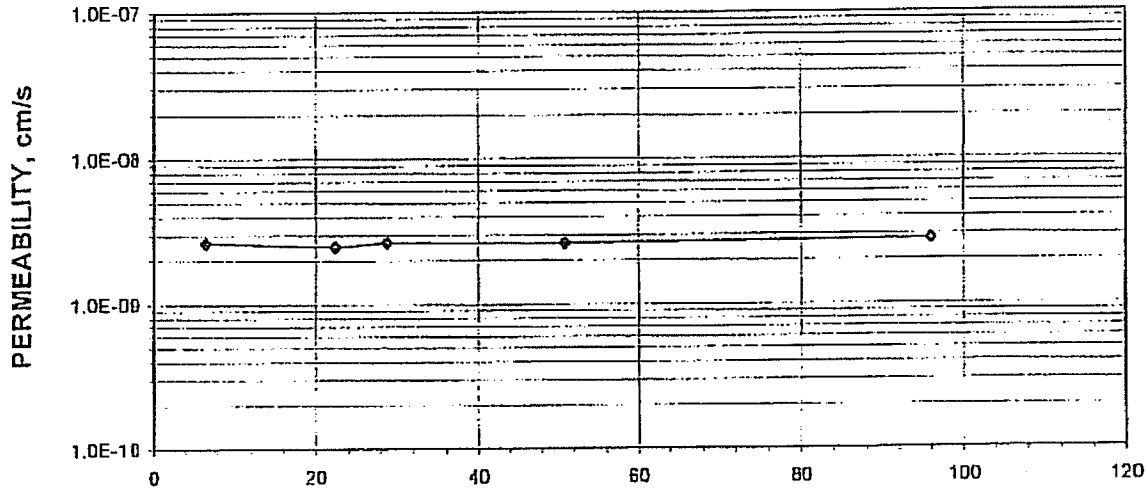
| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-01 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4071 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

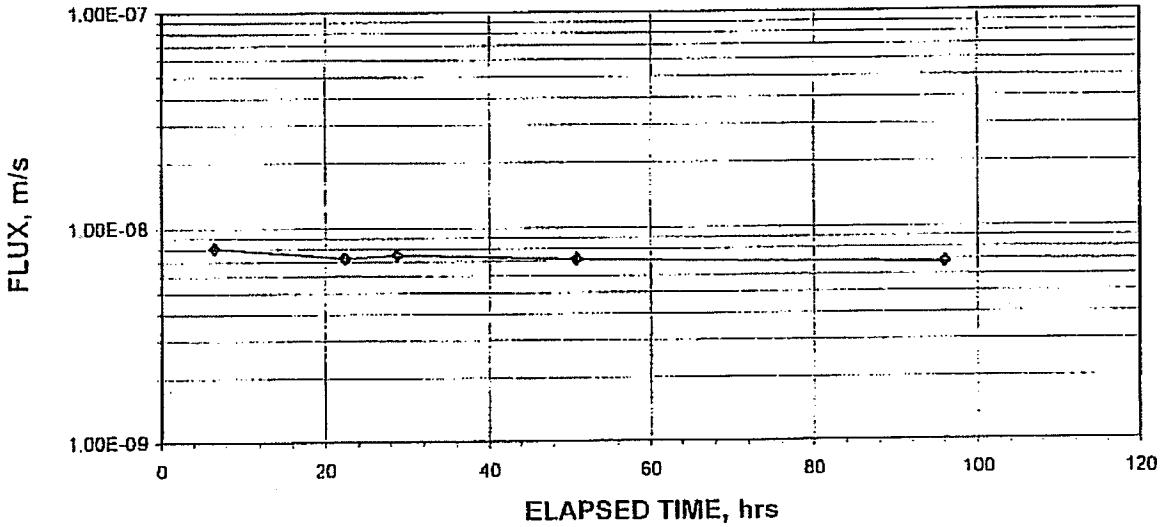
**AVERAGE FLUX = 7.13E-09 m/s**

**AVERAGE PERMEABILITY = 2.68E-09 cm/s @ 20°C**

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME




Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-02 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4115 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 42 | 8 |
| Wt. of Tare & GCL[2] (gm.) | 78.50 | 106.23 |
| Wt. of Tare & Dry GCL [2] (gm.) | 68.35 | 55.06 |
| Wt. of Tare (gm.) | 10.95 | 10.78 |
| Wt. of Water (gm.) | 10.15 | 51.17 |
| Wt. of Dry GCL (gm.) [2] | 57.40 | 44.28 |
| GCL Moisture Content (%) | **17.7** | **115.6** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 54.21 | 99.30 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.182 | 0.268 |
| Clay Component Thickness 2 (in.) [1] | 0.175 | 0.261 |
| Clay Component Thickness 3 (in.) [1] | 0.167 | 0.254 |
| Average Clay Component Thickness (in.) | na | 0.261 |
| Average Clay Component Thickness (mm) | na | **6.629** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,684 | 12,244 |
| Mass/Unit Area of GCL(psf) [2] | 1.37 | 2.51 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 5,680 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.16 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-14-02 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4115 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.663 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | 78.50 |
| Inflow Burette Area ($cm^2$), a-in | 0.871 |
| Outflow Burette Area ($cm^2$), a-out | 0.863 |

**AVERAGE FLUX = 5.90E-09 m/s**
**AVERAGE PERMEABILITY = 2.43E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 167.8 | 23.0 | NA | NA |
| 6/24/2010 | 6.5 | 1.5 | 0.9 | NA | 165.1 | 22.8 | 6.50E-09 | 2.43E-09 |
| 6/25/2010 | 22.4 | 4.5 | 3.3 | 1.36 | 158.8 | 22.7 | 6.02E-09 | 2.32E-09 |
| 6/26/2010 | 50.9 | 9.6 | 7.9 | 1.16 | 147.6 | 22.5 | 6.03E-09 | 2.47E-09 |
| 6/28/2010 | 96.0 | 17.1 | 14.8 | 1.10 | 130.9 | 23.0 | 5.65E-09 | 2.51E-09 |

Checked By: HS Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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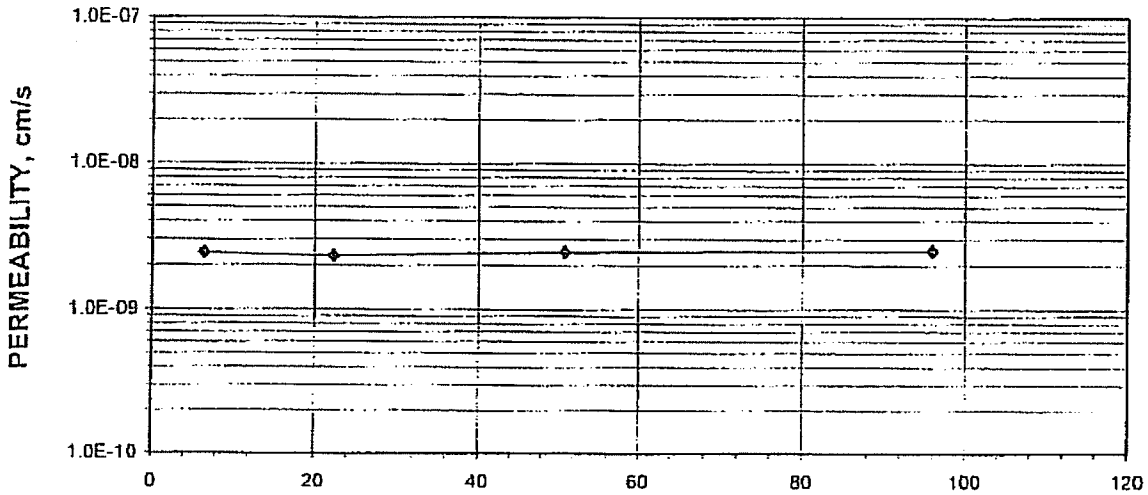
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-02 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4115 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

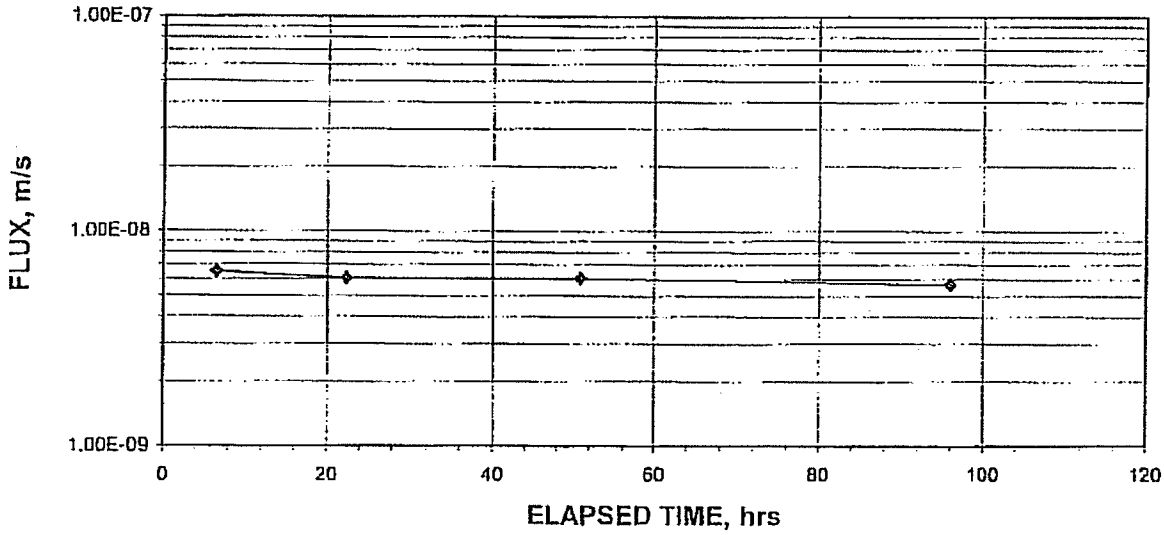
**AVERAGE FLUX = 5.90E-09 m/s**

**AVERAGE PERMEABILITY = 2.43E-09 cm/s @ 20°C**

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME




Checked By: KD Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-03 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4160 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 3 | 62 |
| Wt. of Tare & GCL[2] (gm.) | 73.57 | 90.57 |
| Wt. of Tare & Dry GCL [2] (gm.) | 61.04 | 49.76 |
| Wt. of Tare (gm.) | 10.79 | 10.80 |
| Wt. of Water (gm.) | 12.53 | 40.81 |
| Wt. of Dry GCL (gm.) [2] | 50.25 | 38.96 |
| GCL Moisture Content (%) | 24.9 | 104.7 |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 49.86 | 81.71 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.156 | 0.268 |
| Clay Component Thickness 2 (in.) [1] | 0.148 | 0.265 |
| Clay Component Thickness 3 (in.) [1] | 0.141 | 0.257 |
| Average Clay Component Thickness (in.) | na | 0.263 |
| Average Clay Component Thickness (mm) | na | 6.689 |
| Specimen Dia. (In) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,148 | 10,076 |
| Mass/Unit Area of GCL(psf) [2] | 1.26 | 2.06 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 4,921 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.01 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.


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# GCL INDEX FLUX & PERMEABILITY TEST

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-14-03 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4160 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.669 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | 78.50 |
| Inflow Burette Area ($cm^2$), a-in | 0.825 |
| Outflow Burette Area ($cm^2$), a-out | 0.860 |

**AVERAGE FLUX = 5.11E-09 m/s**
**AVERAGE PERMEABILITY = 2.07E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 167.8 | 23.0 | NA | NA |
| 6/24/2010 | 6.6 | 1.1 | 1.0 | NA | 165.4 | 22.8 | 5.67E-09 | 2.09E-09 |
| 6/25/2010 | 28.8 | 4.7 | 4.3 | 1.09 | 157.3 | 22.4 | 5.49E-09 | 2.11E-09 |
| 6/26/2010 | 50.8 | 7.9 | 7.4 | 1.06 | 150.0 | 22.5 | 5.06E-09 | 2.03E-09 |
| 6/28/2010 | 95.9 | 14.1 | 13.4 | 1.03 | 135.8 | 22.5 | 4.79E-09 | 2.07E-09 |

Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

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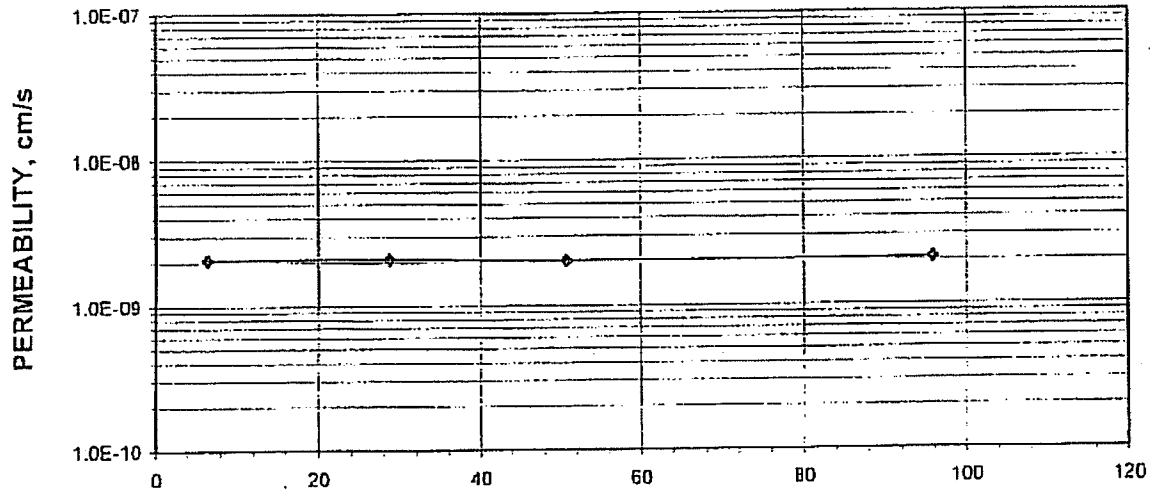
| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-03 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4160 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

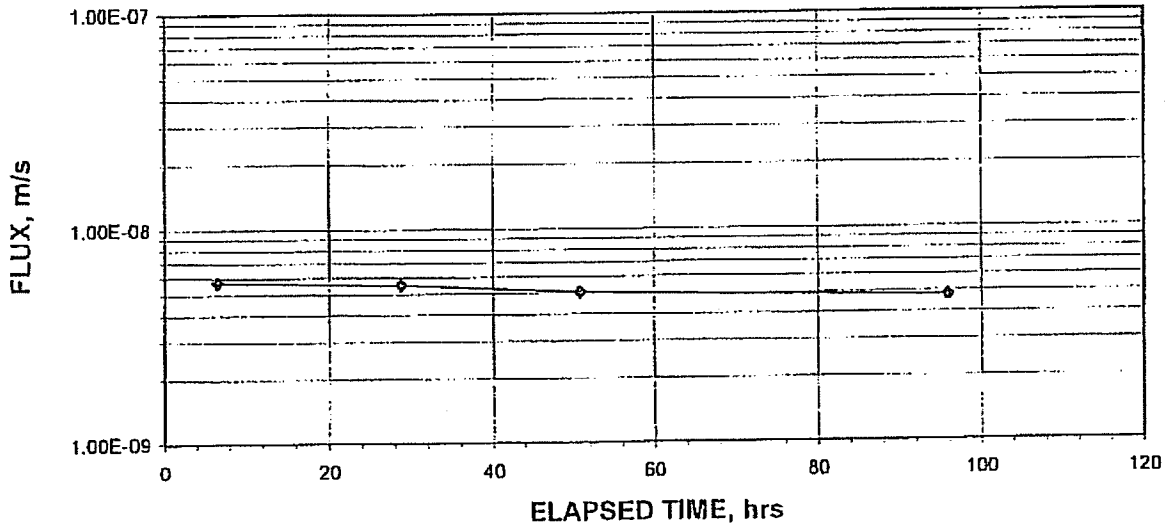
AVERAGE FLUX = 5.11E-09 m/s

AVERAGE PERMEABILITY = 2.07E-09 cm/s @ 20°C

PERMEABILITY VS. ELAPSED TIME




FLUX VS. ELAPSED TIME

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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-04 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4205 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 51 | 41 |
| Wt. of Tare & GCL[2] (gm.) | 83.18 | 92.68 |
| Wt. of Tare & Dry GCL [2] (gm.) | 68.28 | 48.90 |
| Wt. of Tare (gm.) | 10.89 | 10.79 |
| Wt. of Water (gm.) | 14.90 | 43.78 |
| Wt. of Dry GCL (gm.) [2] | 57.39 | 38.11 |
| GCL Moisture Content (%) | **26.0** | **114.9** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 49.47 | 84.39 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.173 | 0.257 |
| Clay Component Thickness 2 (in.) [1] | 0.167 | 0.252 |
| Clay Component Thickness 3 (in.) [1] | 0.158 | 0.248 |
| Average Clay Component Thickness (in.) | na | 0.252 |
| Average Clay Component Thickness (mm) | na | **6.409** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,100 | 10,406 |
| Mass/Unit Area of GCL(psf) [2] | 1.25 | 2.13 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 4,843 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 0.99 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-14-04 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4205 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.641 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | 78.50 |
| Inflow Burette Area ($cm^2$), a-in | 0.856 |
| Outflow Burette Area ($cm^2$), a-out | 0.855 |

**AVERAGE FLUX = 4.60E-09 m/s**
**AVERAGE PERMEABILITY = 1.79E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 167.7 | 23.0 | NA | NA |
| 6/24/2010 | 6.6 | 1.0 | 0.8 | NA | 165.6 | 22.8 | 4.86E-09 | 1.74E-09 |
| 6/25/2010 | 28.8 | 4.2 | 3.5 | 1.20 | 158.7 | 22.4 | 4.70E-09 | 1.75E-09 |
| 6/26/2010 | 50.8 | 7.6 | 6.2 | 1.22 | 151.6 | 22.5 | 4.89E-09 | 1.90E-09 |
| 6/28/2010 | 95.9 | 12.9 | 11.6 | 1.07 | 139.2 | 23.0 | 4.20E-09 | 1.72E-09 |

Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

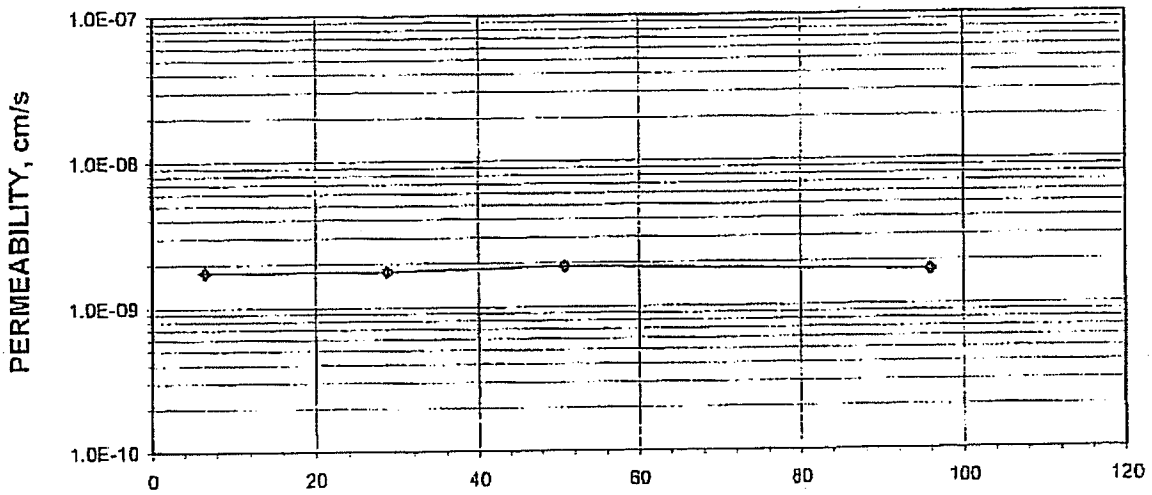
geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-04 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4205 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

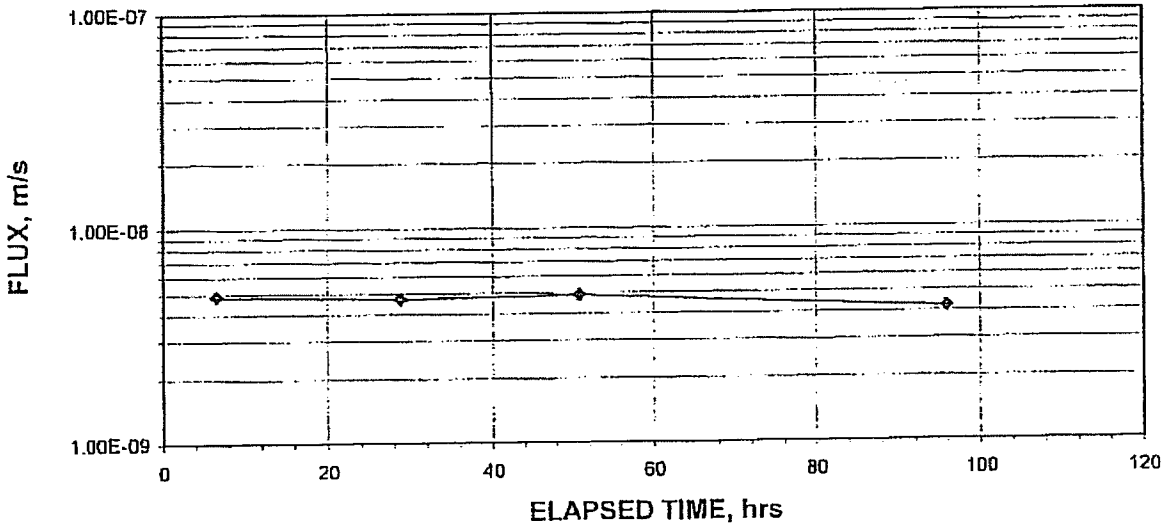
**AVERAGE FLUX = 4.60E-09 m/s**

**AVERAGE PERMEABILITY = 1.79E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**




Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-05 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4249 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 443 | 51 |
| Wt. of Tare & GCL[2] (gm.) | 76.88 | 96.97 |
| Wt. of Tare & Dry GCL[2] (gm.) | 64.13 | 48.59 |
| Wt. of Tare (gm.) | 8.26 | 10.87 |
| Wt. of Water (gm.) | 12.75 | 48.38 |
| Wt. of Dry GCL (gm.)[2] | 55.87 | 37.72 |
| GCL Moisture Content (%) | **22.8** | **128.3** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.)[2] | 48.20 | 89.58 (Calculated) |
| Clay Component Thickness 1 (in.)[1] | 0.167 | 0.248 |
| Clay Component Thickness 2 (in.)[1] | 0.161 | 0.241 |
| Clay Component Thickness 3 (in.)[1] | 0.155 | 0.232 |
| Average Clay Component Thickness (in.) | na | 0.240 |
| Average Clay Component Thickness (mm) | na | **6.104** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$)[2] | 5,943 | 11,046 |
| Mass/Unit Area of GCL(psf)[2] | 1.22 | 2.26 |
| Mass/Unit Area of Dry GCL(gm./m$^2$)[2] | 4,839 | |
| Mass/Unit Area of Dry GCL(psf)[2] | 0.99 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

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INTEGRITY IN TESTING

| | |
|---|---|
| Lab ID No. | L10017-14-05 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4249 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.610 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | **78.50** |
| Inflow Burette Area ($cm^2$), a-in | 0.873 |
| Outflow Burette Area ($cm^2$), a-out | 0.872 |

**AVERAGE FLUX = 4.88E-09 m/s**
**AVERAGE PERMEABILITY = 1.88E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 165.3 | 22.0 | NA | NA |
| 6/25/2010 | 16.5 | 3.0 | 1.8 | NA | 159.8 | 22.0 | 5.15E-09 | 1.84E-09 |
| 6/25/2010 | 26.9 | 4.7 | 3.2 | 1.47 | 156.2 | 21.6 | 5.27E-09 | 1.95E-09 |
| 6/26/2010 | 46.2 | 7.7 | 5.7 | 1.21 | 149.9 | 23.0 | 5.06E-09 | 1.87E-09 |
| 6/27/2010 | 67.0 | 10.7 | 8.5 | 1.13 | 143.3 | 23.5 | 4.93E-09 | 1.88E-09 |
| 6/28/2010 | 88.7 | 13.7 | 11.2 | 1.09 | 136.8 | 23.0 | 4.65E-09 | 1.88E-09 |

Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
(SOP-G52)

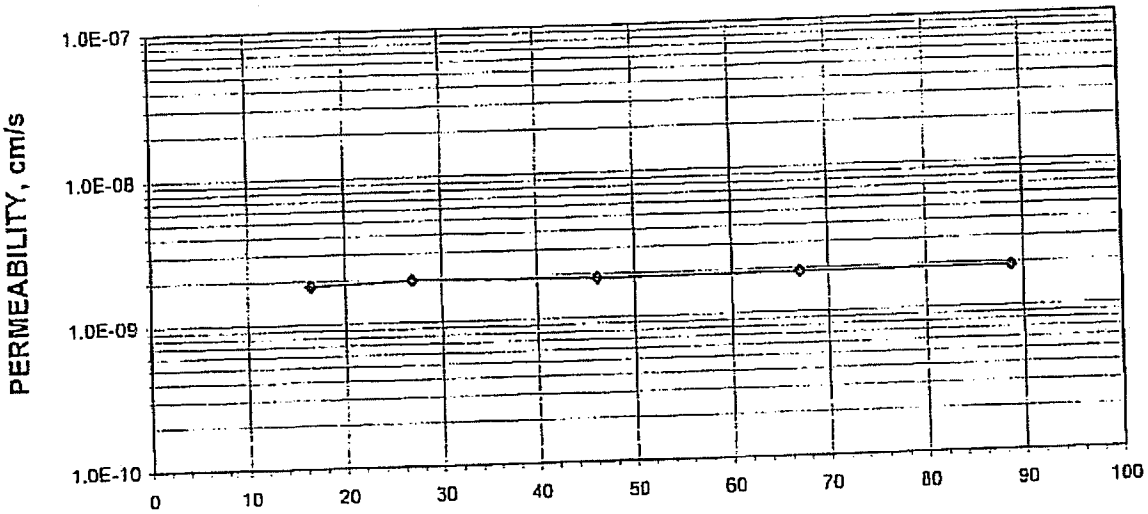
geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-05 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4249 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

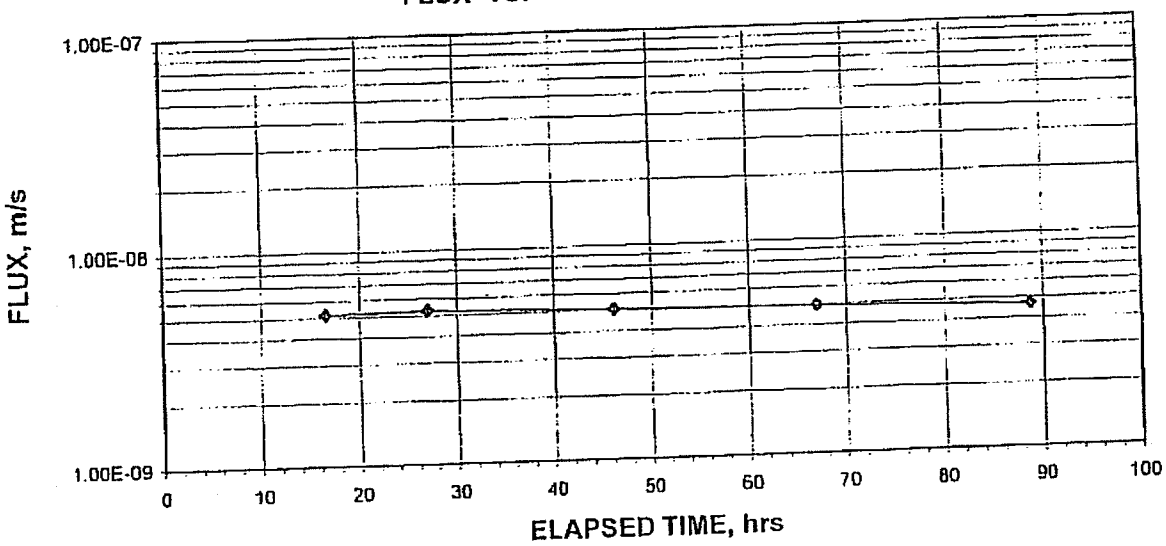
**AVERAGE FLUX = 4.88E-09 m/s**

**AVERAGE PERMEABILITY = 1.88E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**




Checked By: KA Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-06 | Tested by: JO | Date: 6/21/2010 |
| Client | S & ME, Inc. | | |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Checked by: KB | Date: 6-29-10 |
| Project No. | L10017-14 | | |
| Material | CETCO Bentomat ST | | |
| Roll I.D.: | 4293 | | |
| Lot No.: | NA | | |
| Sample No. | NA | | |

Permeant: DEAIRED, DEIONIZED WATER

| MOISTURE CONTENT: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Tare Number | 402 | 46 |
| Wt. of Tare & GCL[2] (gm.) | 68.70 | 111.78 |
| Wt. of Tare & Dry GCL [2] (gm.) | 57.04 | 54.69 |
| Wt. of Tare (gm.) | 8.25 | 10.88 |
| Wt. of Water (gm.) | 11.66 | 57.09 |
| Wt. of Dry GCL (gm.) [2] | 48.79 | 43.81 |
| GCL Moisture Content (%) | **23.9** | **130.3** |

| SPECIMEN: | BEFORE TEST | AFTER TEST |
|---|---|---|
| Wt. of GCL (gm.) [2] | 56.11 | 104.30 (Calculated) |
| Clay Component Thickness 1 (in.) [1] | 0.179 | 0.281 |
| Clay Component Thickness 2 (in.) [1] | 0.174 | 0.278 |
| Clay Component Thickness 3 (in.) [1] | 0.168 | 0.276 |
| Average Clay Component Thickness (in.) | na | 0.278 |
| Average Clay Component Thickness (mm) | na | **7.070** |
| Specimen Dia. (in) | 4.000 | 4.000 |
| Specimen Area (in.$^2$) | 12.57 | 12.57 |
| Specimen Area (m$^2$) | 0.00811 | 0.00811 |
| Mass/Unit Area of GCL(gm./m$^2$) [2] | 6,919 | 12,861 |
| Mass/Unit Area of GCL(psf) [2] | 1.42 | 2.63 |
| Mass/Unit Area of Dry GCL(gm./m$^2$) [2] | 5,584 | |
| Mass/Unit Area of Dry GCL(psf) [2] | 1.14 | |

*NOTES: 1) Direct visual measurement of exposed clay at specimen perimeter.
2) Includes weight of the textile carriers.


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# GCL INDEX FLUX & PERMEABILITY TEST

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| | |
|---|---|
| Lab ID No. | L10017-14-06 |
| Client | S & ME, Inc. |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 |
| Project No. | L10017-14 |
| Material | CETCO Bentomat ST |
| Roll I.D.: | 4293 |
| Sample No. | NA |

**Pressure Heads (Constant)**

| | |
|---|---|
| Top Cap (psi) | 75.0 |
| Bottom Cap (psi) | 77.0 |
| Cell (psi) | 80.0 |
| Total Head (cm) | 140.6 |

**Final Sample Dimensions**

| | |
|---|---|
| Sample Length (cm), L | 0.707 |
| Sample Diameter (cm) | 10.16 |
| Sample Area ($cm^2$), A | 78.50 |
| Inflow Burette Area ($cm^2$), a-in | 0.877 |
| Outflow Burette Area ($cm^2$), a-out | 0.963 |

**AVERAGE FLUX = 5.48E-09 m/s**
**AVERAGE PERMEABILITY = 2.47E-09 cm/s @ 20oC**

| DATE (m-d-y) | ELAPSED TIME t (hr) | TOTAL INFLOW ($cm^3$) | TOTAL OUTFLOW ($cm^3$) | RATIO ΔIN/ΔOUT (3 readings) | TOTAL HEAD h (cm) | TEMP. (°C) | INCREMENTAL FLUX @ 20°C (m/sec) | INCREMENTAL PERMEABILITY @ 20°C (cm/sec) |
|---|---|---|---|---|---|---|---|---|
| 6/24/2010 | 0.0 | 0.0 | 0.0 | NA | 166.5 | 22.0 | NA | NA |
| 6/25/2010 | 16.5 | 3.4 | 2.3 | NA | 160.2 | 22.0 | 6.11E-09 | 2.55E-09 |
| 6/25/2010 | 26.9 | 5.4 | 3.9 | 1.38 | 156.3 | 21.6 | 6.11E-09 | 2.64E-09 |
| 6/26/2010 | 46.2 | 8.7 | 6.8 | 1.18 | 149.5 | 23.0 | 5.70E-09 | 2.46E-09 |
| 6/27/2010 | 67.0 | 12.0 | 10.0 | 1.08 | 142.4 | 23.5 | 5.52E-09 | 2.46E-09 |
| 6/28/2010 | 88.7 | 15.3 | 13.1 | 1.05 | 135.4 | 23.0 | 5.23E-09 | 2.48E-09 |

Checked By: KB Date: 6-29-10



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# GCL INDEX FLUX & PERMEABILITY TEST

ASTM D 5887
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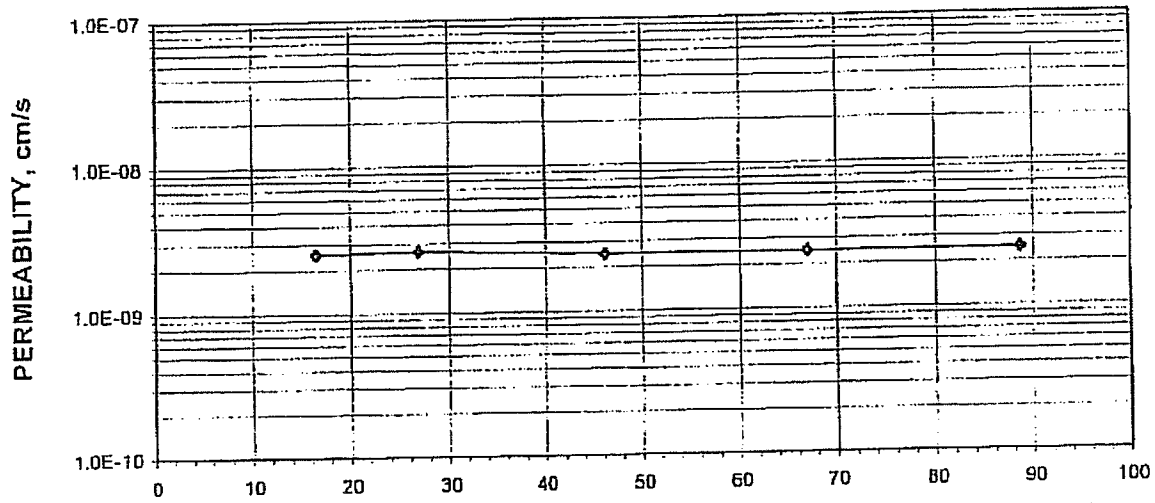
geotechnics
INTEGRITY IN TESTING

| | | | |
|---|---|---|---|
| Lab ID No. | L10017-14-06 | Material | CETCO Bentomat ST |
| Client | S & ME, Inc. | Roll I.D.: | 4293 |
| Client Project | Marshall Steam Station - Industrial Landfill No. 1 | Lot No.: | NA |
| Project No. | L10017-14 | Sample No. | NA |

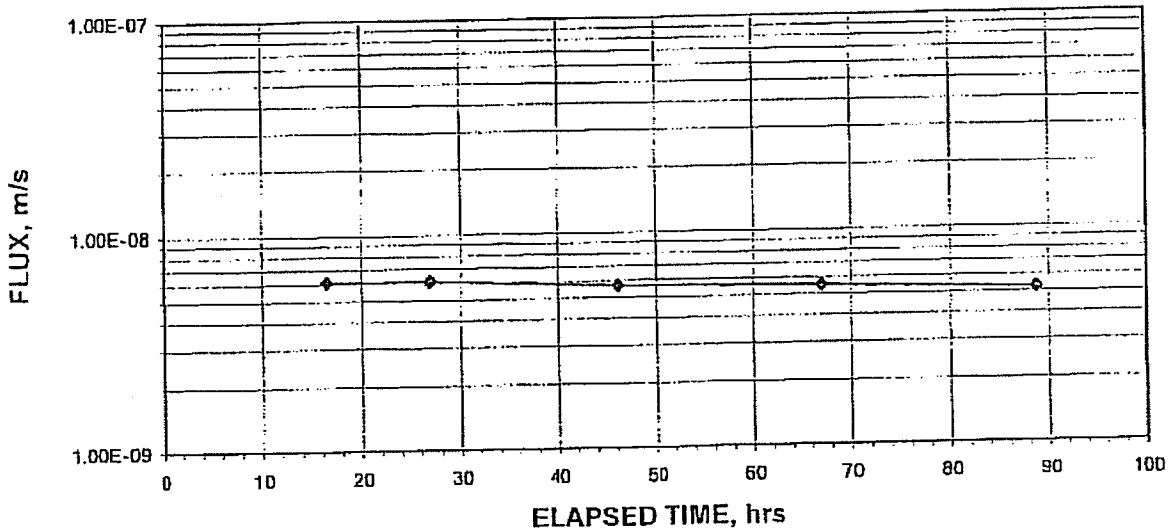
**AVERAGE FLUX = 5.48E-09 m/s**

**AVERAGE PERMEABILITY = 2.47E-09 cm/s @ 20°C**

**PERMEABILITY VS. ELAPSED TIME**




**FLUX VS. ELAPSED TIME**

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# APPENDIX II – GEOSYNTHETICS
# Section 2 – Cells 1 and 2 HDPE Geomembrane Testing

## Manufacturer's Quality Control (MQC) Test Results
## Conformance Test Results

# HDPE Geomembrane Manufacturer's Quality Control (MQC) Test Results

Env Specialties Duke/Marshall Steam doc 13568 | PO# 13173

Terrell, NC

165 rolls 60 HD micro (505) | 165 | left

| roll # | ENGLISH DIMENSIONS wid | len | area | METRIC DIMENSIONS wid | len | area | check weld rod qty (if ordered) | wgt | | lot |
|---|---|---|---|---|---|---|---|---|---|---|
| (K)211212 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 1 | 3725 | 10 sqs | 8191288 |
| (K)211213 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 2 | 3725 | | 8191288 |
| (K)211214 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 3 | 3700 | | 8191288 |
| (K)211315 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 4 | 3700 | 3FT to geosyntec | 8191288 |
| (K)211316 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 5 | 3710 | | 8191288 |
| (K)211317 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 6 | 3710 | | 8191288 |
| (K)211318 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 7 | 3690 | | 8191288 |
| (K)211319 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 8 | 3695 | | 8191288 |
| (K)211320 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 9 | 3750 | 10 sqs | 8191288 |
| (K)211321 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 10 | 3745 | | 8191288 |
| (K)211322 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 11 | 3725 | | 8191288 |
| (K)211323 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 12 | 3725 | | 8191288 |
| (K)211324 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 13 | 3725 | | 8191288 |
| (K)211326 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 14 | 3765 | | 8191288 |
| (K)211327 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 15 | 3725 | | 8191288 |
| (K)211328 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 16 | 3730 | | 8191288 |
| (K)211431 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 17 | 3730 | | 8191288 |
| (K)211432 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 18 | 3750 | 10 sqs | 8191288 |
| (K)211433 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 19 | 3755 | | 8191288 |
| (K)211434 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 20 | 3775 | | 8191288 |
| (K)211435 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 21 | 3785 | | 8191288 |
| (K)211436 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 22 | 3785 | | 8191288 |
| (K)211437 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 23 | 3785 | | 8191288 |
| (K)211438 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 24 | 3790 | | 8191288 |
| (K)211439 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 25 | 3775 | | 8191288 |
| (K)211440 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 26 | 3775 | 10 sqs | 8191288 |
| (K)211441 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 27 | 3775 | | 8191288 |
| (K)211442 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 28 | 3780 | | 8191288 |
| (K)211443 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 29 | 3795 | | 8191288 |
| (K)211444 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 30 | 3805 | | 8191288 |
| (K)211445 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 31 | 3800 | | 8191288 |
| (K)211446 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 32 | 3800 | | 8191288 |
| (K)211547 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 33 | 3775 | | 8191288 |
| (K)211548 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 34 | 3785 | | 8191288 |
| (K)211549 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 35 | 3770 | 10 sqs | 8191288 |
| (K)211550 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 36 | 3765 | | 8191288 |
| (K)211551 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 37 | 3780 | | 8191288 |
| (K)211552 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 38 | 3760 | | 8191288 |
| (K)211553 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 39 | 3720 | | 8191288 |
| (K)211554 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 40 | 3720 | | 8191288 |
| (K)211555 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 41 | 3735 | | 8191288 |
| (K)211556 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 42 | 3750 | | 8191288 |
| (K)211557 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 43 | 3745 | | 8191288 |
| (K)211558 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 44 | 3750 | 10 sqs | 8191288 |
| (K)211559 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 45 | 3745 | | 8191288 |
| (K)211560 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 46 | 3760 | | 8191288 |
| (K)211561 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 47 | 3775 | | 8191288 |
| (K)211562 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 48 | 3800 | | 8191283 |
| (K)211563 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 49 | 3810 | | 8191283 |
| (K)211564 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 50 | 3810 | | 8191283 |
| (K)211665 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 51 | 3785 | | 8191283 |
| (K)211666 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 52 | 3780 | 10 sqs | 8191283 |
| (K)211667 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 53 | 3765 | | 8191283 |
| (K)211668 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 54 | 3715 | | 8191283 |
| (K)211669 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 55 | 3725 | | 8191283 |
| (K)211670 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 56 | 3715 | | 8191283 |
| (K)211671 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 57 | 3795 | | 8191283 |
| (K)211672 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 58 | 3715 | | 8191283 |
| (K)211673 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 59 | 3755 | | 8191283 |
| (K)211674 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 60 | 3755 | | 8191283 |

Env Specialties Duke/Marshall Steam doc 13568 | PO# 13173

Terrell, NC

165 rolls 60 HD micro (505) | 165 | left

| roll # | ENGLISH DIMENSIONS wid | len | area | METRIC DIMENSIONS wid | len | area | check weld rod qty (if ordered) | wgt | | lot |
|---|---|---|---|---|---|---|---|---|---|---|
| (K)211675 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 61 | 3745 | 10 sqs | 8191283 |
| (K)211676 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 62 | 3755 | | 8191283 |
| (K)211677 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 63 | 3760 | | 8191283 |
| (K)211678 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 64 | 3770 | | 8191283 |
| (K)211679 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 65 | 3780 | | 8191283 |
| (K)211680 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 66 | 3790 | | 8191283 |
| (K)211681 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 67 | 3775 | | 8191283 |
| (K)211682 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 68 | 3780 | | 8191283 |
| (K)211683 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 69 | 3780 | 10 sqs | 8191283 |
| (K)211684 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 70 | 3775 | | 8191283 |
| (K)211785 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 71 | 3780 | | 8191283 |
| (K)211786 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 72 | 3765 | | 8191283 |
| (K)211787 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 73 | 3750 | | 8191283 |
| (K)211788 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 74 | 3740 | | 8191283 |
| (K)211789 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 75 | 3750 | | 8191283 |
| (K)211790 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 76 | 3735 | | 8191283 |
| (K)211791 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 77 | 3745 | | 8191283 |
| (K)211792 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 78 | 3750 | 10 sqs | 8191283 |
| (K)211793 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 79 | 3765 | | 8191283 |
| (K)211794 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 80 | 3770 | | 8191283 |
| (K)211795 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 81 | 3790 | | 8191283 |
| (K)211796 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 82 | 3795 | | 8191283 |
| (K)211797 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 83 | 3800 | | 8191283 |
| (K)211798 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 84 | 3805 | | 8191283 |
| (K)211799 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 85 | 3785 | | 8191283 |
| (K)211700 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 86 | 3800 | | 8191283 |
| (K)211701 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 87 | 3800 | 10 sqs | 8191283 |
| (K)211702 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 88 | 3790 | | 8191283 |
| (K)211703 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 89 | 3795 | | 8191283 |
| (K)211704 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 90 | 3800 | | 8191283 |
| (K)212101 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 91 | 3790 | | 8191283 |
| (K)212102 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 92 | 3795 | | 8191283 |
| (K)212103 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 93 | 3780 | | 8191283 |
| (K)212104 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 94 | 3790 | | 8191283 |
| (K)212105 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 95 | 3800 | 10 sqs | 8191283 |
| (K)212106 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 96 | 3760 | | 8191283 |
| (K)212107 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,079 | ESI Marshall Steam 165tot 97 | 3775 | | 8191283 |

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# quality certificate

ROLL # **211212-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.36 | mm | 54 | mil |
| | MAX: | 1.63 | mm | 64 | mil |
| Asperity ASTM D7466: 35/36 mil | AVE: | 1.47 | mm | 58 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | 1.5 mm | 60 mil | |
| Length..... | 153.926 m | 505.0 feet | |
| Width..... | 7.00 m; | 23.0 feet | |
| OIT(Standard) ASTM D3895 minutes | 200 | | |

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.20 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 N/mm (kN/m) | 153 ppi | | 2,641 | psi |
| | Average Strength @ Break | 31 N/mm (kN/m) | 174 ppi | | 3,015 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 17.02 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 457.5 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.0 N | | | 51.701 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 410.9 N | | | 92.383 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 565.6 N | | | 127.15 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-16-10**

Signature

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# quality certificate

ROLL # **211213-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **35/35** mil | AVE: | **1.49** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **155** ppi | | | **2,641** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **177** ppi | | | **3,015** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **457.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.0** | N | | | | **51.701** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **410.9** | N | | | | **92.383** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **565.6** | N | | | | **127.15** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-16-10**

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ROLL # **211214-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.37** | mm | **54** | mil |
| | MAX: | **1.51** | mm | **59** | mil |
| Asperity ASTM D7466: **31/32** mil | AVE: | **1.47** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **153** ppi | **2,641** | psi | | |
| | Average Strength @ Break | **31** N/mm (kN/m) | **174** ppi | **3,015** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **457.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.0** N | | **51.701** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **410.9** N | | **92.383** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **565.6** N | | **127.15** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-16-10**

Signature.....
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# quality certificate

ROLL # **211315-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.47 | mm | 58 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 34/36 mil | AVE: | 1.52 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.20 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 158 | ppi | 2,641 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 180 | ppi | 3,015 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | 17.02 | |
| | Average Elongation @ Break | % | | | | 457.5 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.0 | N | | | 51.701 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 410.9 | N | | | 92.383 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 565.6 | N | | | 127.15 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

Signature.....

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# quality certificate

ROLL # **211316-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **35/36** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **154** ppi | **2,641** | psi | | |
| | Average Strength @ Break | **31** N/mm (kN/m) | **176** ppi | **3,015** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **17.02** | |
| | Average Elongation @ Break | % | | | | **457.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.0** N | | **51.701** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **410.9** N | | **92.383** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **565.6** N | | **127.15** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

Signature

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# quality certificate

ROLL # **211317-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.35 | mm | 53 | mil |
| | MAX: | 1.51 | mm | 59 | mil |
| Asperity ASTM D7466: 32/32 mil | AVE: | 1.44 | mm | 57 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | 2.29 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 144 | ppi | 2,538 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 176 | ppi | 3,097 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 18.54 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 503.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.0 | N | | | 51.701 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 410.9 | N | | | 92.383 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 565.6 | N | | | 127.15 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

Signature.....
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# quality certificate

ROLL # **211318-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.45 | mm | 57 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 31/36 mil | AVE: | 1.50 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.29 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 150 | ppi | 2,538 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 183 | ppi | 3,097 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.54 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 503.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.0 | N | | | 51.701 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 410.9 | N | | | 92.383 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 565.6 | N | | | 127.15 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211319-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.68** | mm | **66** | mil |
| Asperity ASTM D7466: **36/37** mil | AVE: | **1.55** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.29** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **155** ppi | | | **2,538** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | **189** ppi | | | **3,097** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.54** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **503.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.0** N | | | | **51.701** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **410.9** N | | | | **92.383** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **565.6** N | | | | **127.15** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211320-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil |
| | MAX: | 1.61 | mm | 63 | mil |
| | AVE: | 1.53 | mm | 60 | mil |

Asperity ASTM D7466: 32/34 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.29 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 153 | ppi | 2,538 | psi |
| | Average Strength @ Break | 33 | N/mm (kN/m) | 187 | ppi | 3,097 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.54 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 503.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.0 | N | | | 51.701 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 410.9 | N | | | 92.383 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 565.6 | N | | | 127.15 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211321-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **35/37** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.29** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **151** ppi | **2,538** | psi | | |
| | Average Strength @ Break | **32** N/mm (kN/m) | **184** ppi | **3,097** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.54** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **503.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.0** N | | **51.701** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **410.9** N | | **92.383** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **565.6** N | | **127.15** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211322-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.43** | mm | **56** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **29/36** mil | AVE: | **1.50** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.27** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **145** ppi | | | **2,451** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **162** ppi | | | **2,745** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.74** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **461.3** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **226.8** N | | | | **50.988** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **404.1** N | | | | **90.851** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **596.8** N | | | | **134.16** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-17-10**

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ROLL # **211323-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| | AVE: | 1.52 | mm | 60 | mil |

Asperity ASTM D7466: 30/32 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes 200

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.27 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 147 | ppi | 2,451 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 164 | ppi | 2,745 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.74 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 461.3 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 226.8 | N | | | 50.988 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 404.1 | N | | | 90.851 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 596.8 | N | | | 134.16 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

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ROLL # **211324-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **27/36** mil | AVE: | **1.52** | mm | **60** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.27** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **147** ppi | | **2,451** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | | **164** ppi | | **2,745** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.74** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **461.3** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **226.8** | N | | | **50.988** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **404.1** | N | | | **90.851** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **596.8** | N | | | **134.16** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211326-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| | AVE: | **1.51** | mm | **59** | mil |

Asperity ASTM D7466: **32/34** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.27** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **146** ppi | | | **2,451** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | **163** ppi | | | **2,745** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.74** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **461.3** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **226.8** N | | | | **50.988** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **404.1** N | | | | **90.851** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **596.8** N | | | | **134.16** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211327-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil |
| | MAX: | 1.69 | mm | 67 | mil |
| Asperity ASTM D7466: 34/35 mil | AVE: | 1.57 | mm | 62 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | 2.26 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 30 | N/mm (kN/m) | 170 | ppi | 2,753 | psi | |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 166 | ppi | 2,690 | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | 16.48 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | 428.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 226.8 | N | | | 50.988 | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 404.1 | N | | | 90.851 | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | 596.8 | N | | | 134.16 | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211328-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.44 | mm | 57 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| Asperity ASTM D7466: 28/30 mil | AVE: | 1.49 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes 200

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.26 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 161 | ppi | 2,753 | psi |
| | Average Strength @ Break | 28 | N/mm (kN/m) | 158 | ppi | 2,690 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 16.48 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 428.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 226.8 | N | | | 50.988 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 404.1 | N | | | 90.851 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 596.8 | N | | | 134.16 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-17-10**

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ROLL # **211431-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.49 | mm | 59 | mil |
| Asperity ASTM D7466: 33/34 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.47 | mm | 58 | mil |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |
| OIT(Standard) ASTM D3895 minutes | 200 | |

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.26 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 N/mm (kN/m) | 159 ppi | | 2,753 | psi |
| | Average Strength @ Break | 27 N/mm (kN/m) | 156 ppi | | 2,690 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 16.48 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 428.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 226.8 N | | | 50.988 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 404.1 N | | | 90.851 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 596.8 N | | | 134.16 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211432-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.38 | mm | 54 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 33/34 mil | AVE: | 1.50 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.23 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 154 | ppi | 2,609 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 179 | ppi | 3,027 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.63 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 239.1 | N | | | 53.747 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 413.2 | N | | | 92.896 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 570.0 | N | | | 128.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211433-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.38 | mm | 54 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.60 | mm | 63 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 32/33 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.47 | mm | 58 | mil | OIT(Standard) ASTM D3895 minutes | 200 | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.23 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 151 | ppi | 2,609 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 175 | ppi | 3,027 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | 17.63 | |
| | Average Elongation @ Break | % | | | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 239.1 | N | | | 53.747 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 413.2 | N | | | 92.896 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 570.0 | N | | | 128.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211434-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.65 | mm | 65 | mil |
| Asperity ASTM D7466: 36/36 mil | AVE: | 1.51 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.23 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 155 | ppi | 2,609 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 180 | ppi | 3,027 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.63 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 239.1 | N | | | 53.747 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 413.2 | N | | | 92.896 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 570.0 | N | | | 128.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211435-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil |
| | MAX: | 1.61 | mm | 63 | mil |
| Asperity ASTM D7466: 34/37 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.56 | mm | 61 | mil |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |
| OIT(Standard) ASTM D3895 minutes | 200 | |

| | | | | TEST RESULTS | |
|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 N/mm (kN/m) | 160 ppi | 2,609 | psi |
| | Average Strength @ Break | 33 N/mm (kN/m) | 186 ppi | 3,027 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | 17.63 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 239.1 N | | 53.747 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 413.2 N | | 92.896 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 570.0 N | | 128.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211436-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.48** | mm | **58** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.55** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **159** ppi | | **2,609** | psi |
| | Average Strength @ Break | **32** N/mm (kN/m) | **185** ppi | | **3,027** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **17.63** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **486.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **239.1** N | | | **53.747** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **413.2** N | | | **92.896** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **570.0** N | | | **128.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-18-10**

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ROLL # **211437-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.47 | mm | 58 | mil |
| | MAX: | 1.57 | mm | 62 | mil |
| | AVE: | 1.51 | mm | 59 | mil |

Asperity ASTM D7466: 36/38 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **TEST RESULTS** |
| Specific Gravity ASTM D792 | Density | | g/cc | | | | .947 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | | .24 |
| Carbon Black Content ASTM D4218 | Range | | % | | | | 2.29 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 161 | ppi | 2,708 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 177 | ppi | 2,981 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 17.69 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 483.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 239.1 | N | | | 53.747 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 413.2 | N | | | 92.896 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 570.0 | N | | | 128.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211438-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| | AVE: | **1.49** | mm | **59** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

Asperity ASTM D7466: **31/35** mil
ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.29** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **159** ppi | | | **2,708** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **175** ppi | | | **2,981** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.69** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **239.1** N | | | | **53.747** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **413.2** N | | | | **92.896** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **570.0** N | | | | **128.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-18-10**

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ROLL # **211439-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **31/35** mil ODD # : TOP EVEN #: BOTTOM | AVE: | **1.49** | mm | **59** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.29** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **159** ppi | | | **2,708** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **175** ppi | | | **2,981** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.69** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **239.1** N | | | | **53.747** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **413.2** N | | | | **92.896** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **570.0** N | | | | **128.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature.....
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ROLL # **211440-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **34/35** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **158** ppi | | | **2,708** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **174** ppi | | | **2,981** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.69** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **239.1** N | | | | **53.747** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **413.2** N | | | | **92.896** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **570.0** N | | | | **128.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211441-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.63** | mm | **64** | mil |
| Asperity ASTM D7466: **29/35** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **161** ppi | **2,708** | psi | | |
| | Average Strength @ Break | **31** N/mm (kN/m) | **177** ppi | **2,981** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.69** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **239.1** N | | **53.747** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **413.2** N | | **92.896** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **570.0** N | | **128.14** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211442-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.38** | mm | **54** | mil |
| | MAX: | **1.51** | mm | **59** | mil |
| Asperity ASTM D7466: **31/38** mil | AVE: | **1.45** | mm | **57** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.25** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **150** ppi | | **2,623** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | **166** ppi | | **2,912** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **18.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **465.8** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211443-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.39** | mm | **55** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| | AVE: | **1.49** | mm | **59** | mil |

Asperity ASTM D7466: **32/38** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.25** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **154** ppi | **2,623** | psi | | |
| | Average Strength @ Break | **30** N/mm (kN/m) | **171** ppi | **2,912** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **465.8** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | **51.993** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | **91.957** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | **131.87** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211444-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **31/36** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.25** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **156** ppi | **2,623** | psi | | |
| | Average Strength @ Break | **30** N/mm (kN/m) | **173** ppi | **2,912** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **465.8** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | **51.993** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | **91.957** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | **131.87** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature: [signature]
Quality Control Department

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ROLL # **211445-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.44 | mm | 57 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 35/35 mil | AVE: | 1.49 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minules **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.25 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 154 | ppi | 2,623 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 171 | ppi | 2,912 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.02 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 465.8 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.3 | N | | | 51.993 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 409.0 | N | | | 91.957 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 1.0 | N | | | 131.87 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature.....

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ROLL # **211446-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **35/37** mil | AVE: | **1.46** | mm | **57** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.25** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **151** ppi | **2,623** | psi | | |
| | Average Strength @ Break | **29** N/mm (kN/m) | **167** ppi | **2,912** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.02** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **465.8** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | **51.993** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | **91.957** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | **131.87** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**
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ROLL # **211547-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **35/35** mil | AVE: | **1.49** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | **151** | ppi | **2,575** | psi |
| | Average Strength @ Break | **30** | N/mm (kN/m) | **169** | ppi | **2,880** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **18.03** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **433.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** | N | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** | N | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** | N | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

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ROLL # **211548-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **33/35** mil | AVE: | **1.51** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **153** ppi | | | **2,575** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **171** ppi | | | **2,880** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.03** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **433.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-18-10**

Signature: H. Holme

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ROLL # **211549-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| | AVE: | **1.51** | mm | **59** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

Asperity ASTM D7466: **35/40** mil
ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **153** ppi | | **2,575** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | | **171** ppi | | **2,880** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.03** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **433.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** | N | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** | N | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** | N | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211550-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **34/35** mil | AVE: | **1.47** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **149** ppi | | **2,575** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | **167** ppi | | **2,880** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **18.03** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **433.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211551-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.48** | mm | **58** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **34/34** mil | AVE: | **1.52** | mm | **60** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **154** | ppi | **2,575** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **172** | ppi | **2,880** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **18.03** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **433.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.3** N | | | **51.993** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **409.0** N | | | **91.957** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **1.0** N | | | **131.87** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211552-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.45 | mm | 57 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 33/37 mil | AVE: | 1.52 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.12 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 160 | ppi | 2,679 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 182 | ppi | 3,044 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.38 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 240.1 | N | | | 53.981 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 402.9 | N | | | 90.590 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 575.9 | N | | | 129.46 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211553-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.54** | mm | **61** | mil |
| Asperity ASTM D7466: **31/38** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | | **157** ppi | | | **2,679** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **179** ppi | | | **3,044** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.38** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **486.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** | N | | | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** | N | | | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** | N | | | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211554-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **30/36** mil | AVE: | **1.52** | mm | **60** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m | **23.0** feet |
| OIT(Standard) ASTM D3895 minutes | **200** | |

| | | | | TEST RESULTS | |
|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | **2.12** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **160** ppi | **2,679** | psi |
| | Average Strength @ Break | **32** N/mm (kN/m) | **182** ppi | **3,044** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | **17.38** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | **486.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** N | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** N | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** N | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

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ROLL # **211555-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.52 | mm | 60 | mil |
| | AVE: | 1.47 | mm | 58 | mil |

Asperity ASTM D7466: 33/36 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes 200

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.20 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 155 | ppi | 2,679 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 176 | ppi | 3,044 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.38 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 486.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 240.1 | N | | | 53.981 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 402.9 | N | | | 90.590 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 575.9 | N | | | 129.46 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

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ROLL # **211556-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **33/36** mil | AVE: | **1.47** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **155** ppi | | | **2,679** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **176** ppi | | | **3,044** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.38** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **486.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** | N | | | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** | N | | | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** | N | | | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-19-10**

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ROLL # **211557-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **32/37** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.23** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **29** | N/mm (kN/m) | **163** | ppi | | **2,748** | psi |
| | Average Strength @ Break | **27** | N/mm (kN/m) | **152** | ppi | | **2,562** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **18.37** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **372.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** | N | | | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** | N | | | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** | N | | | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211558-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **32/35** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.23** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **29** | N/mm (kN/m) | **163** | ppi | | **2,748** | psi |
| | Average Strength @ Break | **27** | N/mm (kN/m) | **152** | ppi | | **2,562** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **18.37** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **372.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** | N | | | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** | N | | | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** | N | | | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211559-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.57 | mm | 62 | mil |
| Asperity ASTM D7466: 28/33 mil | AVE: | 1.47 | mm | 58 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.23 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 N/mm (kN/m) | 159 ppi | | 2,748 | psi |
| | Average Strength @ Break | 26 N/mm (kN/m) | 148 ppi | | 2,562 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 18.37 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 372.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.19 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 240.1 N | | | 53.981 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 402.9 N | | | 90.590 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 575.9 N | | | 129.46 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

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ROLL # **211560-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.54** | mm | **61** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.18** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **161** ppi | | | **2,748** | psi |
| | Average Strength @ Break | **26** N/mm (kN/m) | **150** ppi | | | **2,562** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.37** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **372.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** N | | | | **53.981** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** N | | | | **90.590** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** N | | | | **129.46** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211561-10** Lot #: **8191288** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **32/38** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **200**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.18** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** | N/mm (kN/m) | **162** | ppi | **2,748** | psi | |
| | Average Strength @ Break | **26** | N/mm (kN/m) | **151** | ppi | **2,562** | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **18.37** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **372.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.19** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **240.1** | N | | | **53.981** | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **402.9** | N | | | **90.590** | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **575.9** | N | | | **129.46** | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature.....

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ROLL # **211562-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.48** | mm | **58** | mil |
| | MAX: | **1.56** | mm | **61** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.52** | mm | **60** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |
| OIT(Standard) ASTM D3895 minutes | **194** | |

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.18** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **161** ppi | | **2,694** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **174** ppi | | **2,915** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **17.73** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **470.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | **57.438** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | **102.23** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | **137.42** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature.....

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ROLL # **211563-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **36/37** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.18** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **159** ppi | | | **2,694** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **172** ppi | | | **2,915** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.73** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **470.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | | **57.438** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | | **102.23** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | | **137.42** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211564-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.71 | mm | 67 | mil |
| Asperity ASTM D7466: 34/36 mil | AVE: | 1.53 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.18 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 162 | ppi | | 2,694 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 176 | ppi | | 2,915 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | 17.73 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | 470.0 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 255.5 | N | | | | 57.438 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 454.8 | N | | | | 102.23 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 611.3 | N | | | | 137.42 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-19-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211665-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **35/36** mil | AVE: | **1.54** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **29** N/mm (kN/m) | **163** ppi | | | **2,694** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **177** ppi | | | **2,915** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.73** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **470.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | | **57.438** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | | **102.23** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | | **137.42** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....

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ROLL # **211666-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **32/35** mil | AVE: | **1.51** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.30** |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.44** |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **160** ppi | | | | **2,694** psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **173** ppi | | | | **2,915** psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.73** |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **470.0** |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.15** |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | | | **57.438** lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | | | **102.23** lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | | | **137.42** lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

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ROLL # **211667-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.37** | mm | **54** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **34/35** mil | AVE: | **1.46** | mm | **57** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.54** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **159** ppi | | | **2,769** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **172** ppi | | | **2,998** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.82** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **460.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | | **57.438** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | | **102.23** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | | **137.42** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....
Quality Control Department

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# quality certificate

ROLL # **211668-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.44 | mm | 57 | mil |
| | MAX: | 1.67 | mm | 66 | mil |
| Asperity ASTM D7466: 34/35 mil | AVE: | 1.52 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.54 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 29 | N/mm (kN/m) | 166 | ppi | 2,769 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 179 | ppi | 2,998 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.82 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 460.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 255.5 | N | | | 57.438 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 454.8 | N | | | 102.23 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 611.3 | N | | | 137.42 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211669-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 33/36 mil | AVE: | 1.47 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.54 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 160 | ppi | 2,769 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 173 | ppi | 2,998 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.82 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 460.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 255.5 | N | | | 57.438 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 454.8 | N | | | 102.23 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 611.3 | N | | | 137.42 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: K Holmes

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ROLL # **211670-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.43** | mm | **56** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **33/34** mil ODD # : TOP EVEN #: BOTTOM | AVE: | **1.50** | mm | **59** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **29** N/mm (kN/m) | **163** ppi | | **2,769** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **177** ppi | | **2,998** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **17.82** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **460.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **255.5** N | | | **57.438** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **454.8** N | | | **102.23** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **611.3** N | | | **137.42** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-20-10**

Signature.....

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ROLL # **211671-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.40 | mm | 55 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.62 | mm | 64 | mil | Width..... | 7.00 m: | 23.0 feet |
| Asperity ASTM D7466: 33/34 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.48 | mm | 58 | mil | OIT(Standard) ASTM D3895 minutes | 194 | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 161 | ppi | 2,769 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 175 | ppi | 2,998 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 17.82 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 460.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 255.5 | N | | | 57.438 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 454.8 | N | | | 102.23 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 611.3 | N | | | 137.42 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211672-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.61 | mm | 63 | mil |
| Asperity ASTM D7466: 31/35 mil | AVE: | 1.50 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.45 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 157 | ppi | 2,663 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 176 | ppi | 2,972 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.99 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 467.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature:

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ROLL # **211673-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 33/36 mil | AVE: | 1.48 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.45 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 N/mm (kN/m) | 155 ppi | | 2,663 | psi |
| | Average Strength @ Break | 30 N/mm (kN/m) | 173 ppi | | 2,972 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 17.99 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 467.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211674-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.40 | mm | 55 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 34/36 mil | AVE: | 1.48 | mm | 58 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.45 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 155 | ppi | 2,663 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 173 | ppi | 2,972 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.99 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 467.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....

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ROLL # **211675-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.56 | mm | 61 | mil |
| Asperity ASTM D7466: 34/38 mil | AVE: | 1.49 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.43 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 156 | ppi | 2,663 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 174 | ppi | 2,972 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.99 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 467.4 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

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ROLL # **211676-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **32/38** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.43** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **157** ppi | | **2,663** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **176** ppi | | **2,972** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **17.99** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **467.4** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.7** N | | | **51.193** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **423.3** N | | | **95.157** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **624.9** N | | | **140.49** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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# quality certificate

ROLL # **211677-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **34/36** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.36** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **148** ppi | | | **2,531** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **161** ppi | | | **2,751** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **443.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.7** | N | | | | **51.193** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **423.3** | N | | | | **95.157** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **624.9** | N | | | | **140.49** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....
Quality Control Department

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# quality certificate

ROLL # **211678-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 32/35 mil | AVE: | 1.48 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.36 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 147 | ppi | 2,531 | psi |
| | Average Strength @ Break | 28 | N/mm (kN/m) | 160 | ppi | 2,751 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.90 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 443.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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# quality certificate

ROLL # **211679-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.46 | mm | 57 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.57 | mm | 62 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 33/36 mil | AVE: | 1.49 | mm | 59 | mil | | | |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes 194

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.36 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 148 | ppi | 2,531 | psi |
| | Average Strength @ Break | 28 | N/mm (kN/m) | 161 | ppi | 2,751 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.90 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 443.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature

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# quality certificate

ROLL # **211680-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.46 | mm | 57 | mil |
| | MAX: | 1.57 | mm | 62 | mil |
| Asperity ASTM D7466: 33/35 mil | AVE: | 1.52 | mm | 60 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.39 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 151 | ppi | 2,531 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 165 | ppi | 2,751 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.90 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 443.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.7 | N | | | 51.193 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 423.3 | N | | | 95.157 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 624.9 | N | | | 140.49 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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# quality certificate

ROLL # **211681-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **33/36** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.39** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **149** ppi | | | **2,531** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **162** ppi | | | **2,751** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **443.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.7** N | | | | **51.193** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **423.3** N | | | | **95.157** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **624.9** N | | | | **140.49** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....
Quality Control Department

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ROLL # **211682-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.41 | mm | 56 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| Asperity ASTM D7466: 30/37 mil | AVE: | 1.48 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.45 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,452 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 174 | ppi | 2,980 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.14 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 509.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: H. Holmes
Quality Control Department

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# quality certificate

ROLL # **211683-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **32/37** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT (Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.45** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **144** | ppi | **2,452** | psi | |
| | Average Strength @ Break | **31** | N/mm (kN/m) | **175** | ppi | **2,980** | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | | % | | | | **18.14** | |
| | Average Elongation @ Break | | % | | | | **509.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.3** | N | | | **51.093** | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **432.1** | N | | | **97.154** | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **594.9** | N | | | **133.74** | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature

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# quality certificate

ROLL # **211684-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **34/35** mil | AVE: | **1.49** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.45** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **144** | ppi | **2,452** | psi |
| | Average Strength @ Break | **31** | N/mm (kN/m) | **175** | ppi | **2,980** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **18.14** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **509.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.3** | N | | | **51.093** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **432.1** | N | | | **97.154** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **594.9** | N | | | **133.74** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **211785-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **33/37** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **143** ppi | | **2,452** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | | **174** ppi | | **2,980** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.14** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **509.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.3** | N | | | **51.093** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **432.1** | N | | | **97.154** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **594.9** | N | | | **133.74** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-20-10**

Signature: [signature]
Quality Control Department

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# quality certificate

ROLL # **211786-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.40 | mm | 55 | mil |
| | MAX: | 1.62 | mm | 64 | mil |
| Asperity ASTM D7466: 31/37 mil | AVE: | 1.48 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.58 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,452 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 174 | ppi | 2,980 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.14 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 509.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: H. Holme
Quality Control Department

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# quality certificate

ROLL # **211787-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **31/37** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **143** ppi | **2,449** | psi | | |
| | Average Strength @ Break | **31** N/mm (kN/m) | **175** ppi | **3,004** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.22** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **504.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.3** N | | **51.093** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **432.1** N | | **97.154** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **594.9** N | | **133.74** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature.....
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# quality certificate

ROLL # **211788-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.37 | mm | 54 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.55 | mm | 61 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 32/36 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.47 | mm | 58 | mil | OIT(Standard) ASTM D3895 minutes | 194 | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | 2.58 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 142 | ppi | 2,449 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 174 | ppi | 3,004 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 18.22 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 504.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature:
Quality Control Department

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# quality certificate

ROLL # **211789-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.57 | mm | 62 | mil |
| Asperity ASTM D7466: 32/37 mil | AVE: | 1.46 | mm | 57 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.58 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 141 | ppi | 2,449 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 173 | ppi | 3,004 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | 18.22 | |
| | Average Elongation @ Break | % | | | | 504.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211790-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.40 | mm | 55 | mil |
| | MAX: | 1.52 | mm | 60 | mil |
| Asperity ASTM D7466: 33/37 mil | AVE: | 1.45 | mm | 57 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.58 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 24 | N/mm (kN/m) | 140 | ppi | 2,449 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 171 | ppi | 3,004 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.22 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 504.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature:

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ROLL # **211791-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil | Thickness..... | 1.5 | mm | 60 mil |
| | MAX: | 1.54 | mm | 61 | mil | Length..... | 153.926 | m | 505.0 feet |
| Asperity ASTM D7466: 32/36 mil | AVE: | 1.48 | mm | 58 | mil | Width..... | 7.00 | m; | 23.0 feet |
| ODD # : TOP EVEN #: BOTTOM | | | | | | OIT(Standard) ASTM D3895 minutes | 194 | | |

| | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.58 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,449 psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 175 | ppi | 3,004 psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.22 |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 504.7 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.3 | N | | | 51.093 lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 432.1 | N | | | 97.154 lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 594.9 | N | | | 133.74 lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature:

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ROLL # **211792-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.60 | mm | 63 | mil |
| Asperity ASTM D7466: 33/36 mil | AVE: | 1.49 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.58 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 153 | ppi | 2,600 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 163 | ppi | 2,781 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.58 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 463.9 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.8 | N | | | 52.112 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 428.0 | N | | | 96.233 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 602.5 | N | | | 135.44 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: [signature]
Quality Control Department

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# quality certificate

ROLL # **211793-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.52** | mm | **60** | mil |
| Asperity ASTM D7466: **32/37** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **151** ppi | | **2,600** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **162** ppi | | **2,781** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **17.58** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **463.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** N | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** N | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** N | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-21-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **211794-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.38** | mm | **54** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **32/37** mil | AVE: | **1.48** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60** mil |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **151** ppi | | **2,600** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **162** ppi | | **2,781** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.58** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **463.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** | N | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** | N | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** | N | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: [signature]
Quality Control Department

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# quality certificate

ROLL # **211795-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.50** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **154** ppi | | | | **2,600** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | **164** ppi | | | | **2,781** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.58** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **463.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** N | | | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** N | | | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** N | | | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature

Quality Control Department

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# quality certificate

ROLL # **211796-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **34/36** mil | AVE: | **1.50** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **TEST RESULTS** |
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.58** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **154** ppi | **2,600** | psi | | |
| | Average Strength @ Break | **29** N/mm (kN/m) | **164** ppi | **2,781** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.58** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **463.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** N | | **52.112** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** N | | **96.233** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** N | | **135.44** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature.....
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ROLL # **211797-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **33/37** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **153** ppi | | | **2,607** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | | **172** ppi | | | **2,932** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.39** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **471.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** | N | | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** | N | | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** | N | | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211798-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.49** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **153** ppi | | | **2,607** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **172** ppi | | | **2,932** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.39** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **471.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** N | | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** N | | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** N | | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature

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ROLL # **211799-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **34/35** mil | AVE: | **1.48** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | | **TEST RESULTS** | |
|---|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** | N/mm (kN/m) | **152** | ppi | | | **2,607** | psi |
| | Average Strength @ Break | **30** | N/mm (kN/m) | **171** | ppi | | | **2,932** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | | **17.39** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | | **471.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** | N | | | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** | N | | | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** | N | | | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **3-21-10**

Signature.....
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ROLL # **211700-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.41 | mm | 56 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 34/37 mil | AVE: | 1.49 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.44 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 153 | ppi | 2,607 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 172 | ppi | 2,932 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.39 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 471.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.8 | N | | | 52.112 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 428.0 | N | | | 96.233 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 602.5 | N | | | 135.44 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211701-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.56** | mm | **61** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.50** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.30** |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.44** |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **154** ppi | | **2,607** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | | **173** ppi | | **2,932** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **17.39** |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **471.7** |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.15** |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.8** | N | | | **52.112** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **428.0** | N | | | **96.233** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **602.5** | N | | | **135.44** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **211702-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| Asperity ASTM D7466: 34/35 mil | AVE: | 1.49 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.62 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 151 | ppi | 2,574 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 178 | ppi | 3,030 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.60 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 478.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.5 | N | | | 51.138 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 438.6 | N | | | 98.606 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 582.2 | N | | | 130.88 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

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ROLL # **211703-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.56 | mm | 61 | mil |
| Asperity ASTM D7466: 33/34 mil | AVE: | 1.49 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.62 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 151 | ppi | 2,574 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 178 | ppi | 3,030 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.60 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 478.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.5 | N | | | 51.138 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 438.6 | N | | | 98.606 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 582.2 | N | | | 130.88 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

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ROLL # **211704-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.55 | mm | 61 | mil |
| Asperity ASTM D7466: 34/36 mil | AVE: | 1.49 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .30 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.62 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 151 | ppi | 2,574 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 178 | ppi | 3,030 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.60 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 478.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.15 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.5 | N | | | 51.138 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 438.6 | N | | | 98.606 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 582.2 | N | | | 130.88 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-21-10**

Signature: [signature]
Quality Control Department

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ROLL # **212101-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.57** | mm | **62** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60** mil |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.68** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **150** ppi | | | **2,574** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **177** ppi | | | **3,030** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **17.60** | |
| | Average Elongation @ Break | % | | | | **478.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** N | | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** N | | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** N | | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **212102-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **31/38** mil | AVE: | **1.49** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.68** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | **151** | ppi | **2,574** | psi | |
| | Average Strength @ Break | **31** | N/mm (kN/m) | **178** | ppi | **3,030** | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **17.60** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **478.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** | N | | | **51.138** | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** | N | | | **98.606** | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** | N | | | **130.88** | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **212103-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| | AVE: | **1.49** | mm | **59** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60** mil |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

Asperity ASTM D7466: **31/32** mil
ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.60** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **157** ppi | | | **2,680** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | **188** ppi | | | **3,206** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.28** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **508.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** N | | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** N | | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** N | | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature: H. Holmes
Quality Control Department

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# quality certificate

ROLL # **212104-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.55** | mm | **61** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **TEST RESULTS** |
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.60** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **158** ppi | | | **2,680** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | **189** ppi | | | **3,206** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.28** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **508.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** N | | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** N | | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** N | | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature.....
Quality Control Department

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# quality certificate

ROLL # **212105-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil | Thickness..... | **1.5 mm** | **60 mil** |
| | MAX: | **1.56** | mm | **61** | mil | Length..... | **153.926** m | **505.0** feet |
| Asperity ASTM D7466: **32/35** mil | AVE: | **1.47** | mm | **58** | mil | Width..... | **7.00** m; | **23.0** feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | | g/10 min | | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | | % | | | | **2.60** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** | N/mm (kN/m) | | **155** | ppi | | **2,680** | psi |
| | Average Strength @ Break | **32** | N/mm (kN/m) | | **186** | ppi | | **3,206** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | | % | | | | **17.28** | |
| Lo = 2.0" Break | Average Elongation @ Break | | | % | | | | **508.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | | % | | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** | N | | | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** | N | | | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** | N | | | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **212106-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil | Thickness..... | **1.5 mm** | **60 mil** |
| | MAX: | **1.56** | mm | **61** | mil | Length..... | **153.926** m | **505.0** feet |
| Asperity ASTM D7466: **33/33** mil | AVE: | **1.49** | mm | **59** | mil | Width..... | **7.00** m; | **23.0** feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | | | | g/cc | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | | | | g/10 min | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | | | | % | | **2.60** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** | N/mm (kN/m) | **157** | ppi | | | **2,680** | psi |
| | Average Strength @ Break | **33** | N/mm (kN/m) | **188** | ppi | | | **3,206** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | | | | % | | **17.28** | |
| Lo = 2.0" Break | Average Elongation @ Break | | | | | % | | **508.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | | | | % | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** | N | | | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** | N | | | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** | N | | | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature

Quality Control Department

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# quality certificate

ROLL # **212107-10** Lot #: **8191283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.56** | mm | **61** | mil |
| | AVE: | **1.54** | mm | **61** | mil |

Asperity ASTM D7466: **30/33** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5** mm | **60** mil |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **194**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **TEST RESULTS** |
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.30** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.60** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** | N/mm (kN/m) | **162** | ppi | **2,680** | psi |
| | Average Strength @ Break | **34** | N/mm (kN/m) | **194** | ppi | **3,206** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **17.28** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **508.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.15** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.5** | N | | | **51.138** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **438.6** | N | | | **98.606** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **582.2** | N | | | **130.88** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **3-22-10**

Signature

Quality Control Department

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12/23/05

CoA Date: 12/18/2009

# Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87974266
PO #: 50206
Weight: 187100 LB
Ship Date: 12/18/2009
Package: BULK
Mode: Hopper Car
Car #: CHVX895050
Seal No: 269759

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8191288

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.240 | g/10mi |
| HLMI Flow Rate | ASTM D1238 | 23.00 | g/10mi |
| Density | D1505 or D4883 | 0.9380 | g/cm3 |
| Pellet Count | P02.08.03 | 27.000 | pel/g |
| Production Date | | 12/14/2009 | |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

Chevron Phillips Chemical Company LP

CoA Date: 12/18/2009

# Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87974263
PO #: 50206
Weight: 186800 LB
Ship Date: 12/18/2009
Package: BULK
Mode: Hopper Car
Car #: PSPX006878
Seal No: 269947

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8191283

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.300 | g/10mi |
| HLMI Flow Rate | ASTM D1238 | 23.00 | g/10mi |
| Density | D1505 or D4883 | 0.9370 | g/cm3 |
| Pellet Count | P02.08.03 | 26.000 | pel/g |
| Production Date | | 12/13/2009 | |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

Env Specialties Duke/Marshall Steam doc 13568 | PO# 13173

Terrell, NC

165 rolls 60 HD micro (505) | 105 | left

| roll # | ENGLISH DIMENSIONS wid | len | area | METRIC DIMENSIONS wid | len | area | check weld rod qty (if ordered) | wgt | | lot |
|---|---|---|---|---|---|---|---|---|---|---|
| (X)218589 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 98 | 3820 | | 7100283 |
| (X)218590 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 99 | 3830 | | 7100283 |
| (X)218591 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 100 | 3845 | | 7100283 |
| (X)218592 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 101 | 3840 | | 7100283 |
| (X)218593 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 102 | 3835 | | 7100283 |
| (X)218694 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 103 | 3835 | | 7100283 |
| (X)218695 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 104 | 3840 | 10 sqs | 7100283 |
| (X)218696 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 105 | 3840 | | 7100283 |
| (X)218697 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 106 | 3845 | | 7100283 |
| (X)218698 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 107 | 3845 | | 7100283 |
| (X)218699 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 108 | 3834 | | 7100283 |
| (X)218600 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 109 | 3850 | | 7100283 |
| (X)218601 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 110 | 3843 | | 7100283 |
| (X)218602 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 111 | 3835 | | 7100283 |
| (X)218603 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 112 | 3830 | 10 sqs | 7100283 |
| (X)218604 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 113 | 3840 | | 7100283 |
| (X)218605 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 114 | 3820 | | 7100283 |
| (X)218606 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 115 | 3795 | | 7100283 |
| (X)218607 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 116 | 3815 | | 7100283 |
| (X)218608 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 117 | 3805 | | 7100283 |
| (X)218609 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 118 | 3805 | | 7100283 |
| (X)218610 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 119 | 3835 | | 7100283 |
| (X)218611 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 120 | 3845 | | 7100283 |
| (X)218612 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 121 | 3840 | 10 sqs | 7100283 |
| (X)218713 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 122 | 3840 | | 7100283 |
| (X)218714 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 123 | 3835 | | 7100283 |
| (X)218715 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 124 | 3830 | | 7100283 |
| (X)218716 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 125 | 3825 | | 7100283 |
| (X)218717 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 126 | 3830 | | 7100283 |
| (X)218718 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 127 | 3835 | | 7100283 |
| (X)218719 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 128 | 3835 | | 7100283 |
| (X)218720 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 129 | 3840 | | 7100283 |
| (X)218721 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 130 | 3810 | 10 sqs | 7100283 |
| (X)218722 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 131 | 3815 | | 7100283 |
| (X)218723 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 132 | 3810 | | 7100283 |
| (X)218724 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 133 | 3815 | | 7100283 |
| (X)218725 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 134 | 3810 | | 7100283 |
| (X)218726 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 135 | 3820 | | 7100283 |
| (X)218727 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 136 | 3815 | | 7100283 |
| (X)218728 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 137 | 3820 | | 7100283 |
| (X)218729 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 138 | 3840 | 10 sqs | 7100283 |
| (X)218730 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 139 | 3830 | | 7100283 |
| (X)218731 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 140 | 3765 | | 7100283 |
| (X)218732 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 141 | 3800 | | 7100283 |
| (X)219101 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 142 | 3740 | | 7100283 |
| (X)219102 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 143 | 3730 | | 7100283 |
| (X)219103 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 144 | 3720 | | 7100283 |
| (X)219104 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 145 | 3740 | | 7100283 |
| (X)219105 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 146 | 3745 | | 7100283 |
| (X)219106 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 147 | 3750 | 10 sqs | 7100283 |
| (X)219107 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 148 | 3740 | | 7100272 |
| (X)219108 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 149 | 3745 | | 7100272 |
| (X)219109 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 150 | 3725 | | 7100272 |
| (X)219110 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 151 | 3770 | | 7100272 |
| (X)219111 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 152 | 3750 | | 7100272 |
| (X)219112 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 153 | 3745 | | 7100272 |
| (X)219113 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 154 | 3760 | | 7100272 |
| (X)219114 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 155 | 3750 | 10 sqs | 7100272 |
| (X)219115 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 156 | 3745 | | 7100272 |
| (X)219116 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 157 | 3750 | | 7100272 |

Env Specialties Duke/Marshall Steam doc 13568

PO# 13173

Terrell, NC

165 rolls 60 HD micro (505) 105 left

| roll # | ENGLISH DIMENSIONS wid | len | area | METRIC DIMENSIONS wid | len | area | check weld rod qty (if ordered) | wgt | | lot |
|---|---|---|---|---|---|---|---|---|---|---|
| (X)219117 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 158 | 3750 | | 7100272 |
| (X)219118 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 159 | 3775 | | 7100272 |
| (X)219119 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 160 | 3770 | | 7100272 |
| (X)219120 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 161 | 3785 | | 7100272 |
| (X)219221 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 162 | | | 7100272 |
| (X)219222 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 163 | | | 7100272 |
| (X)219223 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 164 | | 10 sqs | 7100272 |
| (X)219224 .10 | 23 | 505 | 11,615.0 | 7 | 153.926 | 1,077 | ESI Duke Marshall Steam 165tot 165 | | | 7100272 |

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# quality certificate

ROLL # **218589-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil |
| | MAX: | 1.66 | mm | 65 | mil |
| Asperity ASTM D7466: 31/33 mil | AVE: | 1.59 | mm | 63 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 29 | N/mm (kN/m) | 163 | ppi | 2,603 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 179 | ppi | 2,863 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.81 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 431.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.0 | N | | | 51.030 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 456.2 | N | | | 102.57 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 568.7 | N | | | 127.84 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-7-10**

Signature.....
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# quality certificate

ROLL # **218590-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.44 | mm | 57 | mil |
| | MAX: | 1.60 | mm | 63 | mil |
| Asperity ASTM D7466: 32/32 mil | AVE: | 1.50 | mm | 59 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m: | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 154 | ppi | 2,603 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 169 | ppi | 2,863 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.81 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 431.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.0 | N | | | 51.030 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 456.2 | N | | | 102.57 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 568.7 | N | | | 127.84 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-7-10**

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ROLL # **218591-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.52** | mm | **60** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **156** ppi | **2,603** | psi | | |
| | Average Strength @ Break | **30** N/mm (kN/m) | **171** ppi | **2,863** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.81** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **431.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.0** N | | **51.030** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **456.2** N | | **102.57** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **568.7** N | | **127.84** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-7-10**

Signature

Quality Control Department

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# quality certificate

ROLL # **218592-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.49 | mm | 59 | mil | Thickness..... | 1.5 mm | 60 mil |
| | MAX: | 1.63 | mm | 64 | mil | Length..... | 153.926 m | 505.0 feet |
| Asperily ASTM D7466: 33/34 mil | AVE: | 1.54 | mm | 61 | mil | Width..... | 7.00 m; | 23.0 feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .25 |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.15 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 158 | ppi | 2,603 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 174 | ppi | 2,863 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | 17.81 |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | 431.2 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.46 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.0 | N | | | 51.030 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 456.2 | N | | | 102.57 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 568.7 | N | | | 127.84 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-7-10**

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ROLL # **218593-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **30/36** mil | AVE: | **1.52** | mm | **60** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **142** | ppi | | **2,376** | psi |
| | Average Strength @ Break | **29** | N/mm (kN/m) | **166** | ppi | | **2,779** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **18.18** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **462.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.0** | N | | | | **51.030** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **456.2** | N | | | | **102.57** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **568.7** | N | | | | **127.84** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-7-10**

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# quality certificate

ROLL # **218694-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.39** | mm | **55** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **29/35** mil | AVE: | **1.51** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **141** | ppi | **2,376** | psi | |
| | Average Strength @ Break | **29** | N/mm (kN/m) | **165** | ppi | **2,779** | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **18.18** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **462.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.0** | N | | | **51.030** | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **456.2** | N | | | **102.57** | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **568.7** | N | | | **127.84** | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature

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# quality certificate

ROLL # **218695-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **30/37** mil | AVE: | **1.54** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **144** ppi | | **2,376** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **168** ppi | | **2,779** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | **18.18** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | **462.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **227.0** N | | | **51.030** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **456.2** N | | | **102.57** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **568.7** N | | | **127.84** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-8-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **218696-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.69 | mm | 67 | mil |
| Asperity ASTM D7466: 36/36 mil | AVE: | 1.53 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,376 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 167 | ppi | 2,779 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | 18.18 | |
| | Average Elongation @ Break | % | | | | 462.5 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.0 | N | | | 51.030 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 456.2 | N | | | 102.57 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 568.7 | N | | | 127.84 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature.....

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ROLL # **218697-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.40 | mm | 55 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.65 | mm | 65 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 30/35 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.51 | mm | 59 | mil | OIT(Standard) ASTM D3895 minutes | 188 | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 141 | ppi | 2,376 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 165 | ppi | 2,779 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 18.18 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 462.5 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 227.0 | N | | | 51.030 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 456.2 | N | | | 102.57 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 568.7 | N | | | 127.84 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: 5-8-10

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# quality certificate

ROLL # **218698-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **34/36** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **142** ppi | | **2,385** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **178** ppi | | **2,986** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **19.37** | |
| | Average Elongation @ Break | % | | | | **484.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** | N | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** | N | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** | N | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218699-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.46 | mm | 57 | mil |
| | MAX: | 1.64 | mm | 65 | mil |
| Asperity ASTM D7466: 32/36 mil | AVE: | 1.52 | mm | 60 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,385 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 179 | ppi | 2,986 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 19.37 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 484.0 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.5 | N | | | 51.815 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 400.4 | N | | | 90.025 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 584.3 | N | | | 131.36 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218600-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.48** | mm | **58** | mil |
| | MAX: | **1.64** | mm | **65** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.55** | mm | **61** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **146** ppi | | | **2,385** | psi |
| | Average Strength @ Break | **32** N/mm (kN/m) | **182** ppi | | | **2,986** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **19.37** | |
| | Average Elongation @ Break | % | | | | **484.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** N | | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** N | | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** N | | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218601-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.51** | mm | **59** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **33/35** mil | AVE: | **1.58** | mm | **62** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | **1.5** | mm | **60 mil** |
| Length..... | **153.926** | m | **505.0** feet |
| Width..... | **7.00** | m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **148** ppi | | **2,385** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | | **186** ppi | | **2,986** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **19.37** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **484.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** | N | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** | N | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** | N | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218602-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.47 | mm | 58 | mil | Thickness..... | 1.5 mm | 60 mil |
| | MAX: | 1.67 | mm | 66 | mil | Length..... | 153.926 m | 505.0 feet |
| Asperity ASTM D7466: 34/35 mil | AVE: | 1.55 | mm | 61 | mil | Width..... | 7.00 m; | 23.0 feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .25 |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.15 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 146 | ppi | 2,385 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 182 | ppi | 2,986 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | | 19.37 |
| | Average Elongation @ Break | % | | | | | 484.0 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.46 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.5 | N | | | 51.815 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 400.4 | N | | | 90.025 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 584.3 | N | | | 131.36 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature:

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ROLL # **218603-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.47 | mm | 58 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 29/38 mil | AVE: | 1.54 | mm | 61 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.15 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 144 | ppi | 2,383 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 164 | ppi | 2,706 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.34 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 428.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 230.5 | N | | | 51.815 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 400.4 | N | | | 90.025 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 584.3 | N | | | 131.36 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **218604-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.43** | mm | **56** | mil |
| | MAX: | **1.67** | mm | **66** | mil |
| Asperity ASTM D7466: **29/32** mil ODD # : TOP EVEN #: BOTTOM | AVE: | **1.58** | mm | **62** | mil |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **148** ppi | | | **2,383** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | **168** ppi | | | **2,706** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **18.34** | |
| | Average Elongation @ Break | % | | | | **428.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** N | | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** N | | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** N | | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature.....
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ROLL # **218605-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.69** | mm | **67** | mil |
| Asperity ASTM D7466: **31/35** mil | AVE: | **1.57** | mm | **62** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | **147** | ppi | **2,383** | psi |
| | Average Strength @ Break | **29** | N/mm (kN/m) | **167** | ppi | **2,706** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **18.34** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **428.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** | N | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** | N | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** | N | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218606-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **30/38** mil | AVE: | **1.52** | mm | **60** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **143** ppi | | | **2,383** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **162** ppi | | | **2,706** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | | **18.34** | |
| | Average Elongation @ Break | % | | | | | **428.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** | N | | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** | N | | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** | N | | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218607-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.67** | mm | **66** | mil |
| Asperity ASTM D7466: **32/33** mil | AVE: | **1.57** | mm | **62** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.15** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **147** ppi | | **2,383** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | | **167** ppi | | **2,706** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.34** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **428.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **230.5** | N | | | **51.815** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **400.4** | N | | | **90.025** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **584.3** | N | | | **131.36** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-8-10**

Signature.....

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ROLL # **218608-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | **1.52** | mm | **60** | mil | Thickness..... | **1.5** mm | **60** mil |
| | | | | | | Length..... | **153.926** m | **505.0** feet |
| | MAX: | **1.67** | mm | **66** | mil | Width..... | **7.00** m; | **23.0** feet |
| Asperity ASTM D7466: **28/32** mil ODD # : TOP EVEN #: BOTTOM | AVE: | **1.58** | mm | **62** | mil | OIT(Standard) ASTM D3895 minutes **188** | | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | | **156** ppi | | **2,511** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | | **186** ppi | | **2,984** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **19.25** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **459.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **225.0** | N | | | **50.578** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **419.2** | N | | | **94.251** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **618.9** | N | | | **139.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

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ROLL # **218609-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.49 | mm | 59 | mil |
| | MAX: | 1.66 | mm | 65 | mil |
| Asperity ASTM D7466: 31/33 mil | AVE: | 1.57 | mm | 62 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | 1.5 mm | 60 mil | |
| Length..... | 153.926 m | 505.0 | feet |
| Width..... | 7.00 m; | 23.0 | feet |

OIT (Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.20 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 27 | N/mm (kN/m) | 155 | ppi | 2,511 | psi |
| | Average Strength @ Break | 32 | N/mm (kN/m) | 184 | ppi | 2,984 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 19.25 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 459.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 225.0 | N | | | 50.578 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 419.2 | N | | | 94.251 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 618.9 | N | | | 139.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-8-10**

Signature.....

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ROLL # **218610-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.44** | mm | **57** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **31/38** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.20** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **149** ppi | | **2,511** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **177** ppi | | **2,984** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **19.25** | |
| | Average Elongation @ Break | % | | | | **459.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **225.0** | N | | | **50.578** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **419.2** | N | | | **94.251** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **618.9** | N | | | **139.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature.....

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ROLL # **218611-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.44 | mm | 57 | mil | Thickness..... | 1.5 mm | 60 mil |
| | MAX: | 1.64 | mm | 65 | mil | Length..... | 153.926 m | 505.0 feet |
| | AVE: | 1.53 | mm | 60 | mil | Width..... | 7.00 m; | 23.0 feet |

Asperity ASTM D7466: 34/34 mil
ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes 188

| | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.44 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 151 | ppi | 2,511 psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 180 | ppi | 2,984 psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 19.25 |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 459.1 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 225.0 | N | | | 50.578 lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 419.2 | N | | | 94.251 lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 618.9 | N | | | 139.14 lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **218612-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil | Thickness..... | **1.5 mm** | **60 mil** |
| | MAX: | **1.64** | mm | **65** | mil | Length..... | **153.926** m | **505.0** feet |
| Asperity ASTM D7466: **30/35** mil | AVE: | **1.51** | mm | **59** | mil | Width..... | **7.00** m; | **23.0** feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | | % | | | | **2.44** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | | **149** | ppi | | **2,511** | psi |
| | Average Strength @ Break | **31** | N/mm (kN/m) | | **177** | ppi | | **2,984** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | | % | | | | **19.25** | |
| Lo = 2.0" Break | Average Elongation @ Break | | | % | | | | **459.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **225.0** | N | | | | | **50.578** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **419.2** | N | | | | | **94.251** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **618.9** | N | | | | | **139.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature

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ROLL # **218713-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.62 | mm | 64 | mil |
| | AVE: | 1.52 | mm | 60 | mil |

Asperity ASTM D7466: 30/39 mil
ODD # : TOP EVEN #: BOTTOM

| | | | |
|---|---|---|---|
| Thickness..... | 1.5 mm | 60 mil | |
| Length..... | 153.926 m | 505.0 | feet |
| Width..... | 7.00 m; | 23.0 | feet |

OIT(Standard) ASTM D3895 minutes 188

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.41 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 24 | N/mm (kN/m) | 138 | ppi | 2,307 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 169 | ppi | 2,816 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.77 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 481.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 225.0 | N | | | 50.578 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 419.2 | N | | | 94.251 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 618.9 | N | | | 139.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-8-10**

Signature.....
Quality Control Department

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ROLL # **218714-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.61 | mm | 63 | mil |
| Asperity ASTM D7466: 32/35 mil | AVE: | 1.54 | mm | 61 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.41 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 24 | N/mm (kN/m) | 140 | ppi | 2,307 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 171 | ppi | 2,816 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | 18.77 | |
| | Average Elongation @ Break | % | | | | 481.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 225.0 | N | | | 50.578 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 419.2 | N | | | 94.251 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 618.9 | N | | | 139.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

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ROLL # **218715-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil |
| | MAX: | 1.65 | mm | 65 | mil |
| Asperity ASTM D7466: 31/37 mil | AVE: | 1.52 | mm | 60 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.41 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 24 | N/mm (kN/m) | 138 | ppi | 2,307 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 169 | ppi | 2,816 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.77 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 481.2 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 225.0 | N | | | 50.578 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 419.2 | N | | | 94.251 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 618.9 | N | | | 139.14 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature

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# quality certificate

ROLL # **218716-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **30/38** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.27** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **24** N/mm (kN/m) | | **136** ppi | | **2,307** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | | **166** ppi | | **2,816** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.77** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **481.2** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **225.0** | N | | | **50.578** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **419.2** | N | | | **94.251** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **618.9** | N | | | **139.14** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature.....

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ROLL # **218717-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **31/35** mil | AVE: | **1.53** | mm | **60** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m: | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.43** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **142** ppi | | **2,353** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **160** ppi | | **2,657** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.45** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **456.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature

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ROLL # **218718-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.47 | mm | 58 | mil |
| | MAX: | 1.69 | mm | 67 | mil |
| Asperity ASTM D7466: 32/35 mil | AVE: | 1.56 | mm | 61 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.43 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 144 | ppi | | 2,353 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 163 | ppi | | 2,657 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | 17.45 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | 456.6 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 244.5 | N | | | | 54.971 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 436.2 | N | | | | 98.064 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 589.7 | N | | | | 132.57 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature

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ROLL # **218719-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.50** | mm | **59** | mil |
| | MAX: | **1.76** | mm | **69** | mil |
| Asperity ASTM D7466: **30/34** mil | AVE: | **1.61** | mm | **63** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m: | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.43** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **149** ppi | | **2,353** | psi |
| | Average Strength @ Break | **29** N/mm (kN/m) | | **168** ppi | | **2,657** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.45** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **456.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **218720-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.48 | mm | 58 | mil | Thickness..... | 1.5 mm | 60 mil |
| | MAX: | 1.73 | mm | 68 | mil | Length..... | 153.926 m | 505.0 feet |
| Asperity ASTM D7466: 31/34 mil | AVE: | 1.60 | mm | 63 | mil | Width..... | 7.00 m; | 23.0 feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .25 |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.43 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 148 | ppi | 2,353 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 167 | ppi | 2,657 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | 17.45 |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | 456.6 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.46 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 244.5 | N | | | 54.971 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 436.2 | N | | | 98.064 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 589.7 | N | | | 132.57 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature: [signature]
Quality Control Department

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ROLL # **218721-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | | | |
|---|---|---|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil | Thickness..... | **1.5 mm** | **60 mil** |
| | MAX: | **1.70** | mm | **67** | mil | Length..... | **153.926** m | **505.0** feet |
| Asperity ASTM D7466: **30/33** mil | AVE: | **1.59** | mm | **63** | mil | Width..... | **7.00** m; | **23.0** feet |

ODD # : TOP EVEN #: BOTTOM

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.43** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | **147** | ppi | | **2,353** | psi |
| | Average Strength @ Break | **29** | N/mm (kN/m) | **166** | ppi | | **2,657** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **17.45** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **456.6** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature:

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ROLL # **218722-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **32/36** mil | AVE: | **1.57** | mm | **62** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** | N/mm (kN/m) | **149** | ppi | | **2,408** | psi |
| | Average Strength @ Break | **31** | N/mm (kN/m) | **177** | ppi | | **2,870** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **16.56** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **479.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

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ROLL # **218723-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **28/35** mil | AVE: | **1.56** | mm | **61** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **148** ppi | | **2,408** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **176** ppi | | **2,870** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **16.56** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **479.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature

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ROLL # **218724-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.50** | mm | **59** | mil |
| | MAX: | **1.64** | mm | **65** | mil |
| Asperity ASTM D7466: **29/33** mil | AVE: | **1.59** | mm | **63** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | **1.5** | mm | **60** mil |
| Length..... | **153.926** | m | **505.0** feet |
| Width..... | **7.00** | m | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **151** ppi | | | **2,408** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | **180** ppi | | | **2,870** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **16.56** | |
| | Average Elongation @ Break | % | | | | **479.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** N | | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** N | | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** N | | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature.....
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ROLL # **218725-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.43 | mm | 56 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.69 | mm | 67 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 30/33 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.56 | mm | 61 | mil | OIT(Standard) ASTM D3895 minutes | 188 | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | | g/10 min | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | | % | | | 2.42 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 148 | ppi | 2,408 | psi |
| | Average Strength @ Break | 31 | N/mm (kN/m) | 176 | ppi | 2,870 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | 16.56 | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | 479.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 244.5 | N | | | 54.971 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 436.2 | N | | | 98.064 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 589.7 | N | | | 132.57 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **218726-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.47** | mm | **58** | mil |
| | MAX: | **1.68** | mm | **66** | mil |
| Asperity ASTM D7466: **30/35** mil | AVE: | **1.56** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.42** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | | **148** ppi | | **2,408** | psi |
| | Average Strength @ Break | **31** N/mm (kN/m) | | **176** ppi | | **2,870** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **16.56** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **479.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **244.5** | N | | | **54.971** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **436.2** | N | | | **98.064** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **589.7** | N | | | **132.57** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

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# quality certificate

ROLL # **218727-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.46** | mm | **57** | mil |
| | MAX: | **1.67** | mm | **66** | mil |
| Asperity ASTM D7466: **31/32** mil | AVE: | **1.56** | mm | **61** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m | **23.0** feet |
| OIT(Standard) ASTM D3895 minutes | **188** | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.40** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | **161** ppi | | | **2,625** | psi |
| | Average Strength @ Break | **34** N/mm (kN/m) | **193** ppi | | | **3,146** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **14.89** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** N | | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** N | | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** N | | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

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ROLL # **218728-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.48** | mm | **58** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| | AVE: | **1.56** | mm | **61** | mil |

Asperity ASTM D7466: **30/35** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.40** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | | **161** ppi | | | **2,625** | psi |
| | Average Strength @ Break | **34** N/mm (kN/m) | | **193** ppi | | | **3,146** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | | **14.89** | |
| | Average Elongation @ Break | % | | | | | **483.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** | N | | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** | N | | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** | N | | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature: H. Holmes
Quality Control Department

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ROLL # **218729-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.45** | mm | **57** | mil |
| | MAX: | **1.66** | mm | **65** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.57** | mm | **62** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | **2.40** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **28** N/mm (kN/m) | | **162** ppi | | | **2,625** | psi |
| | Average Strength @ Break | **34** N/mm (kN/m) | | **194** ppi | | | **3,146** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | **14.89** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | **483.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** | N | | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** | N | | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** | N | | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature.....

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ROLL # **218730-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.45 | mm | 57 | mil |
| | MAX: | 1.64 | mm | 65 | mil |
| Asperity ASTM D7466: 34/36 mil | AVE: | 1.54 | mm | 61 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 28 | N/mm (kN/m) | 159 | ppi | 2,625 | psi |
| | Average Strength @ Break | 33 | N/mm (kN/m) | 191 | ppi | 3,146 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 14.89 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 483.9 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.0 | N | | | 51.944 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 441.5 | N | | | 99.259 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 598.5 | N | | | 134.55 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature: [signature]
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ROLL # **218731-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.42** | mm | **56** | mil |
| | MAX: | **1.63** | mm | **64** | mil |
| Asperity ASTM D7466: **30/37** mil | AVE: | **1.51** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **27** N/mm (kN/m) | **156** ppi | | | **2,625** | psi |
| | Average Strength @ Break | **33** N/mm (kN/m) | **187** ppi | | | **3,146** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **14.89** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **483.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** N | | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** N | | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** N | | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

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ROLL # **218732-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.37 | mm | 54 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| | AVE: | 1.50 | mm | 59 | mil |

Asperity ASTM D7466: **34/37** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | | 2.32 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 24 | N/mm (kN/m) | 137 | ppi | | 2,324 | psi |
| | Average Strength @ Break | 30 | N/mm (kN/m) | 172 | ppi | | 2,908 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | | 18.90 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | | 485.5 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.0 | N | | | | 51.944 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 441.5 | N | | | | 99.259 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 598.5 | N | | | | 134.55 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-9-10**

Signature.....
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# quality certificate

ROLL # **219101-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.36** | mm | **54** | mil |
| | MAX: | **1.58** | mm | **62** | mil |
| Asperity ASTM D7466: **35/35** mil | AVE: | **1.47** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.32** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **24** N/mm (kN/m) | **134** ppi | **2,324** | psi | | |
| | Average Strength @ Break | **29** N/mm (kN/m) | **168** ppi | **2,908** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **485.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** N | | **51.944** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** N | | **99.259** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** N | | **134.55** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-10-10**

Signature.....

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ROLL # **219102-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.39** | mm | **55** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **34/36** mil | AVE: | **1.48** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.32** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **24** N/mm (kN/m) | **135** ppi | | | **2,324** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | **169** ppi | | | **2,908** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **485.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** N | | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** N | | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** N | | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219103-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.32** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **24** N/mm (kN/m) | | **137** ppi | | **2,324** | psi |
| | Average Strength @ Break | **30** N/mm (kN/m) | | **172** ppi | | **2,908** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **485.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** | N | | | **51.944** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** | N | | | **99.259** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** | N | | | **134.55** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219104-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.38 | mm | 54 | mil |
| | MAX: | 1.53 | mm | 60 | mil |
| Asperity ASTM D7466: 32/38 mil | AVE: | 1.46 | mm | 57 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | **TEST RESULTS** |
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.946** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.25** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.32** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **23** N/mm (kN/m) | **134** ppi | **2,324** | psi | | |
| | Average Strength @ Break | **29** N/mm (kN/m) | **167** ppi | **2,908** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.90** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **485.5** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.46** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.0** N | | **51.944** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **441.5** N | | **99.259** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.5** N | | **134.55** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-10-10**

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ROLL # **219105-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| Asperity ASTM D7466: 31/38 mil | AVE: | 1.49 | mm | 59 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | 1.5 mm | 60 mil | |
| Length..... | 153.926 m | 505.0 | feet |
| Width..... | 7.00 m; | 23.0 | feet |
| OIT (Standard) ASTM D3895 minutes | 188 | | |

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 N/mm (kN/m) | 143 ppi | | 2,438 | psi |
| | Average Strength @ Break | 29 N/mm (kN/m) | 163 ppi | | 2,786 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 17.95 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 445.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 N | | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 N | | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 N | | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

Signature: H. Holme

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ROLL # **219106-10** Lot #: **7100283** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.42 | mm | 56 | mil |
| | MAX: | 1.61 | mm | 63 | mil |
| Asperity ASTM D7466: 31/37 mil | AVE: | 1.48 | mm | 58 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **188**

| | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | .946 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | .25 | |
| Carbon Black Content ASTM D4218 | Range | % | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 N/mm (kN/m) | 142 ppi | | 2,438 | psi |
| | Average Strength @ Break | 28 N/mm (kN/m) | 162 ppi | | 2,786 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | 17.95 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | 445.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | -0.46 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 N | | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 N | | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 N | | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219107-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.38 | mm | 54 | mil |
| | MAX: | 1.58 | mm | 62 | mil |
| Asperity ASTM D7466: 35/35 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.46 | mm | 57 | mil |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 140 | ppi | 2,438 | psi |
| | Average Strength @ Break | 28 | N/mm (kN/m) | 160 | ppi | 2,786 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.95 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 445.7 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 | N | | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 | N | | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 | N | | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219108-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | | Thickness..... | 1.5 mm | 60 mil |
|---|---|---|---|---|---|---|---|---|
| | MIN: | 1.38 | mm | 54 | mil | Length..... | 153.926 m | 505.0 feet |
| | MAX: | 1.61 | mm | 63 | mil | Width..... | 7.00 m; | 23.0 feet |
| Asperity ASTM D7466: 33/35 mil ODD # : TOP EVEN #: BOTTOM | AVE: | 1.49 | mm | 59 | mil | OIT(Standard) ASTM D3895 minutes | 191 | |

| | | | | | | TEST RESULTS |
|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.31 |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 N/mm (kN/m) | 143 ppi | 2,438 | psi | |
| | Average Strength @ Break | 29 N/mm (kN/m) | 163 ppi | 2,786 | psi | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.95 |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 445.7 |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 N | | 52.058 | lbs | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 N | | 87.794 | lbs | |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 N | | 139.79 | lbs | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219109-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.35** | mm | **53** | mil |
| | MAX: | **1.62** | mm | **64** | mil |
| Asperity ASTM D7466: **34/37** mil | AVE: | **1.47** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.31** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **141** | ppi | **2,438** | psi |
| | Average Strength @ Break | **28** | N/mm (kN/m) | **161** | ppi | **2,786** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **17.95** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **445.7** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.6** | N | | | **52.058** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **390.5** | N | | | **87.794** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **621.8** | N | | | **139.79** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219110-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.37 | mm | 54 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| | AVE: | 1.46 | mm | 57 | mil |

Asperity ASTM D7466: 33/35 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.40 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 144 | ppi | 2,508 | psi |
| | Average Strength @ Break | 27 | N/mm (kN/m) | 155 | ppi | 2,695 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.07 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 412.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 | N | | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 | N | | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 | N | | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**
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# quality certificate

ROLL # **219111-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.35 | mm | 53 | mil |
| | MAX: | 1.60 | mm | 63 | mil |
| Asperity ASTM D7466: 32/38 mil | AVE: | 1.47 | mm | 58 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | | |
|---|---|---|---|
| Thickness..... | 1.5 mm | 60 mil | |
| Length..... | 153.926 m | 505.0 | feet |
| Width..... | 7.00 m; | 23.0 | feet |
| OIT(Standard) ASTM D3895 | minutes 191 | | |

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.40 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 145 | ppi | 2,508 | psi |
| | Average Strength @ Break | 27 | N/mm (kN/m) | 156 | ppi | 2,695 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.07 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 412.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 | N | | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 | N | | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 | N | | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

Signature.....

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# quality certificate

ROLL # **219112-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.34 | mm | 53 | mil |
| | MAX: | 1.57 | mm | 62 | mil |
| Asperity ASTM D7466: 33/36 mil | AVE: | 1.46 | mm | 57 | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m: | 23.0 feet |
| OIT(Standard) ASTM D3895 minutes | 191 | |

| | | | | TEST RESULTS | |
|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | 2.40 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 N/mm (kN/m) | 144 ppi | 2,508 | psi |
| | Average Strength @ Break | 27 N/mm (kN/m) | 155 ppi | 2,695 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | 17.07 | |
| | Average Elongation @ Break | % | | 412.1 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 231.6 N | | 52.058 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 390.5 N | | 87.794 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 621.8 N | | 139.79 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219113-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.39** | mm | **55** | mil |
| | MAX: | **1.63** | mm | **64** | mil |
| Asperity ASTM D7466: **31/35** mil | AVE: | **1.50** | mm | **59** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.40** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **148** ppi | | | **2,508** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **159** ppi | | | **2,695** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.07** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **412.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.6** N | | | | **52.058** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **390.5** N | | | | **87.794** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **621.8** N | | | | **139.79** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219114-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.43** | mm | **56** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| | AVE: | **1.52** | mm | **60** | mil |

Asperity ASTM D7466: **31/34** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.40** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **150** ppi | | | **2,508** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **161** ppi | | | **2,695** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break | Average Elongation @ Yield | % | | | | **17.07** | |
| | Average Elongation @ Break | % | | | | **412.1** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **231.6** N | | | | **52.058** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **390.5** N | | | | **87.794** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **621.8** N | | | | **139.79** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

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ROLL # **219115-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.38** | mm | **54** | mil |
| | MAX: | **1.63** | mm | **64** | mil |
| Asperity ASTM D7466: **33/35** mil | AVE: | **1.48** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | | **2.37** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **145** | ppi | | **2,490** | psi |
| | Average Strength @ Break | **28** | N/mm (kN/m) | **161** | ppi | | **2,770** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | | **17.62** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | | **446.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** | N | | | | **56.464** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** | N | | | | **99.422** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** | N | | | | **134.52** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 | hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 | hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219116-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.39 | mm | 55 | mil |
| | MAX: | 1.63 | mm | 64 | mil |
| | AVE: | 1.50 | mm | 59 | mil |

Asperity ASTM D7466: 33/34 mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.37 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 26 | N/mm (kN/m) | 147 | ppi | 2,490 | psi |
| | Average Strength @ Break | 29 | N/mm (kN/m) | 164 | ppi | 2,770 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 17.62 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 446.0 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 251.2 | N | | | 56.464 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 442.2 | N | | | 99.422 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 598.4 | N | | | 134.52 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**
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ROLL # **219117-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.43** | mm | **56** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **33/35** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.37** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **26** N/mm (kN/m) | **146** ppi | **2,490** | psi | | |
| | Average Strength @ Break | **28** N/mm (kN/m) | **162** ppi | **2,770** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.62** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **446.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** N | | **56.464** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** N | | **99.422** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** N | | **134.52** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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# quality certificate

ROLL # **219118-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.39** | mm | **55** | mil |
| | MAX: | **1.54** | mm | **61** | mil |
| Asperity ASTM D7466: **31/33** mil | AVE: | **1.45** | mm | **57** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | | |
|---|---|---|---|
| Thickness..... | **1.5** | mm | **60 mil** |
| Length..... | **153.926** | m | **505.0** feet |
| Width..... | **7.00** | m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.26** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **142** ppi | **2,490** | psi | | |
| | Average Strength @ Break | **28** N/mm (kN/m) | **158** ppi | **2,770** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.62** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **446.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** N | | **56.464** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** N | | **99.422** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** N | | **134.52** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

Signature.....

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# quality certificate

ROLL # **219119-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.38** | mm | **54** | mil |
| | MAX: | **1.61** | mm | **63** | mil |
| Asperity ASTM D7466: **31/36** mil | AVE: | **1.47** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.26** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **144** ppi | | **2,490** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **160** ppi | | **2,770** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **17.62** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **446.0** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** | N | | | **56.464** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** | N | | | **99.422** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** | N | | | **134.52** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

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ROLL # **219120-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | 1.32 | mm | 52 | mil |
| | MAX: | 1.59 | mm | 63 | mil |
| Asperity ASTM D7466: 31/35 mil | AVE: | 1.47 | mm | 58 | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | 1.5 mm | 60 mil |
| Length..... | 153.926 m | 505.0 feet |
| Width..... | 7.00 m; | 23.0 feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | .947 | |
| MFI ASTM D1238 COND. E GRADE: K307 | Melt Flow Index 190°C /2160 g | g/10 min | | | | .24 | |
| Carbon Black Content ASTM D4218 | Range | % | | | | 2.47 | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | 10 In Cat 1 | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | 25 | N/mm (kN/m) | 143 | ppi | 2,467 | psi |
| | Average Strength @ Break | 28 | N/mm (kN/m) | 160 | ppi | 2,766 | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | 18.61 | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | 423.9 | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | -0.62 | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | 251.2 | N | | | 56.464 | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | 442.2 | N | | | 99.422 | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | 598.4 | N | | | 134.52 | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | CERTIFIED | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | ONGOING | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-10-10**

Signature.....

Quality Control Department

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# quality certificate

ROLL # **219221-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| | AVE: | **1.49** | mm | **59** | mil |

Asperity ASTM D7466: **31/36** mil
ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | | **145** ppi | | **2,467** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | | **162** ppi | | **2,766** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.61** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **423.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** | N | | | **56.464** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** | N | | | **99.422** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** | N | | | **134.52** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-11-10**

Signature.....
Quality Control Department

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# quality certificate

ROLL # **219222-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.40** | mm | **55** | mil |
| | MAX: | **1.59** | mm | **63** | mil |
| Asperity ASTM D7466: **34/34** mil | AVE: | **1.49** | mm | **59** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.47** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **145** ppi | **2,467** | psi | | |
| | Average Strength @ Break | **28** N/mm (kN/m) | **162** ppi | **2,766** | psi | | |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.61** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **423.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** N | | **56.464** | lbs | | |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** N | | **99.422** | lbs | | |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** N | | **134.52** | lbs | | |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-11-10**

Signature.....
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# quality certificate

ROLL # **219223-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.37** | mm | **54** | mil |
| | MAX: | **1.60** | mm | **63** | mil |
| Asperity ASTM D7466: **33/34** mil | AVE: | **1.48** | mm | **58** | mil |
| ODD # : TOP EVEN #: BOTTOM | | | | | |

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | | g/cc | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | | g/10 min | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | | % | | | **2.35** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** | N/mm (kN/m) | **144** | ppi | **2,467** | psi |
| | Average Strength @ Break | **28** | N/mm (kN/m) | **161** | ppi | **2,766** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | | % | | | **18.61** | |
| Lo = 2.0" Break | Average Elongation @ Break | | % | | | **423.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | | % | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** | N | | | **56.464** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** | N | | | **99.422** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** | N | | | **134.52** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date: **5-11-10**

Signature.....

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# quality certificate

ROLL # **219224-10** Lot #: **7100272** **Liner Type: MICROSPIKE™ HDPE**

| Measurement ASTM D5994 (Modified) | | METRIC | | ENGLISH | |
|---|---|---|---|---|---|
| | MIN: | **1.41** | mm | **56** | mil |
| | MAX: | **1.65** | mm | **65** | mil |
| Asperity ASTM D7466: **31/34** mil | AVE: | **1.48** | mm | **58** | mil |

ODD # : TOP EVEN #: BOTTOM

| | | |
|---|---|---|
| Thickness..... | **1.5 mm** | **60 mil** |
| Length..... | **153.926** m | **505.0** feet |
| Width..... | **7.00** m; | **23.0** feet |

OIT(Standard) ASTM D3895 minutes **191**

| | | | | | | TEST RESULTS | |
|---|---|---|---|---|---|---|---|
| Specific Gravity ASTM D792 | Density | g/cc | | | | **.947** | |
| MFI ASTM D1238 COND. E GRADE: **K307** | Melt Flow Index 190°C /2160 g | g/10 min | | | | **.24** | |
| Carbon Black Content ASTM D4218 | Range | % | | | | **2.35** | |
| Carbon Black Dispersion ASTM D5596 | Category | | | | | **10 In Cat 1** | |
| Tensile Strength ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) | Average Strength @ Yield | **25** N/mm (kN/m) | **144** ppi | | | **2,467** | psi |
| | Average Strength @ Break | **28** N/mm (kN/m) | **161** ppi | | | **2,766** | psi |
| Elongation ASTM D6693 ASTM D638 (Modified) ( 2 inches / minute ) Lo = 1.3" Yield | Average Elongation @ Yield | % | | | | **18.61** | |
| Lo = 2.0" Break | Average Elongation @ Break | % | | | | **423.9** | |
| Dimensional Stability ASTM D1204 (Modified) | Average Dimensional change | % | | | | **-0.62** | |
| Tear Resistance ASTM D-1004 (Modified) | Average Tear Resistance | **251.2** N | | | | **56.464** | lbs |
| Puncture Resistance FTMS 101 Method 2065 (Modified) | Load | **442.2** N | | | | **99.422** | lbs |
| Puncture Resistance ASTM D4833 (Modified) | Load | **598.4** N | | | | **134.52** | lbs |
| ESCR ASTM D1693 | Minimum Hrs w/o Failures | 1500 hrs | | | | **CERTIFIED** | |
| Notched Constant Tensile Load ASTM D5397 | pass / fail @ 30% | 300 hrs | | | | **ONGOING** | |

Customer: **Environmental Specialties**
PO: **13173 Duke Energy**
Destination **Terrell, NC**

Date:..... **5-11-10**

Signature.....
Quality Control Department

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CoA Date: 03/04/2010

# Certificate of Analysis

Shipped To: AGRU AMERICA INC
500 GARRISON RD
GEORGETOWN SC 29440
USA

Recipient: PALMER
Fax:

CPC Delivery #: 88015277
PO #: 005329
Weight: 196200 LB
Ship Date: 03/04/2010
Package: BULK
Mode: Hopper Car
Car #: NAHX610315

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7100283

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.25 | g/10mi |
| HLMI Flow Rate | ASTM D1238 | 21 | g/10mi |
| Density | D1505 or D4883 | 0.936 | g/cm3 |
| Pellet Count | P02.08.03 | 27 | pel/g |
| Production Date | | 03/01/2010 | |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

CoA Date: 03/04/2010

# Certificate of Analysis

| | |
|---|---|
| Shipped To: AGRU AMERICA INC<br>500 GARRISON RD<br>GEORGETOWN SC 29440<br>USA | CPC Delivery #: 88013175<br>PO #: 005329<br>Weight: 195400 LB<br>Ship Date: 03/02/2010<br>Package: BULK |
| Recipient: PALMER<br>Fax: | Mode: Hopper Car<br>Car #: CHVX889230<br>Seal No: 275012 |

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7100272

| Property | Test Method | Value | Unit |
|---|---|---|---|
| Melt Index | ASTM D1238 | 0.24 | g/10mi |
| HLMI Flow Rate | ASTM D1238 | 21 | g/10mi |
| Density | D1505 or D4883 | 0.937 | g/cm3 |
| Pellet Count | P02.08.03 | 27 | pel/g |
| Production Date | | 02/27/2010 | |

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
**However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.**

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

# HDPE Geomembrane Conformance Test Results

# CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-01
LAB ID NO.: L10017-01-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211212-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 61 | 62 | 60 | 59 | | |
| | | | 60 | 60 | 60 | 60 | 59 | 60.2 ✓ | 0.92 |
| DENSITY | D 1505 | g/cc | 0.9469 | 0.9469 | 0.9468 | | | 0.9469 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.22 | 2.20 | | | | 2.21 ✓ | 0.013 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 57.2 | 56.0 | 55.9 | 56.3 | 54.3 | | |
| | | | 54.9 | 56.0 | 53.2 | 54.5 | 56.1 | 55.4 ✓ | 1.18 |
| | | CD-lbs | 50.7 | 51.4 | 51.4 | 49.6 | 50.1 | | |
| | | | 53.6 | 50.8 | 51.8 | 49.1 | 50.3 | 50.9 ✓ | 1.27 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 147 | 152 | 147 | 153 | 149 | 150 ✓ | 2.67 |
| | | CD-ppi | 157 | 160 | 157 | 157 | 160 | 158 ✓ | 1.64 |
| STRENGTH AT BREAK | | MD-ppi | 184 | 180 | 178 | 185 | 165 | 178 ✓ | 8.24 |
| | | CD-ppi | 157 | 160 | 159 | 166 | 161 | 161 ✓ | 3.49 |
| ELONGATION AT YIELD | | MD% | 20.4 | 20.4 | 21.0 | 19.9 | 18.5 | 20.0 ✓ | 0.94 |
| Lo = 1.3" | | CD% | 15.4 | 15.4 | 16.2 | 14.3 | 14.0 | 15.1 ✓ | 0.90 |
| ELONGATION AT BREAK | | MD% | 414 | 396 | 386 | 439 | 418 | 411 ✓ | 20.56 |
| Lo = 2.0" | | CD% | 472 | 311 | 470 | 543 | 397 | 439 ✓ | 88.05 |

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544 Braddock Avenue • East Pittsburgh, PA 15112 • 412-823-7600 • FAX 412-823-8999 • www.geotechnics.net

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# CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-01
LAB ID NO.: L10017-01-02
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211320-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 58 | 59 | 61 | 61 | 60 | | |
| | | | 62 | 60 | 60 | 62 | 61 | **60.4** | 1.26 |
| DENSITY | D 1505 | g/cc | 0.9466 | 0.9466 | 0.9465 | | | **0.9466** | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.21 | 2.22 | | | | **2.21** | 0.007 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 56.7 | 56.0 | 55.9 | 55.4 | 53.5 | | |
| | | | 58.4 | 55.7 | 55.9 | 57.4 | 55.6 | **56.1** | 1.29 |
| | | CD-lbs | 52.3 | 52.5 | 52.6 | 53.5 | 54.2 | | |
| | | | 52.3 | 51.0 | 52.3 | 52.7 | 48.7 | **52.2** | 1.49 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 147 | 146 | 152 | 156 | 147 | **150** | 4.37 |
| | | CD-ppi | 160 | 162 | 168 | 168 | 172 | **166** | 4.94 |
| STRENGTH AT BREAK | | MD-ppi | 205 | 172 | 206 | 217 | 196 | **199** | 17.04 |
| | | CD-ppi | 171 | 162 | 169 | 168 | 172 | **169** | 3.82 |
| ELONGATION AT YIELD | | MD% | 21.4 | 19.4 | 20.5 | 20.5 | 20.2 | **20.4** | 0.72 |
| Lo = 1.3" | | CD% | 14.8 | 13.1 | 13.7 | 14.5 | 12.9 | **13.8** | 0.84 |
| ELONGATION AT BREAK | | MD% | 438 | 445 | 449 | 447 | 428 | **441** | 8.56 |
| Lo = 2.0" | | CD% | 504 | 481 | 519 | 444 | 517 | **493** | 31.30 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-01
LAB ID NO.: L10017-01-03
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211432-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 59 | 60 | 63 | 60 | 61 | | |
| | | | 59 | 61 | 62 | 61 | 59 | **60.5** ✓ | 1.35 |
| DENSITY | D 1505 | g/cc | 0.9468 | 0.9468 | 0.9467 | | | **0.9468** ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.32 | 2.32 | | | | **2.32** ✓ | 0.003 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 55.0 | 56.5 | 55.6 | 56.6 | 57.8 | | |
| | | | 56.5 | 55.3 | 56.4 | 54.9 | 53.4 | **55.8** ✓ | 1.22 |
| | | CD-lbs | 48.3 | 49.6 | 49.6 | 50.6 | 50.7 | | |
| | | | 51.1 | 49.5 | 48.2 | 48.8 | 50.6 | **49.7** ✓ | 1.04 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppl | 144 | 147 | 150 | 152 | 150 | **149** ✓ | 3.33 |
| | | CD-ppi | 150 | 156 | 158 | 160 | 156 | **156** ✓ | 3.58 |
| STRENGTH AT BREAK | | MD-ppl | 158 | 199 | 208 | 206 | 187 | **192** ✓ | 20.44 |
| | | CD-ppl | 168 | 156 | 158 | 160 | 156 | **159** ✓ | 4.88 |
| ELONGATION AT YIELD | | MD% | 19.7 | 21.0 | 21.3 | 20.0 | 19.7 | **20.3** ✓ | 0.76 |
| Lo = 1.3" | | CD% | 15.8 | 13.9 | 14.2 | 13.9 | 13.4 | **14.2** ✓ | 0.92 |
| ELONGATION AT BREAK | | MD% | 404 | 430 | 461 | 453 | 440 | **438** ✓ | 22.23 |
| Lo = 2.0" | | CD% | 518 | 468 | 376 | 424 | 354 | **428** ✓ | 66.89 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-01
LAB ID NO.: L10017-01-04
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211440-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 63 | 63 | 60 | 59 | | |
| | | | 62 | 59 | 60 | 62 | 59 | **60.8** | 1.62 |
| DENSITY | D 1505 | g/cc | 0.9470 | 0.9471 | 0.9468 | | | **0.9470** | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.20 | 2.18 | | | | **2.19** | 0.017 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 57.8 | 54.8 | 52.4 | 54.9 | 58.2 | | |
| | | | 58.1 | 58.8 | 58.2 | 57.7 | 59.1 | **57.0** | 2.19 |
| | | CD-lbs | 51.2 | 52.4 | 53.7 | 55.5 | 52.1 | | |
| | | | 50.9 | 52.1 | 49.4 | 51.8 | 53.8 | **52.3** | 1.71 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 154 | 151 | 146 | 156 | 144 | **150** | 4.92 |
| | | CD-ppi | 168 | 157 | 160 | 164 | 162 | **162** | 3.85 |
| STRENGTH AT BREAK | | MD-ppi | 205 | 186 | 183 | 206 | 201 | **196** | 10.99 |
| | | CD-ppi | 192 | 166 | 176 | 174 | 182 | **178** | 9.78 |
| ELONGATION AT YIELD | | MD% | 22.7 | 22.9 | 22.9 | 24.1 | 24.9 | **23.5** | 0.96 |
| Lo = 1.3" | | CD% | 15.0 | 15.3 | 15.0 | 13.6 | 13.9 | **14.6** | 0.76 |
| ELONGATION AT BREAK | | MD% | 460 | 435 | 475 | 440 | 416 | **445** | 22.86 |
| Lo = 2.0" | | CD% | 582 | 506 | 540 | 526 | 555 | **542** | 28.83 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-01
LAB ID NO.: L10017-01-05
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211549-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 62 | 63 | 61 | 61 | 62 | | |
| | | | 61 | 60 | 62 | 58 | 62 | 61.2 | 1.40 |
| DENSITY | D 1505 | g/cc | 0.9467 | 0.9467 | 0.9466 | | | 0.9467 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.28 | 2.29 | | | | 2.28 | 0.010 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 56.8 | 56.9 | 52.9 | 55.2 | 57.8 | | |
| | | | 58.7 | 56.7 | 60.6 | 56.6 | 56.9 | 56.9 | 2.02 |
| | | CD-lbs | 52.2 | 53.4 | 55.4 | 53.8 | 54.3 | | |
| | | | 54.8 | 55.8 | 56.6 | 53.2 | 56.1 | 54.6 | 1.42 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 156 | 152 | 143 | 147 | 146 | 149 | 5.31 |
| | | CD-ppi | 175 | 164 | 163 | 164 | 158 | 165 | 6.15 |
| STRENGTH AT BREAK | | MD-ppi | 214 | 186 | 197 | 198 | 162 | 191 | 19.34 |
| | | CD-ppi | 192 | 178 | 173 | 164 | 160 | 173 | 12.57 |
| ELONGATION AT YIELD | | MD% | 21.3 | 20.8 | 21.9 | 21.1 | 19.7 | 21.0 | 0.81 |
| Lo = 1.3" | | CD% | 14.2 | 14.2 | 14.4 | 13.6 | 15.0 | 14.3 | 0.50 |
| ELONGATION AT BREAK | | MD% | 447 | 399 | 414 | 437 | 416 | 423 | 19.22 |
| Lo = 2.0" | | CD% | 578 | 558 | 540 | 316 | 463 | 491 | 107.08 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211558-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 65 | 62 | 63 | 60 | 60 | | |
| | | | 62 | 61 | 60 | 62 | 62 | 61.7 | 1.57 |
| DENSITY | D 1505 | g/cc | 0.9473 | 0.9474 | 0.9474 | | | 0.9474 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.27 | 2.26 | | | | 2.26 | 0.009 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.4 | 55.1 | 56.8 | 58.8 | 56.8 | | |
| | | | 56.5 | 57.8 | 53.8 | 57.2 | 52.5 | 56.0 | 1.96 |
| | | CD-lbs | 54.6 | 48.3 | 50.9 | 51.7 | 49.9 | | |
| | | | 48.3 | 47.7 | 45.9 | 47.6 | 47.9 | 49.3 | 2.53 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 156 | 160 | 158 | 160 | 153 | 157 | 2.88 |
| | | CD-ppi | 167 | 167 | 173 | 166 | 159 | 166 | 5.13 |
| STRENGTH AT BREAK | | MD-ppi | 214 | 187 | 196 | 196 | 172 | 193 | 15.57 |
| | | CD-ppi | 171 | 171 | 173 | 166 | 159 | 168 | 5.73 |
| ELONGATION AT YIELD | | MD% | 20.9 | 20.1 | 20.6 | 20.1 | 20.1 | 20.4 | 0.37 |
| Lo = 1.3" | | CD% | 15.1 | 15.1 | 14.8 | 14.8 | 14.8 | 14.9 | 0.16 |
| ELONGATION AT BREAK | | MD% | 455 | 418 | 451 | 445 | 432 | 440 | 15.16 |
| Lo = 2.0" | | CD% | 505 | 519 | 458 | 424 | 429 | 467 | 43.36 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-02
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211666-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 61 | 59 | 61 | 60 | | |
| | | | 60 | 63 | 64 | 62 | 60 | 61.1 | 1.52 |
| DENSITY | D 1505 | g/cc | 0.9477 | 0.9476 | 0.9477 | | | 0.9476 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.51 | 2.53 | | | | 2.52 | 0.014 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 52.8 | 55.7 | 55.4 | 54.4 | 53.5 | | |
| | | | 57.7 | 57.1 | 56.5 | 55.6 | 59.1 | 55.8 | 1.92 |
| | | CD-lbs | 47.2 | 54.0 | 52.1 | 51.2 | 48.1 | | |
| | | | 51.1 | 47.6 | 49.2 | 46.7 | 46.8 | 49.4 | 2.55 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 147 | 148 | 164 | 154 | 150 | 153 | 7.12 |
| | | CD-ppi | 166 | 165 | 173 | 178 | 161 | 169 | 6.57 |
| STRENGTH AT BREAK | | MD-ppi | 188 | 189 | 209 | 192 | 206 | 197 | 9.86 |
| | | CD-ppi | 172 | 168 | 190 | 178 | 170 | 176 | 8.92 |
| ELONGATION AT YIELD | | MD% | 20.5 | 20.2 | 20.2 | 19.4 | 19.9 | 20.0 | 0.42 |
| Lo = 1.3" | | CD% | 13.7 | 14.8 | 13.4 | 13.4 | 13.7 | 13.8 | 0.58 |
| ELONGATION AT BREAK | | MD% | 377 | 445 | 433 | 431 | 490 | 435 | 40.34 |
| Lo = 2.0" | | CD% | 517 | 517 | 583 | 489 | 515 | 524 | 34.95 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-03
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211675-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 59 | 60 | 60 | 61 | 60 | | |
| | | | 60 | 61 | 60 | 63 | 63 | **60.7** | 1.34 |
| DENSITY | D 1505 | g/cc | 0.9471 | 0.9471 | 0.9471 | | | **0.9471** | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.36 | 2.41 | | | | **2.38** | 0.029 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 53.9 | 57.1 | 51.3 | 51.9 | 51.9 | | |
| | | | 54.5 | 53.3 | 56.4 | 55.8 | 53.0 | **53.9** | 2.01 |
| | | CD-lbs | 50.0 | 48.8 | 53.0 | 49.9 | 47.3 | | |
| | | | 53.0 | 48.0 | 53.6 | 54.7 | 47.6 | **50.6** | 2.75 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 153 | 161 | 152 | 150 | 154 | **154** | 4.28 |
| | | CD-ppi | 148 | 153 | 159 | 162 | 160 | **156** | 5.55 |
| STRENGTH AT BREAK | | MD-ppi | 169 | 201 | 213 | 173 | 194 | **190** | 18.68 |
| | | CD-ppi | 165 | 170 | 159 | 173 | 167 | **167** | 5.26 |
| ELONGATION AT YIELD | | MD% | 20.8 | 20.5 | 20.8 | 20.2 | 20.2 | **20.5** | 0.30 |
| Lo = 1.3" | | CD% | 14.7 | 14.4 | 15.5 | 14.7 | 14.4 | **14.7** | 0.45 |
| ELONGATION AT BREAK | | MD% | 421 | 478 | 468 | 424 | 471 | **452** | 27.56 |
| Lo = 2.0" | | CD% | 518 | 543 | 468 | 536 | 498 | **513** | 30.43 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-04
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211683-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 60 | 59 | 60 | 62 | 61 | | |
| | | | 62 | 62 | 61 | 65 | 63 | **61.5** | 1.72 |
| DENSITY | D 1505 | g/cc | 0.9479 | 0.9479 | 0.9479 | | | **0.9479** | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.76 | 2.75 | | | | **2.76** | 0.012 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 56.7 | 54.8 | 54.1 | 57.0 | 46.4 | | |
| | | | 51.1 | 50.7 | 52.4 | 52.0 | 45.2 | **52.0** | 3.94 |
| | | CD-lbs | 53.1 | 55.8 | 55.5 | 52.3 | 47.5 | | |
| | | | 50.4 | 51.2 | 48.9 | 50.5 | 49.8 | **51.5** | 2.70 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 146 | 140 | 158 | 143 | 148 | **147** | 7.18 |
| | | CD-ppi | 160 | 161 | 154 | 174 | 156 | **161** | 7.96 |
| STRENGTH AT BREAK | | MD-ppi | 220 | 170 | 204 | 165 | 191 | **190** | 23.00 |
| | | CD-ppi | 160 | 165 | 157 | 174 | 156 | **162** | 7.67 |
| ELONGATION AT YIELD | | MD% | 20.8 | 19.7 | 20.5 | 20.3 | 20.0 | **20.3** | 0.43 |
| Lo = 1.3" | | CD% | 14.3 | 14.0 | 14.6 | 14.0 | 14.0 | **14.2** | 0.27 |
| ELONGATION AT BREAK | | MD% | 484 | 438 | 420 | 453 | 437 | **446** | 24.05 |
| Lo = 2.0" | | CD% | 172 | 511 | 501 | 481 | 451 | **423** | 142.28 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-05
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211701-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 60 | 60 | 61 | 59 | 63 | | |
| | | | 59 | 60 | 61 | 62 | 63 | 60.8 | 1.48 |
| DENSITY | D 1505 | g/cc | 0.9476 | 0.9477 | 0.9477 | | | 0.9476 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.69 | 2.66 | | | | 2.68 | 0.023 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 52.6 | 54.3 | 54.8 | 56.3 | 57.3 | | |
| | | | 54.6 | 50.4 | 54.2 | 51.3 | 48.3 | 53.4 | 2.76 |
| | | CD-lbs | 47.1 | 56.0 | 52.0 | 48.8 | 48.4 | | |
| | | | 45.6 | 46.0 | 47.2 | 45.9 | 46.4 | 48.3 | 3.30 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 155 | 143 | 153 | 146 | 152 | 150 | 5.00 |
| | | CD-ppi | 153 | 156 | 171 | 163 | 151 | 159 | 8.42 |
| STRENGTH AT BREAK | | MD-ppi | 218 | 190 | 186 | 166 | 176 | 187 | 19.73 |
| | | CD-ppi | 162 | 156 | 176 | 163 | 163 | 164 | 7.59 |
| ELONGATION AT YIELD | | MD% | 20.9 | 20.9 | 20.1 | 19.9 | 20.1 | 20.4 | 0.48 |
| Lo = 1.3" | | CD% | 15.2 | 14.3 | 14.6 | 15.2 | 15.2 | 14.9 | 0.42 |
| ELONGATION AT BREAK | | MD% | 460 | 444 | 425 | 440 | 457 | 445 | 14.10 |
| Lo = 2.0" | | CD% | 493 | 465 | 514 | 465 | 486 | 485 | 20.65 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-06
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 211792-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 59 | 58 | 60 | 59 | 60 | | |
| | | | 60 | 60 | 59 | 62 | 61 | 59.8 ✓ | 1.14 |
| DENSITY | D 1505 | g/cc | 0.9472 | 0.9472 | 0.9474 | | | 0.9473 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.45 | 2.44 | | | | 2.44 ✓ | 0.009 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 51.1 | 53.8 | 56.2 | 54.2 | 55.2 | | |
| | | | 54.3 | 51.2 | 53.4 | 54.0 | 55.0 | 53.8 ✓ | 1.63 |
| | | CD-lbs | 51.8 | 47.8 | 49.2 | 53.5 | 51.7 | | |
| | | | 47.1 | 45.6 | 47.1 | 50.6 | 46.4 | 49.1 ✓ | 2.69 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 152 | 163 | 149 | 155 | 151 | 154 ✓ | 5.54 |
| | | CD-ppi | 157 | 160 | 157 | 166 | 160 | 160 ✓ | 3.92 |
| STRENGTH AT BREAK | | MD-ppi | 198 | 204 | 170 | 170 | 193 | 187 ✓ | 16.30 |
| | | CD-ppi | 157 | 160 | 161 | 166 | 160 | 161 ✓ | 3.47 |
| ELONGATION AT YIELD | | MD% | 20.2 | 19.8 | 18.2 | 18.8 | 19.8 | 19.4 ✓ | 0.83 |
| Lo = 1.3" | | CD% | 13.9 | 13.9 | 15.9 | 15.3 | 15.0 | 14.8 ✓ | 0.88 |
| ELONGATION AT BREAK | | MD% | 428 | 451 | 448 | 394 | 444 | 433 ✓ | 23.54 |
| Lo = 2.0" | | CD% | 213 | 461 | 494 | 470 | 415 | 411 ✓ | 114.20 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-03
LAB ID NO.: L10017-03-07
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 212105-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 62 | 62 | 61 | 62 | 61 | | |
| | | | 60 | 60 | 60 | 60 | 62 | 61.0 | 0.94 |
| DENSITY | D 1505 | g/cc | 0.9479 | 0.9478 | 0.9479 | | | 0.9478 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.51 | 2.47 | | | | 2.49 | 0.024 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.2 | 56.0 | 50.1 | 55.3 | 51.2 | | |
| | | | 53.1 | 53.2 | 53.5 | 51.7 | 53.0 | 53.1 | 1.80 |
| | | CD-lbs | 48.3 | 49.6 | 47.2 | 48.0 | 48.4 | | |
| | | | 51.2 | 49.8 | 51.4 | 49.5 | 47.5 | 49.1 | 1.46 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 160 | 157 | 156 | 158 | 156 | 157 | 1.43 |
| | | CD-ppi | 156 | 164 | 164 | 164 | 161 | 162 | 3.27 |
| STRENGTH AT BREAK | | MD-ppi | 201 | 192 | 189 | 179 | 156 | 184 | 17.29 |
| | | CD-ppi | 157 | 164 | 164 | 170 | 161 | 163 | 4.96 |
| ELONGATION AT YIELD Lo = 1.3" | | MD% | 20.6 | 20.0 | 19.7 | 18.1 | 18.7 | 19.4 | 1.01 |
| | | CD% | 15.3 | 13.9 | 14.4 | 16.1 | 14.7 | 14.9 | 0.85 |
| ELONGATION AT BREAK Lo = 2.0" | | MD% | 432 | 439 | 418 | 463 | 354 | 421 | 40.95 |
| | | CD% | 404 | 285 | 469 | 404 | 304 | 373 | 76.88 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 218603-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 56 | 57 | 59 | 60 | 60 | | |
| | | | 60 | 61 | 61 | 61 | 61 | 59.6 | 2.05 |
| DENSITY | D 1505 | g/cc | 0.9453 | 0.9451 | 0.9451 | | | 0.9452 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.22 | 2.40 | | | | 2.31 | 0.127 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 56.1 | 55.6 | 61.3 | 57.8 | 61.3 | | |
| | | | 56.3 | 62.0 | 54.1 | 57.3 | 57.9 | 58.0 | 2.70 |
| | | CD-lbs | 55.1 | 55.0 | 54.3 | 58.4 | 54.6 | | |
| | | | 56.7 | 53.3 | 51.1 | 56.4 | 53.4 | 54.8 | 2.04 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 152 | 153 | 162 | 165 | 165 | 160 | 6.26 |
| | | CD-ppi | 160 | 172 | 163 | 157 | 156 | 162 | 6.68 |
| STRENGTH AT BREAK | | MD-ppi | 193 | 165 | 199 | 194 | 165 | 183 | 16.85 |
| | | CD-ppi | 185 | 178 | 181 | 157 | 156 | 171 | 13.76 |
| ELONGATION AT YIELD | | MD% | 21.2 | 19.3 | 20.6 | 20.6 | 18.4 | 20.0 | 1.14 |
| Lo = 1.3" | | CD% | 15.9 | 14.3 | 13.5 | 16.8 | 13.5 | 14.8 | 1.49 |
| ELONGATION AT BREAK | | MD% | 465 | 428 | 416 | 418 | 312 | 408 | 57.07 |
| Lo = 2.0" | | CD% | 516 | 496 | 520 | 304 | 117 | 391 | 177.44 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-02
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 218612-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 60 | 60 | 60 | 62 | | |
| | | | 61 | 61 | 62 | 60 | 64 | 61.1 ✓ | 1.11 |
| DENSITY | D 1505 | g/cc | 0.9458 | 0.9457 | 0.9457 | | | 0.9457 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.54 | 2.56 | | | | 2.55 ✓ | 0.016 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.4 | 54.1 | 57.8 | 56.6 | 55.4 | | |
| | | | 55.1 | 60.8 | 53.6 | 60.8 | 56.6 | 56.5 ✓ | 2.59 |
| | | CD-lbs | 49.8 | 49.5 | 53.6 | 53.5 | 53.8 | | |
| | | | 51.3 | 53.7 | 54.2 | 53.7 | 49.3 | 52.2 ✓ | 2.03 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 150 | 157 | 165 | 168 | 162 | 160 ✓ | 6.88 |
| | | CD-ppi | 162 | 157 | 172 | 180 | 161 | 166 ✓ | 9.19 |
| STRENGTH AT BREAK | | MD-ppi | 163 | 166 | 228 | 178 | 173 | 182 ✓ | 26.51 |
| | | CD-ppi | 192 | 168 | 178 | 180 | 171 | 178 ✓ | 9.31 |
| ELONGATION AT YIELD | | MD% | 20.0 | 19.2 | 21.1 | 18.6 | 17.8 | 19.3 ✓ | 1.27 |
| Lo = 1.3" | | CD% | 16.9 | 16.0 | 15.5 | 13.5 | 14.1 | 15.2 ✓ | 1.39 |
| ELONGATION AT BREAK | | MD% | 375 | 426 | 463 | 432 | 448 | 429 ✓ | 33.36 |
| Lo = 2.0" | | CD% | 549 | 485 | 488 | 429 | 528 | 496 ✓ | 46.12 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-10-01 HDPE MARSHALL.xls]Sheet1 L10017-10-02 5/19/2010

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# CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-03
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 218695-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 60 | 60 | 60 | 64 | | |
| | | | 66 | 61 | 61 | 68 | 70 | 63.2 ✓ | 3.66 |
| DENSITY | D 1505 | g/cc | 0.9456 | 0.9453 | 0.9452 | | | 0.9454 ✓ | 0.0002 |
| CARBON BLACK CONTENT | D 1603 | % | 2.23 | 2.18 | | | | 2.21 ✓ | 0.029 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.8 | 60.8 | 62.8 | 59.4 | 57.1 | | |
| | | | 57.6 | 54.4 | 60.3 | 55.9 | 55.3 | 57.8 ✓ | 2.86 |
| | | CD-lbs | 51.0 | 55.1 | 57.4 | 53.6 | 50.5 | | |
| | | | 51.9 | 53.9 | 56.1 | 52.4 | 53.3 | 53.5 ✓ | 2.20 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 147 | 149 | 160 | 164 | 153 | 155 ✓ | 7.32 |
| | | CD-ppi | 158 | 174 | 171 | 156 | 150 | 162 ✓ | 10.37 |
| STRENGTH AT BREAK | | MD-ppi | 170 | 180 | 220 | 176 | 176 | 184 ✓ | 20.45 |
| | | CD-ppi | 192 | 191 | 171 | 177 | 157 | 178 ✓ | 14.59 |
| ELONGATION AT YIELD | | MD% | 20.7 | 21.8 | 21.5 | 19.6 | 18.8 | 20.5 ✓ | 1.27 |
| Lo = 1.3" | | CD% | 17.1 | 15.7 | 13.5 | 14.9 | 14.6 | 15.2 ✓ | 1.34 |
| ELONGATION AT BREAK | | MD% | 415 | 433 | 436 | 417 | 478 | 436 ✓ | 25.37 |
| Lo = 2.0" | | CD% | 553 | 530 | 218 | 516 | 458 | 455 ✓ | 137.05 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-10-02 HDPE MARSHALL.xls]Sheet1 L10017-10-03 5/19/2010

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-04
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 218721-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 61 | 59 | 60 | 60 | | |
| | | | 60 | 69 | 67 | 69 | 67 | **63.3** ✓ | 4.10 |
| DENSITY | D 1505 | g/cc | 0.9460 | 0.9457 | 0.9459 | | | **0.9459** ✓ | 0.0002 |
| CARBON BLACK CONTENT | D 1603 | % | 2.46 | 2.48 | | | | **2.47** ✓ | 0.009 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 58.3 | 51.4 | 54.0 | 56.4 | 56.7 | | |
| | | | 52.2 | 58.0 | 54.9 | 59.3 | 56.2 | **55.7** ✓ | 2.60 |
| | | CD-lbs | 54.6 | 51.1 | 52.6 | 51.1 | 49.7 | | |
| | | | 56.9 | 56.4 | 55.2 | 50.9 | 50.0 | **52.9** ✓ | 2.70 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 154 | 146 | 156 | 148 | 160 | **153** ✓ | 5.55 |
| | | CD-ppi | 150 | 152 | 158 | 159 | 156 | **155** ✓ | 3.80 |
| STRENGTH AT BREAK | | MD-ppi | 221 | 158 | 171 | 177 | 176 | **181** ✓ | 23.87 |
| | | CD-ppi | 150 | 179 | 174 | 182 | 199 | **177** ✓ | 17.67 |
| ELONGATION AT YIELD Lo = 1.3" | | MD% | 20.5 | 19.1 | 18.3 | 19.6 | 19.4 | **19.4** ✓ | 0.80 |
| | | CD% | 16.4 | 15.3 | 16.1 | 14.8 | 14.2 | **15.4** ✓ | 0.91 |
| ELONGATION AT BREAK Lo = 2.0" | | MD% | 472 | 402 | 423 | 443 | 428 | **434** ✓ | 26.01 |
| | | CD% | 406 | 541 | 479 | 499 | 577 | **500** ✓ | 64.98 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-10-04 HDPE MARSHALL.xls]Sheet1 L10017-10-04 5/19/2010

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-05
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 218729-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 60 | 59 | 58 | 60 | 60 | | |
| | | | 60 | 61 | 61 | 60 | 63 | 60.2 ✓ | 1.45 |
| DENSITY | D 1505 | g/cc | 0.9453 | 0.9452 | 0.9455 | | | 0.9453 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.43 | 2.43 | | | | 2.43 ✓ | 0.002 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.2 | 58.7 | 59.6 | 59.5 | 54.7 | | |
| | | | 53.7 | 59.7 | 57.5 | 53.5 | 60.6 | 57.2 ✓ | 2.84 |
| | | CD-lbs | 51.4 | 50.5 | 53.7 | 54.7 | 53.6 | | |
| | | | 55.1 | 49.5 | 51.7 | 48.4 | 57.3 | 52.6 ✓ | 2.77 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 140 | 145 | 156 | 162 | 161 | 153 ✓ | 9.79 |
| | | CD-ppi | 163 | 150 | 148 | 162 | 165 | 158 ✓ | 7.81 |
| STRENGTH AT BREAK | | MD-ppi | 178 | 159 | 212 | 162 | 161 | 174 ✓ | 22.27 |
| | | CD-ppi | 186 | 161 | 154 | 188 | 170 | 172 ✓ | 14.94 |
| ELONGATION AT YIELD | | MD% | 21.8 | 19.5 | 21.2 | 18.1 | 18.1 | 19.7 ✓ | 1.72 |
| Lo = 1.3" | | CD% | 16.8 | 17.1 | 13.2 | 15.7 | 14.0 | 15.4 ✓ | 1.71 |
| ELONGATION AT BREAK | | MD% | 411 | 419 | 432 | 393 | 338 | 399 ✓ | 36.71 |
| Lo = 2.0" | | CD% | 508 | 482 | 466 | 527 | 488 | 494 ✓ | 23.71 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-10-05 HDPE MARSHALL.xls]Sheet1 L10017-10-05 5/19/2010

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-06
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 219106-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 60 | 59 | 60 | 59 | 64 | | |
| | | | 64 | 62 | 61 | 64 | 60 | 61.1 ✓ | 2.00 |
| DENSITY | D 1505 | g/cc | 0.9458 | 0.9460 | 0.9458 | | | 0.9459 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.37 | 2.42 | | | | 2.39 ✓ | 0.035 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 57.8 | 57.6 | 59.8 | 52.8 | 50.4 | | |
| | | | 55.6 | 55.8 | 60.9 | 55.5 | 53.9 | 56.0 ✓ | 3.17 |
| | | CD-lbs | 49.6 | 50.6 | 54.3 | 54.2 | 54.0 | | |
| | | | 52.3 | 48.7 | 53.4 | 53.2 | 52.8 | 52.3 ✓ | 2.00 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 157 | 158 | 164 | 142 | 138 | 152 ✓ | 11.42 |
| | | CD-ppi | 160 | 157 | 153 | 148 | 161 | 156 ✓ | 5.47 |
| STRENGTH AT BREAK | | MD-ppi | 177 | 205 | 191 | 159 | 181 | 182 ✓ | 17.18 |
| | | CD-ppi | 174 | 157 | 161 | 163 | 178 | 166 ✓ | 8.71 |
| ELONGATION AT YIELD | | MD% | 18.8 | 21.6 | 15.4 | 19.3 | 20.4 | 19.1 ✓ | 2.33 |
| Lo = 1.3" | | CD% | 17.2 | 19.2 | 15.0 | 15.3 | 13.9 | 16.1 ✓ | 2.09 |
| ELONGATION AT BREAK | | MD% | 441 | 413 | 538 | 416 | 466 | 455 ✓ | 51.21 |
| Lo = 2.0" | | CD% | 469 | 363 | 487 | 488 | 536 | 469 ✓ | 64.05 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-10-06 HDPE MARSHALL.xls]Sheet1 L10017-10-06 5/19/2010

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-10
LAB ID NO.: L10017-10-07
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 219223-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 61 | 61 | 58 | 58 | 56 | | |
| | | | 57 | 61 | 60 | 61 | 65 | 59.7 ✓ | 2.77 |
| DENSITY | D 1505 | g/cc | 0.9462 | 0.9460 | 0.9460 | | | 0.9461 ✓ | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.39 | 2.39 | | | | 2.39 ✓ | 0.006 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 56.3 | 57.7 | 59.5 | 51.0 | 51.0 | | |
| | | | 58.6 | 61.5 | 54.5 | 51.0 | 51.7 | 55.3 ✓ | 3.98 |
| | | CD-lbs | 47.3 | 49.3 | 51.7 | 54.8 | 55.0 | | |
| | | | 50.0 | 51.1 | 48.6 | 53.5 | 54.7 | 51.6 ✓ | 2.80 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 142 | 144 | 155 | 160 | 162 | 153 ✓ | 9.14 |
| | | CD-ppi | 166 | 150 | 148 | 164 | 167 | 159 ✓ | 9.17 |
| STRENGTH AT BREAK | | MD-ppi | 174 | 145 | 205 | 189 | 180 | 179 ✓ | 22.25 |
| | | CD-ppi | 181 | 166 | 148 | 171 | 190 | 171 ✓ | 15.73 |
| ELONGATION AT YIELD Lo = 1.3" | | MD% | 19.1 | 18.2 | 20.2 | 17.4 | 18.5 | 18.7 ✓ | 1.05 |
| | | CD% | 16.5 | 16.2 | 14.6 | 14.0 | 15.1 | 15.3 ✓ | 1.06 |
| ELONGATION AT BREAK Lo = 2.0" | | MD% | 460 | 370 | 444 | 455 | 427 | 431 ✓ | 36.48 |
| | | CD% | 483 | 493 | 191 | 489 | 530 | 437 ✓ | 138.85 |

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# CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-12
LAB ID NO.: L10017-12-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 219114-10

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| THICKNESS | D 5994 | mils | 60 | 58 | 58 | 59 | 61 | | |
| | | | 59 | 61 | 62 | 63 | 63 | 60.3 | 1.76 |
| DENSITY | D 1505 | g/cc | 0.9454 | 0.9454 | 0.9452 | | | 0.9453 | 0.0001 |
| CARBON BLACK CONTENT | D 1603 | % | 2.33 | 2.32 | | | | 2.33 | 0.003 |
| TEAR RESISTANCE | D 1004 | MD-lbs | 54.6 | 57.7 | 57.3 | 58.0 | 54.5 | | |
| | | | 52.4 | 51.4 | 52.1 | 51.4 | 58.0 | 54.7 | 2.82 |
| | | CD-lbs | 54.5 | 61.7 | 56.4 | 57.6 | 56.1 | | |
| | | | 55.3 | 60.6 | 55.8 | 53.5 | 54.0 | 56.6 | 2.72 |
| TENSILE PROPERTIES | D 6693 | | | | | | | | |
| STRENGTH AT YIELD | | MD-ppi | 150 | 160 | 150 | 167 | 163 | 158 | 7.77 |
| | | CD-ppi | 162 | 168 | 176 | 155 | 156 | 163 | 8.60 |
| STRENGTH AT BREAK | | MD-ppi | 177 | 217 | 163 | 167 | 163 | 177 | 22.74 |
| | | CD-ppi | 177 | 168 | 190 | 170 | 156 | 172 | 12.36 |
| ELONGATION AT YIELD | | MD% | 20.0 | 24.2 | 19.2 | 18.4 | 17.8 | 19.9 | 2.53 |
| Lo = 1.3" | | CD% | 17.1 | 17.1 | 15.1 | 16.2 | 15.9 | 16.3 | 0.85 |
| ELONGATION AT BREAK | | MD% | 498 | 464 | 447 | 369 | 418 | 439 | 48.76 |
| Lo = 2.0" | | CD% | 513 | 470 | 563 | 521 | 443 | 502 | 46.66 |

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# APPENDIX II – GEOSYNTHETICS
# Section 3 – Cells 1 and 2 Geocomposite Testing

**330-mil, LDS and LCS Geocomposite Manufacturer's Quality Control (MQC) Test Results**
**330-mil, LDS and LCS Geocomposite Conformance Test Results**
**350-mil, LDS Geocomposite Alternate Manufacturer's Quality Control (MQC) Test Results**
**350-mil, LDS Geocomposite Alternate Conformance Test Results**

# 330-mil, LDS and LCS Geocomposite Manufacturer's Quality Control (MQC) Test Results

S&ME

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

May 11, 2010
Environmental Specialties International
7943 Pecue Lane, Suite A
Baton Rouge, LA 70809

**Ref. : Duke Energy Marshall Steam Station, NC**
**Customer P.O. # 13179**
**Transnet 330-2-8**

We certify that the Transnet 330-2-8 drainage composite, meets the project requirements as stated in the specifications. The properties listed in this section are:

| Property | Test Method | Unit | Required Value | Qualifier |
|---|---|---|---|---|
| **Geonet**[4] | | | | |
| Mass per Unit Area | ASTM D 5261 | $lbs/ft^2$ | 0.3 | Minimum |
| Thickness | ASTM D 5199 | mil | 300 | Minimum |
| Carbon Black | ASTM D 4218 | % | 2.0 - 3.0 | Range |
| Tensile Strength | ASTM D 5035 | lbs/in | 75 | Minimum |
| Melt Flow | ASTM D 1238[3] | g/10 min | 1.0 | Maximum |
| Density | ASTM D 1505 | $g/cm^3$ | 0.94 | Minimum |
| **Composite** | | | | |
| Ply Adhesion | ASTM D 7005 | lb/in | 1.0 | MARV[6] |
| Transmissivity[1] | ASTM D 4716 | $m^2/sec$ | $2.87 \times 10^{-3}$ | MARV |
| Transmissivity[2] | ASTM D 4716 | $m^2/sec$ | $3.45 \times 10^{-3}$ | MARV |
| **Geotextile**[4 & 5] | | | | |
| Fabric Weight | ASTM D 5261 | $oz/yd^2$ | 8.0 | MARV |
| Grab Strength | ASTM D 4632 | lbs | 200 | MARV |
| Grab Elongation | ASTM D 4632 | % | 50 | MARV |
| Puncture Resistance | ASTM D 4833 | lbs | 80 | MARV |
| Permeability | ASTM D 4491 | cm/sec | $2.0 \times 10^{-4}$ | MARV |
| AOS | ASTM D 4751 | US Sieve | 80 | MARV |
| UV Resistance | ASTM D 4355 | %/hrs | 70/500 | MARV |

**Notes:**

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.03 and a confining pressure of 7200 psf between ottawa sand & liner after 100 hours.

2 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.03 and a confining pressure of 7200 psf between liners after 100 hours.

3 Condition 190/2.16

4 Geotextile and Geonet properties are prior to lamination.

5 Geotextile data is provided by the supplier.

6 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,

*Nilay Patel*

Nilay Patel
QA Manager

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210001 | 359210001 - N | 3592.008 | 3592.016 | 1.22 | 4.02 | |
| 2 | 359210002 | 359210002 - N | 3592.008 | 3592.016 | | | |
| 3 | 359210003 | 359210003 - N | 3592.008 | 3592.016 | | | |
| 4 | 359210004 | 359210004 - N | 3592.008 | 3592.016 | | | |
| 5 | 359210005 | 359210005 - N | 3592.008 | 3592.016 | | | |
| 6 | 359210006 | 359210006 - N | 3592.008 | 3592.016 | | | |
| 7 | 359210007 | 359210007 - N | 3592.008 | 3592.016 | | | |
| 8 | 359210008 | 359210008 - N | 3592.021 | 3592.005 | | | |
| 9 | 359210009 | 359210009 - N | 3592.021 | 3592.005 | | | |
| 10 | 359210010 | 359210010 - N | 3592.021 | 3592.005 | | | |
| 11 | 359210011 | 359210011 - N | 3592.021 | 3592.005 | | | |
| 12 | 359210012 | 359210012 - N | 3592.021 | 3592.005 | | | |
| 13 | 359210013 | 359210013 - N | 3592.021 | 3592.005 | | | |
| 14 | 359210014 | 359210014 - N | 3592.021 | 3592.005 | | | |
| 15 | 359210015 | 359210015 - N | 3592.002 | 3592.022 | | | |
| 16 | 359210016 | 359210016 - N | 3592.002 | 3592.022 | | | |
| 17 | 359210017 | 359210017 - N | 3592.002 | 3592.022 | | | |
| 18 | 359210018 | 359210018 - N | 3592.002 | 3592.022 | | | |
| 19 | 359210019 | 359210019 - N | 3592.002 | 3592.022 | | | |
| 20 | 359210020 | 359210020 - N | 3592.002 | 3592.022 | 1.90 | 4.45 | |
| 21 | 359210021 | 359210021 - N | 3592.002 | 3592.022 | | | |
| 22 | 359210022 | 359210022 - N | 3592.017 | 3592.009 | | | |
| 23 | 359210023 | 359210023 - N | 3592.017 | 3592.009 | | | |
| 24 | 359210024 | 359210024 - N | 3592.017 | 3592.009 | | | |
| 25 | 359210025 | 359210025 - N | 3592.017 | 3592.009 | | | |
| 26 | 359210026 | 359210026 - N | 3592.017 | 3592.009 | | | |
| 27 | 359210027 | 359210027 - N | 3592.017 | 3592.009 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210001 - N | CHVX898541 | 0.9543 | 0.442 | 360 | 2.73 | 126 | |
| 359210002 - N | CHVX898541 | 0.9543 | | | | | |
| 359210003 - N | CHVX898541 | 0.9543 | | | | | |
| 359210004 - N | CHVX898541 | 0.9543 | | | | | |
| 359210005 - N | CHVX898541 | 0.9543 | | | | | |
| 359210006 - N | CHVX898541 | 0.9543 | | | | | |
| 359210007 - N | CHVX898541 | 0.9543 | | | | | |
| 359210008 - N | CHVX898541 | 0.9543 | | | | | |
| 359210009 - N | CHVX898541 | 0.9543 | | | | | |
| 359210010 - N | CHVX898541 | 0.9543 | | | | | |
| 359210011 - N | CHVX898541 | 0.9543 | | | | | |
| 359210012 - N | CHVX898541 | 0.9543 | | | | | |
| 359210013 - N | CHVX898541 | 0.9543 | | | | | |
| 359210014 - N | CHVX898541 | 0.9543 | | | | | |
| 359210015 - N | CHVX898541 | 0.9543 | | | | | |
| 359210016 - N | CHVX898541 | 0.9543 | | | | | |
| 359210017 - N | CHVX898541 | 0.9543 | | | | | |
| 359210018 - N | CHVX898541 | 0.9543 | | | | | |
| 359210019 - N | CHVX898541 | 0.9543 | | | | | |
| 359210020 - N | CHVX898541 | 0.9551 | 0.477 | 369 | 2.24 | 137 | |
| 359210021 - N | CHVX898541 | 0.9551 | | | | | |
| 359210022 - N | CHVX898541 | 0.9551 | | | | | |
| 359210023 - N | CHVX898541 | 0.9551 | | | | | |
| 359210024 - N | CHVX898541 | 0.9551 | | | | | |
| 359210025 - N | CHVX898541 | 0.9551 | | | | | |
| 359210026 - N | CHVX898541 | 0.9551 | | | | | |
| 359210027 - N | CHVX898541 | 0.9551 | | | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210028 | 359210028 - N | 3592.017 | 3592.009 | | | |
| 2 | 359210029 | 359210029 - N | 3592.012 | 3592.026 | | | |
| 3 | 359210030 | 359210030 - N | 3592.012 | 3592.026 | | | |
| 4 | 359210031 | 359210031 - N | 3592.012 | 3592.026 | | | |
| 5 | 359210032 | 359210032 - N | 3592.012 | 3592.026 | | | |
| 6 | 359210033 | 359210033 - N | 3592.012 | 3592.026 | | | |
| 7 | 359210034 | 359210034 - N | 3592.012 | 3592.026 | | | |
| 8 | 359210035 | 359210035 - N | 3592.012 | 3592.026 | | | |
| 9 | 359210036 | 359210036 - N | 3592.025 | 3592.003 | | | |
| 10 | 359210037 | 359210037 - N | 3592.025 | 3592.003 | | | |
| 11 | 359210038 | 359210038 - N | 3592.025 | 3592.003 | | | |
| 12 | 359210039 | 359210039 - N | 3592.025 | 3592.003 | | | |
| 13 | 359210040 | 359210040 - N | 3592.025 | 3592.003 | 1.25 | 4.05 | |
| 14 | 359210041 | 359210041 - N | 3592.025 | 3592.003 | | | |
| 15 | 359210042 | 359210042 - N | 3592.025 | 3592.003 | | | |
| 16 | 359210043 | 359210043 - N | 3592.006 | 3592.020 | | | |
| 17 | 359210044 | 359210044 - N | 3592.006 | 3592.020 | | | |
| 18 | 359210045 | 359210045 - N | 3592.006 | 3592.020 | | | |
| 19 | 359210046 | 359210046 - N | 3592.006 | 3592.020 | | | |
| 20 | 359210047 | 359210047 - N | 3592.006 | 3592.020 | | | |
| 21 | 359210048 | 359210048 - N | 3592.006 | 3592.020 | | | |
| 22 | 359210049 | 359210049 - N | 3592.006 | 3592.020 | | | |
| 23 | 359210050 | 359210050 - N | 3592.019 | 3592.011 | | | |
| 24 | 359210051 | 359210051 - N | 3592.019 | 3592.011 | | | |
| 25 | 359210052 | 359210052 - N | 3592.019 | 3592.011 | | | |
| 26 | 359210053 | 359210053 - N | 3592.019 | 3592.011 | | | |
| 27 | 359210054 | 359210054 - N | 3592.019 | 3592.011 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210028 - N | CHVX898541 | 0.9551 | | | | | |
| 359210029 - N | CHVX898541 | 0.9551 | | | | | |
| 359210030 - N | CHVX898541 | 0.9551 | | | | | |
| 359210031 - N | CHVX898541 | 0.9551 | | | | | |
| 359210032 - N | CHVX898541 | 0.9551 | | | | | |
| 359210033 - N | CHVX898541 | 0.9551 | | | | | |
| 359210034 - N | CHVX898541 | 0.9551 | | | | | |
| 359210035 - N | CHVX898541 | 0.9551 | | | | | |
| 359210036 - N | CHVX898541 | 0.9551 | | | | | |
| 359210037 - N | CHVX898541 | 0.9551 | | | | | |
| 359210038 - N | CHVX898541 | 0.9551 | | | | | |
| 359210039 - N | CHVX898541 | 0.9551 | | | | | |
| 359210040 - N | CHVX898541 | 0.9545 | 0.444 | 362 | 2.70 | 128 | |
| 359210041 - N | CHVX898541 | 0.9545 | | | | | |
| 359210042 - N | CHVX898541 | 0.9545 | | | | | |
| 359210043 - N | CHVX898541 | 0.9545 | | | | | |
| 359210044 - N | CHVX898541 | 0.9545 | | | | | |
| 359210045 - N | CHVX898541 | 0.9545 | | | | | |
| 359210046 - N | CHVX898541 | 0.9545 | | | | | |
| 359210047 - N | CHVX898541 | 0.9545 | | | | | |
| 359210048 - N | CHVX898541 | 0.9545 | | | | | |
| 359210049 - N | CHVX898541 | 0.9545 | | | | | |
| 359210050 - N | CHVX898541 | 0.9545 | | | | | |
| 359210051 - N | CHVX898541 | 0.9545 | | | | | |
| 359210052 - N | CHVX898541 | 0.9545 | | | | | |
| 359210053 - N | CHVX898541 | 0.9545 | | | | | |
| 359210054 - N | CHVX898541 | 0.9545 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210055 | 359210055 - N | 3592.019 | 3592.011 | | | |
| 2 | 359210056 | 359210056 - N | 3592.019 | 3592.011 | | | |
| 3 | 359210057 | 359210057 - N | 3592.004 | 3592.024 | | | |
| 4 | 359210058 | 359210058 - N | 3592.004 | 3592.024 | | | |
| 5 | 359210059 | 359210059 - N | 3592.004 | 3592.024 | | | |
| 6 | 359210060 | 359210060 - N | 3592.004 | 3592.024 | 1.87 | 4.43 | |
| 7 | 359210061 | 359210061 - N | 3592.004 | 3592.024 | | | |
| 8 | 359210062 | 359210062 - N | 3592.004 | 3592.024 | | | |
| 9 | 359210063 | 359210063 - N | 3592.004 | 3592.024 | | | |
| 10 | 359210064 | 359210064 - N | 3592.023 | 3592.007 | | | |
| 11 | 359210065 | 359210065 - N | 3592.023 | 3592.007 | | | |
| 12 | 359210066 | 359210066 - N | 3592.023 | 3592.007 | | | |
| 13 | 359210067 | 359210067 - N | 3592.023 | 3592.007 | | | |
| 14 | 359210068 | 359210068 - N | 3592.023 | 3592.007 | | | |
| 15 | 359210069 | 359210069 - N | 3592.023 | 3592.007 | | | |
| 16 | 359210070 | 359210070 - N | 3592.023 | 3592.007 | | | |
| 17 | 359210071 | 359210071 - N | 3592.010 | 3592.018 | | | |
| 18 | 359210072 | 359210072 - N | 3592.010 | 3592.018 | | | |
| 19 | 359210073 | 359210073 - N | 3592.010 | 3592.018 | | | |
| 20 | 359210074 | 359210074 - N | 3592.010 | 3592.018 | | | |
| 21 | 359210075 | 359210075 - N | 3592.010 | 3592.018 | | | |
| 22 | 359210076 | 359210076 - N | 3592.010 | 3592.018 | | | |
| 23 | 359210077 | 359210077 - N | 3592.010 | 3592.018 | | | |
| 24 | 359210078 | 359210078 - N | 3592.027 | 3592.013 | | | |
| 25 | 359210079 | 359210079 - N | 3592.027 | 3592.013 | | | |
| 26 | 359210080 | 359210080 - N | 3592.027 | 3592.013 | 1.28 | 4.08 | |
| 27 | 359210081 | 359210081 - N | 3592.027 | 3592.013 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210055 - N | CHVX898541 | 0.9545 | | | | | |
| 359210056 - N | CHVX898541 | 0.9545 | | | | | |
| 359210057 - N | CHVX898541 | 0.9545 | | | | | |
| 359210058 - N | CHVX898541 | 0.9545 | | | | | |
| 359210059 - N | CHVX898541 | 0.9545 | | | | | |
| 359210060 - N | CHVX898541 | 0.9549 | 0.475 | 367 | 2.26 | 135 | |
| 359210061 - N | CHVX898541 | 0.9549 | | | | | |
| 359210062 - N | CHVX898541 | 0.9549 | | | | | |
| 359210063 - N | CHVX898541 | 0.9549 | | | | | |
| 359210064 - N | CHVX898541 | 0.9549 | | | | | |
| 359210065 - N | CHVX898541 | 0.9549 | | | | | |
| 359210066 - N | CHVX898541 | 0.9549 | | | | | |
| 359210067 - N | CHVX898541 | 0.9549 | | | | | |
| 359210068 - N | CHVX898541 | 0.9549 | | | | | |
| 359210069 - N | CHVX898541 | 0.9549 | | | | | |
| 359210070 - N | CHVX898541 | 0.9549 | | | | | |
| 359210071 - N | CHVX898541 | 0.9549 | | | | | |
| 359210072 - N | CHVX898541 | 0.9549 | | | | | |
| 359210073 - N | CHVX898541 | 0.9549 | | | | | |
| 359210074 - N | CHVX898541 | 0.9549 | | | | | |
| 359210075 - N | CHVX898541 | 0.9549 | | | | | |
| 359210076 - N | CHVX898541 | 0.9549 | | | | | |
| 359210077 - N | CHVX898541 | 0.9549 | | | | | |
| 359210078 - N | CHVX898541 | 0.9549 | | | | | |
| 359210079 - N | CHVX898541 | 0.9549 | | | | | |
| 359210080 - N | CHVX898541 | 0.9542 | 0.450 | 364 | 2.67 | 130 | |
| 359210081 - N | CHVX898541 | 0.9542 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210082 | 359210082 - N | 3592.027 | 3592.013 | | | |
| 2 | 359210083 | 359210083 - N | 3592.027 | 3592.013 | | | |
| 3 | 359210084 | 359210084 - N | 3592.027 | 3592.013 | | | |
| 4 | 359210085 | 359210085 - N | 3592.014 | 3592.051 | | | |
| 5 | 359210086 | 359210086 - N | 3592.014 | 3592.051 | | | |
| 6 | 359210087 | 359210087 - N | 3592.014 | 3592.051 | | | |
| 7 | 359210088 | 359210088 - N | 3592.014 | 3592.051 | | | |
| 8 | 359210089 | 359210089 - N | 3592.014 | 3592.051 | | | |
| 9 | 359210090 | 359210090 - N | 3592.014 | 3592.051 | | | |
| 10 | 359210091 | 359210091 - N | 3592.014 | 3592.051 | | | |
| 11 | 359210092 | 359210092 - N | 3592.042 | 3592.015 | | | |
| 12 | 359210093 | 359210093 - N | 3592.042 | 3592.015 | | | |
| 13 | 359210094 | 359210094 - N | 3592.042 | 3592.015 | | | |
| 14 | 359210095 | 359210095 - N | 3592.042 | 3592.015 | | | |
| 15 | 359210096 | 359210096 - N | 3592.042 | 3592.015 | | | |
| 16 | 359210097 | 359210097 - N | 3592.042 | 3592.015 | | | |
| 17 | 359210098 | 359210098 - N | 3592.042 | 3592.015 | | | |
| 18 | 359210099 | 359210099 - N | 3592.001 | 3592.045 | | | |
| 19 | 359210100 | 359210100 - N | 3592.001 | 3592.045 | 1.84 | 4.40 | |
| 20 | 359210101 | 359210101 - N | 3592.001 | 3592.045 | | | |
| 21 | 359210102 | 359210102 - N | 3592.001 | 3592.045 | | | |
| 22 | 359210103 | 359210103 - N | 3592.001 | 3592.045 | | | |
| 23 | 359210104 | 359210104 - N | 3592.001 | 3592.045 | | | |
| 24 | 359210105 | 359210105 - N | 3592.001 | 3592.045 | | | |
| 25 | 359210106 | 359210106 - N | 3592.050 | 3592.031 | | | |
| 26 | 359210107 | 359210107 - N | 3592.050 | 3592.031 | | | |
| 27 | 359210108 | 359210108 - N | 3592.050 | 3592.031 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210082 - N | CHVX898541 | 0.9542 | | | | | |
| 359210083 - N | CHVX898541 | 0.9542 | | | | | |
| 359210084 - N | CHVX898541 | 0.9542 | | | | | |
| 359210085 - N | CHVX898541 | 0.9542 | | | | | |
| 359210086 - N | CHVX898541 | 0.9542 | | | | | |
| 359210087 - N | CHVX898541 | 0.9542 | | | | | |
| 359210088 - N | CHVX898541 | 0.9542 | | | | | |
| 359210089 - N | CHVX898541 | 0.9542 | | | | | |
| 359210090 - N | CHVX898541 | 0.9542 | | | | | |
| 359210091 - N | CHVX898541 | 0.9542 | | | | | |
| 359210092 - N | CHVX898541 | 0.9542 | | | | | |
| 359210093 - N | CHVX898541 | 0.9542 | | | | | |
| 359210094 - N | CHVX898541 | 0.9542 | | | | | |
| 359210095 - N | CHVX898541 | 0.9542 | | | | | |
| 359210096 - N | CHVX898541 | 0.9542 | | | | | |
| 359210097 - N | CHVX898541 | 0.9542 | | | | | |
| 359210098 - N | CHVX898541 | 0.9542 | | | | | |
| 359210099 - N | CHVX898541 | 0.9542 | | | | | |
| 359210100 - N | CHVX898541 | 0.9547 | 0.471 | 370 | 2.29 | 133 | |
| 359210101 - N | CHVX898541 | 0.9547 | | | | | |
| 359210102 - N | CHVX898541 | 0.9547 | | | | | |
| 359210103 - N | CHVX898541 | 0.9547 | | | | | |
| 359210104 - N | CHVX898541 | 0.9547 | | | | | |
| 359210105 - N | CHVX898541 | 0.9547 | | | | | |
| 359210106 - N | CHVX898541 | 0.9547 | | | | | |
| 359210107 - N | CHVX898541 | 0.9547 | | | | | |
| 359210108 - N | CHVX898541 | 0.9547 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210109 | 359210109 - N | 3592.050 | 3592.031 | | | |
| 2 | 359210110 | 359210110 - N | 3592.050 | 3592.031 | | | |
| 3 | 359210111 | 359210111 - N | 3592.050 | 3592.031 | | | |
| 4 | 359210112 | 359210112 - N | 3592.050 | 3592.031 | | | |
| 5 | 359210113 | 359210113 - N | 3592.034 | 3592.047 | | | |
| 6 | 359210114 | 359210114 - N | 3592.034 | 3592.047 | | | |
| 7 | 359210115 | 359210115 - N | 3592.034 | 3592.047 | | | |
| 8 | 359210116 | 359210116 - N | 3592.034 | 3592.047 | | | |
| 9 | 359210117 | 359210117 - N | 3592.034 | 3592.047 | | | |
| 10 | 359210118 | 359210118 - N | 3592.034 | 3592.047 | | | |
| 11 | 359210119 | 359210119 - N | 3592.034 | 3592.047 | | | |
| 12 | 359210120 | 359210120 - N | 3592.048 | 3592.029 | 1.33 | 4.11 | |
| 13 | 359210121 | 359210121 - N | 3592.048 | 3592.029 | | | |
| 14 | 359210122 | 359210122 - N | 3592.048 | 3592.029 | | | |
| 15 | 359210123 | 359210123 - N | 3592.048 | 3592.029 | | | |
| 16 | 359210124 | 359210124 - N | 3592.048 | 3592.029 | | | |
| 17 | 359210125 | 359210125 - N | 3592.048 | 3592.029 | | | |
| 18 | 359210126 | 359210126 - N | 3592.048 | 3592.029 | | | |
| 19 | 359210127 | 359210127 - N | 3592.038 | 3592.053 | | | |
| 20 | 359210128 | 359210128 - N | 3592.038 | 3592.053 | | | |
| 21 | 359210129 | 359210129 - N | 3592.038 | 3592.053 | | | |
| 22 | 359210130 | 359210130 - N | 3592.038 | 3592.053 | | | |
| 23 | 359210131 | 359210131 - N | 3592.038 | 3592.053 | | | |
| 24 | 359210132 | 359210132 - N | 3592.038 | 3592.053 | | | |
| 25 | 359210133 | 359210133 - N | 3592.038 | 3592.053 | | | |
| 26 | 359210134 | 359210134 - N | 3592.052 | 3592.032 | | | |
| 27 | 359210135 | 359210135 - N | 3592.052 | 3592.032 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210109 - N | CHVX898541 | 0.9547 | | | | | |
| 359210110 - N | CHVX898541 | 0.9547 | | | | | |
| 359210111 - N | CHVX898541 | 0.9547 | | | | | |
| 359210112 - N | CHVX898541 | 0.9547 | | | | | |
| 359210113 - N | CHVX898541 | 0.9547 | | | | | |
| 359210114 - N | CHVX898541 | 0.9547 | | | | | |
| 359210115 - N | CHVX898541 | 0.9547 | | | | | |
| 359210116 - N | CHVX898541 | 0.9547 | | | | | |
| 359210117 - N | CHVX898541 | 0.9547 | | | | | |
| 359210118 - N | CHVX898541 | 0.9547 | | | | | |
| 359210119 - N | CHVX898541 | 0.9547 | | | | | |
| 359210120 - N | CHVX898541 | 0.9544 | 0.448 | 359 | 2.65 | 125 | |
| 359210121 - N | CHVX898541 | 0.9544 | | | | | |
| 359210122 - N | CHVX898541 | 0.9544 | | | | | |
| 359210123 - N | CHVX898541 | 0.9544 | | | | | |
| 359210124 - N | CHVX898541 | 0.9544 | | | | | |
| 359210125 - N | CHVX898541 | 0.9544 | | | | | |
| 359210126 - N | CHVX898541 | 0.9544 | | | | | |
| 359210127 - N | CHVX898541 | 0.9544 | | | | | |
| 359210128 - N | CHVX898541 | 0.9544 | | | | | |
| 359210129 - N | CHVX898541 | 0.9544 | | | | | |
| 359210130 - N | CHVX898541 | 0.9544 | | | | | |
| 359210131 - N | CHVX898541 | 0.9544 | | | | | |
| 359210132 - N | CHVX898541 | 0.9544 | | | | | |
| 359210133 - N | CHVX898541 | 0.9544 | | | | | |
| 359210134 - N | CHVX898541 | 0.9544 | | | | | |
| 359210135 - N | CHVX898541 | 0.9544 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210136 | 359210136 - N | 3592.052 | 3592.032 | | | |
| 2 | 359210137 | 359210137 - N | 3592.052 | 3592.032 | | | |
| 3 | 359210138 | 359210138 - N | 3592.052 | 3592.032 | | | |
| 4 | 359210139 | 359210139 - N | 3592.052 | 3592.032 | | | |
| 5 | 359210140 | 359210140 - N | 3592.052 | 3592.032 | 1.82 | 4.38 | |
| 6 | 359210141 | 359210141 - N | 3592.036 | 3592.043 | | | |
| 7 | 359210142 | 359210142 - N | 3592.036 | 3592.043 | | | |
| 8 | 359210143 | 359210143 - N | 3592.036 | 3592.043 | | | |
| 9 | 359210144 | 359210144 - N | 3592.036 | 3592.043 | | | |
| 10 | 359210145 | 359210145 - N | 3592.036 | 3592.043 | | | |
| 11 | 359210146 | 359210146 - N | 3592.036 | 3592.043 | | | |
| 12 | 359210147 | 359210147 - N | 3592.036 | 3592.043 | | | |
| 13 | 359210148 | 359210148 - N | 3592.044 | 3592.035 | | | |
| 14 | 359210149 | 359210149 - N | 3592.044 | 3592.035 | | | |
| 15 | 359210150 | 359210150 - N | 3592.044 | 3592.035 | | | |
| 16 | 359210151 | 359210151 - N | 3592.044 | 3592.035 | | | |
| 17 | 359210152 | 359210152 - N | 3592.044 | 3592.035 | | | |
| 18 | 359210153 | 359210153 - N | 3592.044 | 3592.035 | | | |
| 19 | 359210154 | 359210154 - N | 3592.044 | 3592.035 | | | |
| 20 | 359210155 | 359210155 - N | 3592.030 | 3592.049 | | | |
| 21 | 359210156 | 359210156 - N | 3592.030 | 3592.049 | | | |
| 22 | 359210157 | 359210157 - N | 3592.030 | 3592.049 | | | |
| 23 | 359210158 | 359210158 - N | 3592.030 | 3592.049 | | | |
| 24 | 359210159 | 359210159 - N | 3592.030 | 3592.049 | | | |
| 25 | 359210160 | 359210160 - N | 3592.030 | 3592.049 | 1.36 | 4.14 | |
| 26 | 359210161 | 359210161 - N | 3592.030 | 3592.049 | | | |
| 27 | 359210162 | 359210162 - N | 3592.046 | 3592.033 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210136 - N | CHVX898541 | 0.9544 | | | | | |
| 359210137 - N | CHVX898541 | 0.9544 | | | | | |
| 359210138 - N | CHVX898541 | 0.9544 | | | | | |
| 359210139 - N | CHVX898541 | 0.9544 | | | | | |
| 359210140 - N | CHVX898541 | 0.9550 | 0.473 | 368 | 2.32 | 138 | |
| 359210141 - N | CHVX898541 | 0.9550 | | | | | |
| 359210142 - N | CHVX898541 | 0.9550 | | | | | |
| 359210143 - N | CHVX898541 | 0.9550 | | | | | |
| 359210144 - N | CHVX898541 | 0.9550 | | | | | |
| 359210145 - N | CHVX898541 | 0.9550 | | | | | |
| 359210146 - N | CHVX898541 | 0.9550 | | | | | |
| 359210147 - N | CHVX898541 | 0.9550 | | | | | |
| 359210148 - N | CHVX898541 | 0.9550 | | | | | |
| 359210149 - N | CHVX898541 | 0.9550 | | | | | |
| 359210150 - N | CHVX898541 | 0.9550 | | | | | |
| 359210151 - N | CHVX898541 | 0.9550 | | | | | |
| 359210152 - N | CHVX898541 | 0.9550 | | | | | |
| 359210153 - N | CHVX898541 | 0.9550 | | | | | |
| 359210154 - N | CHVX898541 | 0.9550 | | | | | |
| 359210155 - N | CHVX898541 | 0.9550 | | | | | |
| 359210156 - N | CHVX898541 | 0.9550 | | | | | |
| 359210157 - N | CHVX898541 | 0.9550 | | | | | |
| 359210158 - N | CHVX898541 | 0.9550 | | | | | |
| 359210159 - N | CHVX898541 | 0.9550 | | | | | |
| 359210160 - N | CHVX898541 | 0.9546 | 0.439 | 361 | 2.62 | 127 | |
| 359210161 - N | CHVX898541 | 0.9546 | | | | | |
| 359210162 - N | CHVX898541 | 0.9546 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210163 | 359210163 - N | 3592.046 | 3592.033 | | | |
| 2 | 359210164 | 359210164 - N | 3592.046 | 3592.033 | | | |
| 3 | 359210165 | 359210165 - N | 3592.046 | 3592.033 | | | |
| 4 | 359210166 | 359210166 - N | 3592.046 | 3592.033 | | | |
| 5 | 359210167 | 359210167 - N | 3592.046 | 3592.033 | | | |
| 6 | 359210168 | 359210168 - N | 3592.046 | 3592.033 | | | |
| 7 | 359210169 | 359210169 - N | 3592.028 | 3592.041 | | | |
| 8 | 359210170 | 359210170 - N | 3592.028 | 3592.041 | | | |
| 9 | 359210171 | 359210171 - N | 3592.028 | 3592.041 | | | |
| 10 | 359210172 | 359210172 - N | 3592.028 | 3592.041 | | | |
| 11 | 359210173 | 359210173 - N | 3592.028 | 3592.041 | | | |
| 12 | 359210174 | 359210174 - N | 3592.028 | 3592.041 | | | |
| 13 | 359210175 | 359210175 - N | 3592.028 | 3592.041 | | | |
| 14 | 359210176 | 359210176 - N | 3592.054 | 3592.037 | | | |
| 15 | 359210177 | 359210177 - N | 3592.054 | 3592.037 | | | |
| 16 | 359210178 | 359210178 - N | 3592.054 | 3592.037 | | | |
| 17 | 359210179 | 359210179 - N | 3592.054 | 3592.037 | | | |
| 18 | 359210180 | 359210180 - N | 3592.054 | 3592.037 | 1.80 | 4.35 | |
| 19 | 359210181 | 359210181 - N | 3592.054 | 3592.037 | | | |
| 20 | 359210182 | 359210182 - N | 3592.054 | 3592.037 | | | |
| 21 | 359210183 | 359210183 - N | 3592.040 | 3592.077 | | | |
| 22 | 359210184 | 359210184 - N | 3592.040 | 3592.077 | | | |
| 23 | 359210185 | 359210185 - N | 3592.040 | 3592.077 | | | |
| 24 | 359210186 | 359210186 - N | 3592.040 | 3592.077 | | | |
| 25 | 359210187 | 359210187 - N | 3592.040 | 3592.077 | | | |
| 26 | 359210188 | 359210188 - N | 3592.040 | 3592.077 | | | |
| 27 | 359210189 | 359210189 - N | 3592.040 | 3592.077 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210163 - N | CHVX898541 | 0.9546 | | | | | |
| 359210164 - N | CHVX898541 | 0.9546 | | | | | |
| 359210165 - N | CHVX898541 | 0.9546 | | | | | |
| 359210166 - N | CHVX898541 | 0.9546 | | | | | |
| 359210167 - N | CHVX898541 | 0.9546 | | | | | |
| 359210168 - N | CHVX898541 | 0.9546 | | | | | |
| 359210169 - N | CHVX898541 | 0.9546 | | | | | |
| 359210170 - N | CHVX898541 | 0.9546 | | | | | |
| 359210171 - N | CHVX898541 | 0.9546 | | | | | |
| 359210172 - N | CHVX898541 | 0.9546 | | | | | |
| 359210173 - N | CHVX898541 | 0.9546 | | | | | |
| 359210174 - N | CHVX898541 | 0.9546 | | | | | |
| 359210175 - N | CHVX898541 | 0.9546 | | | | | |
| 359210176 - N | CHVX898541 | 0.9546 | | | | | |
| 359210177 - N | CHVX898541 | 0.9546 | | | | | |
| 359210178 - N | CHVX898541 | 0.9546 | | | | | |
| 359210179 - N | CHVX898541 | 0.9546 | | | | | |
| 359210180 - N | NAHX610274 | 0.9539 | 0.470 | 366 | 2.37 | 136 | |
| 359210181 - N | NAHX610274 | 0.9539 | | | | | |
| 359210182 - N | NAHX610274 | 0.9539 | | | | | |
| 359210183 - N | NAHX610274 | 0.9539 | | | | | |
| 359210184 - N | NAHX610274 | 0.9539 | | | | | |
| 359210185 - N | NAHX610274 | 0.9539 | | | | | |
| 359210186 - N | NAHX610274 | 0.9539 | | | | | |
| 359210187 - N | NAHX610274 | 0.9539 | | | | | |
| 359210188 - N | NAHX610274 | 0.9539 | | | | | |
| 359210189 - N | NAHX610274 | 0.9539 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210190 | 359210190 - N | 3592.074 | 3592.039 | | | |
| 2 | 359210191 | 359210191 - N | 3592.074 | 3592.039 | | | |
| 3 | 359210192 | 359210192 - N | 3592.074 | 3592.039 | | | |
| 4 | 359210193 | 359210193 - N | 3592.074 | 3592.039 | | | |
| 5 | 359210194 | 359210194 - N | 3592.074 | 3592.039 | | | |
| 6 | 359210195 | 359210195 - N | 3592.074 | 3592.039 | | | |
| 7 | 359210196 | 359210196 - N | 3592.074 | 3592.039 | | | |
| 8 | 359210197 | 359210197 - N | 3592.058 | 3592.081 | | | |
| 9 | 359210198 | 359210198 - N | 3592.058 | 3592.081 | | | |
| 10 | 359210199 | 359210199 - N | 3592.058 | 3592.081 | | | |
| 11 | 359210200 | 359210200 - N | 3592.058 | 3592.081 | 1.39 | 4.17 | |
| 12 | 359210201 | 359210201 - N | 3592.058 | 3592.081 | | | |
| 13 | 359210202 | 359210202 - N | 3592.058 | 3592.081 | | | |
| 14 | 359210203 | 359210203 - N | 3592.058 | 3592.081 | | | |
| 15 | 359210204 | 359210204 - N | 3592.078 | 3592.063 | | | |
| 16 | 359210205 | 359210205 - N | 3592.078 | 3592.063 | | | |
| 17 | 359210206 | 359210206 - N | 3592.078 | 3592.063 | | | |
| 18 | 359210207 | 359210207 - N | 3592.078 | 3592.063 | | | |
| 19 | 359210208 | 359210208 - N | 3592.078 | 3592.063 | | | |
| 20 | 359210209 | 359210209 - N | 3592.078 | 3592.063 | | | |
| 21 | 359210210 | 359210210 - N | 3592.078 | 3592.063 | | | |
| 22 | 359210211 | 359210211 - N | 3592.060 | 3592.075 | | | |
| 23 | 359210212 | 359210212 - N | 3592.060 | 3592.075 | | | |
| 24 | 359210213 | 359210213 - N | 3592.060 | 3592.075 | | | |
| 25 | 359210214 | 359210214 - N | 3592.060 | 3592.075 | | | |
| 26 | 359210215 | 359210215 - N | 3592.060 | 3592.075 | | | |
| 27 | 359210216 | 359210216 - N | 3592.060 | 3592.075 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210190 - N | NAHX610274 | 0.9539 | | | | | |
| 359210191 - N | NAHX610274 | 0.9539 | | | | | |
| 359210192 - N | NAHX610274 | 0.9539 | | | | | |
| 359210193 - N | NAHX610274 | 0.9539 | | | | | |
| 359210194 - N | NAHX610274 | 0.9539 | | | | | |
| 359210195 - N | NAHX610274 | 0.9539 | | | | | |
| 359210196 - N | NAHX610274 | 0.9539 | | | | | |
| 359210197 - N | NAHX610274 | 0.9539 | | | | | |
| 359210198 - N | NAHX610274 | 0.9539 | | | | | |
| 359210199 - N | NAHX610274 | 0.9539 | | | | | |
| 359210200 - N | NAHX610274 | 0.9548 | 0.443 | 363 | 2.60 | 129 | |
| 359210201 - N | NAHX610274 | 0.9548 | | | | | |
| 359210202 - N | NAHX610274 | 0.9548 | | | | | |
| 359210203 - N | NAHX610274 | 0.9548 | | | | | |
| 359210204 - N | NAHX610274 | 0.9548 | | | | | |
| 359210205 - N | NAHX610274 | 0.9548 | | | | | |
| 359210206 - N | NAHX610274 | 0.9548 | | | | | |
| 359210207 - N | NAHX610274 | 0.9548 | | | | | |
| 359210208 - N | NAHX610274 | 0.9548 | | | | | |
| 359210209 - N | NAHX610274 | 0.9548 | | | | | |
| 359210210 - N | NAHX610274 | 0.9548 | | | | | |
| 359210211 - N | NAHX610274 | 0.9548 | | | | | |
| 359210212 - N | NAHX610274 | 0.9548 | | | | | |
| 359210213 - N | NAHX610274 | 0.9548 | | | | | |
| 359210214 - N | NAHX610274 | 0.9548 | | | | | |
| 359210215 - N | NAHX610274 | 0.9548 | | | | | |
| 359210216 - N | NAHX610274 | 0.9548 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210217 | 359210217 - N | 3592.060 | 3592.075 | | | |
| 2 | 359210218 | 359210218 - N | 3592.072 | 3592.065 | | | |
| 3 | 359210219 | 359210219 - N | 3592.072 | 3592.065 | | | |
| 4 | 359210220 | 359210220 - N | 3592.072 | 3592.065 | 1.77 | 4.32 | |
| 5 | 359210221 | 359210221 - N | 3592.072 | 3592.065 | | | |
| 6 | 359210222 | 359210222 - N | 3592.072 | 3592.065 | | | |
| 7 | 359210223 | 359210223 - N | 3592.072 | 3592.065 | | | |
| 8 | 359210224 | 359210224 - N | 3592.072 | 3592.065 | | | |
| 9 | 359210225 | 359210225 - N | 3592.064 | 3592.071 | | | |
| 10 | 359210226 | 359210226 - N | 3592.064 | 3592.071 | | | |
| 11 | 359210227 | 359210227 - N | 3592.064 | 3592.071 | | | |
| 12 | 359210228 | 359210228 - N | 3592.064 | 3592.071 | | | |
| 13 | 359210229 | 359210229 - N | 3592.064 | 3592.071 | | | |
| 14 | 359210230 | 359210230 - N | 3592.064 | 3592.071 | | | |
| 15 | 359210231 | 359210231 - N | 3592.064 | 3592.071 | | | |
| 16 | 359210232 | 359210232 - N | 3592.080 | 3592.057 | | | |
| 17 | 359210233 | 359210233 - N | 3592.080 | 3592.057 | | | |
| 18 | 359210234 | 359210234 - N | 3592.080 | 3592.057 | | | |
| 19 | 359210235 | 359210235 - N | 3592.080 | 3592.057 | | | |
| 20 | 359210236 | 359210236 - N | 3592.080 | 3592.057 | | | |
| 21 | 359210237 | 359210237 - N | 3592.080 | 3592.057 | | | |
| 22 | 359210238 | 359210238 - N | 3592.080 | 3592.057 | | | |
| 23 | 359210239 | 359210239 - N | 3592.062 | 3592.079 | | | |
| 24 | 359210240 | 359210240 - N | 3592.062 | 3592.079 | 1.42 | 4.20 | |
| 25 | 359210241 | 359210241 - N | 3592.062 | 3592.079 | | | |
| 26 | 359210242 | 359210242 - N | 3592.062 | 3592.079 | | | |
| 27 | 359210243 | 359210243 - N | 3592.062 | 3592.079 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210217 - N | NAHX610274 | 0.9548 | | | | | |
| 359210218 - N | NAHX610274 | 0.9548 | | | | | |
| 359210219 - N | NAHX610274 | 0.9548 | | | | | |
| 359210220 - N | NAHX610274 | 0.9541 | 0.474 | 369 | 2.40 | 134 | |
| 359210221 - N | NAHX610274 | 0.9541 | | | | | |
| 359210222 - N | NAHX610274 | 0.9541 | | | | | |
| 359210223 - N | NAHX610274 | 0.9541 | | | | | |
| 359210224 - N | NAHX610274 | 0.9541 | | | | | |
| 359210225 - N | NAHX610274 | 0.9541 | | | | | |
| 359210226 - N | NAHX610274 | 0.9541 | | | | | |
| 359210227 - N | NAHX610274 | 0.9541 | | | | | |
| 359210228 - N | NAHX610274 | 0.9541 | | | | | |
| 359210229 - N | NAHX610274 | 0.9541 | | | | | |
| 359210230 - N | NAHX610274 | 0.9541 | | | | | |
| 359210231 - N | NAHX610274 | 0.9541 | | | | | |
| 359210232 - N | NAHX610274 | 0.9541 | | | | | |
| 359210233 - N | NAHX610274 | 0.9541 | | | | | |
| 359210234 - N | NAHX610274 | 0.9541 | | | | | |
| 359210235 - N | NAHX610274 | 0.9541 | | | | | |
| 359210236 - N | NAHX610274 | 0.9541 | | | | | |
| 359210237 - N | NAHX610274 | 0.9541 | | | | | |
| 359210238 - N | NAHX610274 | 0.9541 | | | | | |
| 359210239 - N | NAHX610274 | 0.9541 | | | | | |
| 359210240 - N | NAHX610274 | 0.9550 | 0.441 | 365 | 2.57 | 131 | |
| 359210241 - N | NAHX610274 | 0.9550 | | | | | |
| 359210242 - N | NAHX610274 | 0.9550 | | | | | |
| 359210243 - N | NAHX610274 | 0.9550 | | | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210244 | 359210244 - N | 3592.062 | 3592.079 | | | |
| 2 | 359210245 | 359210245 - N | 3592.062 | 3592.079 | | | |
| 3 | 359210246 | 359210246 - N | 3592.076 | 3592.059 | | | |
| 4 | 359210247 | 359210247 - N | 3592.076 | 3592.059 | | | |
| 5 | 359210248 | 359210248 - N | 3592.076 | 3592.059 | | | |
| 6 | 359210249 | 359210249 - N | 3592.076 | 3592.059 | | | |
| 7 | 359210250 | 359210250 - N | 3592.076 | 3592.059 | | | |
| 8 | 359210251 | 359210251 - N | 3592.076 | 3592.059 | | | |
| 9 | 359210252 | 359210252 - N | 3592.076 | 3592.059 | | | |
| 10 | 359210253 | 359210253 - N | 3592.068 | 3592.073 | | | |
| 11 | 359210254 | 359210254 - N | 3592.068 | 3592.073 | | | |
| 12 | 359210255 | 359210255 - N | 3592.068 | 3592.073 | | | |
| 13 | 359210256 | 359210256 - N | 3592.068 | 3592.073 | | | |
| 14 | 359210257 | 359210257 - N | 3592.068 | 3592.073 | | | |
| 15 | 359210258 | 359210258 - N | 3592.068 | 3592.073 | | | |
| 16 | 359210259 | 359210259 - N | 3592.068 | 3592.073 | | | |
| 17 | 359210260 | 359210260 - N | 3592.070 | 3592.067 | 1.74 | 4.30 | |
| 18 | 359210261 | 359210261 - N | 3592.070 | 3592.067 | | | |
| 19 | 359210262 | 359210262 - N | 3592.070 | 3592.067 | | | |
| 20 | 359210263 | 359210263 - N | 3592.070 | 3592.067 | | | |
| 21 | 359210264 | 359210264 - N | 3592.070 | 3592.067 | | | |
| 22 | 359210265 | 359210265 - N | 3592.070 | 3592.067 | | | |
| 23 | 359210266 | 359210266 - N | 3592.070 | 3592.067 | | | |
| 24 | 359210267 | 359210267 - N | 3592.061 | 3592.069 | | | |
| 25 | 359210268 | 359210268 - N | 3592.061 | 3592.069 | | | |
| 26 | 359210269 | 359210269 - N | 3592.061 | 3592.069 | | | |
| 27 | 359210270 | 359210270 - N | 3592.061 | 3592.069 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210244 - N | NAHX610274 | 0.9550 | | | | | |
| 359210245 - N | NAHX610274 | 0.9550 | | | | | |
| 359210246 - N | NAHX610274 | 0.9550 | | | | | |
| 359210247 - N | NAHX610274 | 0.9550 | | | | | |
| 359210248 - N | NAHX610274 | 0.9550 | | | | | |
| 359210249 - N | NAHX610274 | 0.9550 | | | | | |
| 359210250 - N | NAHX610274 | 0.9550 | | | | | |
| 359210251 - N | NAHX610274 | 0.9550 | | | | | |
| 359210252 - N | NAHX610274 | 0.9550 | | | | | |
| 359210253 - N | NAHX610274 | 0.9550 | | | | | |
| 359210254 - N | NAHX610274 | 0.9550 | | | | | |
| 359210255 - N | NAHX610274 | 0.9550 | | | | | |
| 359210256 - N | NAHX610274 | 0.9550 | | | | | |
| 359210257 - N | NAHX610274 | 0.9550 | | | | | |
| 359210258 - N | NAHX610274 | 0.9550 | | | | | |
| 359210259 - N | NAHX610274 | 0.9550 | | | | | |
| 359210260 - N | NAHX610274 | 0.9544 | 0.478 | 367 | 2.42 | 137 | |
| 359210261 - N | NAHX610274 | 0.9544 | | | | | |
| 359210262 - N | NAHX610274 | 0.9544 | | | | | |
| 359210263 - N | NAHX610274 | 0.9544 | | | | | |
| 359210264 - N | NAHX610274 | 0.9544 | | | | | |
| 359210265 - N | NAHX610274 | 0.9544 | | | | | |
| 359210266 - N | NAHX610274 | 0.9544 | | | | | |
| 359210267 - N | NAHX610274 | 0.9544 | | | | | |
| 359210268 - N | NAHX610274 | 0.9544 | | | | | |
| 359210269 - N | NAHX610274 | 0.9544 | | | | | |
| 359210270 - N | NAHX610274 | 0.9544 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210271 | 359210271 - N | 3592.061 | 3592.069 | | | |
| 2 | 359210272 | 359210272 - N | 3592.061 | 3592.069 | | | |
| 3 | 359210273 | 359210273 - N | 3592.061 | 3592.069 | | | |
| 4 | 359210274 | 359210274 - N | 3592.106 | 3592.055 | | | |
| 5 | 359210275 | 359210275 - N | 3592.106 | 3592.055 | | | |
| 6 | 359210276 | 359210276 - N | 3592.106 | 3592.055 | | | |
| 7 | 359210277 | 359210277 - N | 3592.106 | 3592.055 | | | |
| 8 | 359210278 | 359210278 - N | 3592.106 | 3592.055 | | | |
| 9 | 359210279 | 359210279 - N | 3592.106 | 3592.055 | | | |
| 10 | 359210280 | 359210280 - N | 3592.106 | 3592.055 | 1.21 | 4.01 | |
| 11 | 359210281 | 359210281 - N | 3592.056 | 3592.101 | | | |
| 12 | 359210282 | 359210282 - N | 3592.056 | 3592.101 | | | |
| 13 | 359210283 | 359210283 - N | 3592.056 | 3592.101 | | | |
| 14 | 359210284 | 359210284 - N | 3592.056 | 3592.101 | | | |
| 15 | 359210285 | 359210285 - N | 3592.056 | 3592.101 | | | |
| 16 | 359210286 | 359210286 - N | 3592.056 | 3592.101 | | | |
| 17 | 359210287 | 359210287 - N | 3592.056 | 3592.101 | | | |
| 18 | 359210288 | 359210288 - N | 3592.102 | 3592.085 | | | |
| 19 | 359210289 | 359210289 - N | 3592.102 | 3592.085 | | | |
| 20 | 359210290 | 359210290 - N | 3592.102 | 3592.085 | | | |
| 21 | 359210291 | 359210291 - N | 3592.102 | 3592.085 | | | |
| 22 | 359210292 | 359210292 - N | 3592.102 | 3592.085 | | | |
| 23 | 359210293 | 359210293 - N | 3592.102 | 3592.085 | | | |
| 24 | 359210294 | 359210294 - N | 3592.102 | 3592.085 | | | |
| 25 | 359210295 | 359210295 - N | 3592.066 | 3592.107 | | | |
| 26 | 359210296 | 359210296 - N | 3592.066 | 3592.107 | | | |
| 27 | 359210297 | 359210297 - N | 3592.066 | 3592.107 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210271 - N | NAHX610274 | 0.9544 | | | | | |
| 359210272 - N | NAHX610274 | 0.9544 | | | | | |
| 359210273 - N | NAHX610274 | 0.9544 | | | | | |
| 359210274 - N | NAHX610274 | 0.9544 | | | | | |
| 359210275 - N | NAHX610274 | 0.9544 | | | | | |
| 359210276 - N | NAHX610274 | 0.9544 | | | | | |
| 359210277 - N | NAHX610274 | 0.9544 | | | | | |
| 359210278 - N | NAHX610274 | 0.9544 | | | | | |
| 359210279 - N | NAHX610274 | 0.9544 | | | | | |
| 359210280 - N | NAHX610274 | 0.9547 | 0.445 | 362 | 2.55 | 126 | |
| 359210281 - N | NAHX610274 | 0.9547 | | | | | |
| 359210282 - N | NAHX610274 | 0.9547 | | | | | |
| 359210283 - N | NAHX610274 | 0.9547 | | | | | |
| 359210284 - N | NAHX610274 | 0.9547 | | | | | |
| 359210285 - N | NAHX610274 | 0.9547 | | | | | |
| 359210286 - N | NAHX610274 | 0.9547 | | | | | |
| 359210287 - N | NAHX610274 | 0.9547 | | | | | |
| 359210288 - N | NAHX610274 | 0.9547 | | | | | |
| 359210289 - N | NAHX610274 | 0.9547 | | | | | |
| 359210290 - N | NAHX610274 | 0.9547 | | | | | |
| 359210291 - N | NAHX610274 | 0.9547 | | | | | |
| 359210292 - N | NAHX610274 | 0.9547 | | | | | |
| 359210293 - N | NAHX610274 | 0.9547 | | | | | |
| 359210294 - N | NAHX610274 | 0.9547 | | | | | |
| 359210295 - N | NAHX610274 | 0.9547 | | | | | |
| 359210296 - N | NAHX610274 | 0.9547 | | | | | |
| 359210297 - N | NAHX610274 | 0.9547 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210298 | 359210298 - N | 3592.066 | 3592.107 | | | |
| 2 | 359210299 | 359210299 - N | 3592.066 | 3592.107 | | | |
| 3 | 359210300 | 359210300 - N | 3592.066 | 3592.107 | 1.72 | 4.39 | |
| 4 | 359210301 | 359210301 - N | 3592.066 | 3592.107 | | | |
| 5 | 359210302 | 359210302 - N | 3592.108 | 3592.091 | | | |
| 6 | 359210303 | 359210303 - N | 3592.108 | 3592.091 | | | |
| 7 | 359210304 | 359210304 - N | 3592.108 | 3592.091 | | | |
| 8 | 359210305 | 359210305 - N | 3592.108 | 3592.091 | | | |
| 9 | 359210306 | 359210306 - N | 3592.108 | 3592.091 | | | |
| 10 | 359210307 | 359210307 - N | 3592.108 | 3592.091 | | | |
| 11 | 359210308 | 359210308 - N | 3592.108 | 3592.091 | | | |
| 12 | 359210309 | 359210309 - N | 3592.088 | 3592.103 | | | |
| 13 | 359210310 | 359210310 - N | 3592.088 | 3592.103 | | | |
| 14 | 359210311 | 359210311 - N | 3592.088 | 3592.103 | | | |
| 15 | 359210312 | 359210312 - N | 3592.088 | 3592.103 | | | |
| 16 | 359210313 | 359210313 - N | 3592.088 | 3592.103 | | | |
| 17 | 359210314 | 359210314 - N | 3592.088 | 3592.103 | | | |
| 18 | 359210315 | 359210315 - N | 3592.088 | 3592.103 | | | |
| 19 | 359210316 | 359210316 - N | 3592.100 | 3592.089 | | | |
| 20 | 359210317 | 359210317 - N | 3592.100 | 3592.089 | | | |
| 21 | 359210318 | 359210318 - N | 3592.100 | 3592.089 | | | |
| 22 | 359210319 | 359210319 - N | 3592.100 | 3592.089 | | | |
| 23 | 359210320 | 359210320 - N | 3592.100 | 3592.089 | 1.24 | 4.03 | |
| 24 | 359210321 | 359210321 - N | 3592.100 | 3592.089 | | | |
| 25 | 359210322 | 359210322 - N | 3592.100 | 3592.089 | | | |
| 26 | 359210323 | 359210323 - N | 3592.092 | 3592.105 | | | |
| 27 | 359210324 | 359210324 - N | 3592.092 | 3592.105 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210298 - N | NAHX610274 | 0.9547 | | | | | |
| 359210299 - N | NAHX610274 | 0.9547 | | | | | |
| 359210300 - N | NAHX610274 | 0.9542 | 0.476 | 370 | 2.45 | 133 | |
| 359210301 - N | NAHX610274 | 0.9542 | | | | | |
| 359210302 - N | NAHX610274 | 0.9542 | | | | | |
| 359210303 - N | NAHX610274 | 0.9542 | | | | | |
| 359210304 - N | NAHX610274 | 0.9542 | | | | | |
| 359210305 - N | NAHX610274 | 0.9542 | | | | | |
| 359210306 - N | NAHX610274 | 0.9542 | | | | | |
| 359210307 - N | NAHX610274 | 0.9542 | | | | | |
| 359210308 - N | NAHX610274 | 0.9542 | | | | | |
| 359210309 - N | NAHX610274 | 0.9542 | | | | | |
| 359210310 - N | NAHX610274 | 0.9542 | | | | | |
| 359210311 - N | NAHX610274 | 0.9542 | | | | | |
| 359210312 - N | NAHX610274 | 0.9542 | | | | | |
| 359210313 - N | NAHX610274 | 0.9542 | | | | | |
| 359210314 - N | NAHX610274 | 0.9542 | | | | | |
| 359210315 - N | NAHX610274 | 0.9542 | | | | | |
| 359210316 - N | NAHX610274 | 0.9542 | | | | | |
| 359210317 - N | NAHX610274 | 0.9542 | | | | | |
| 359210318 - N | NAHX610274 | 0.9542 | | | | | |
| 359210319 - N | NAHX610274 | 0.9542 | | | | | |
| 359210320 - N | NAHX610274 | 0.9549 | 0.449 | 364 | 2.77 | 128 | |
| 359210321 - N | NAHX610274 | 0.9549 | | | | | |
| 359210322 - N | NAHX610274 | 0.9549 | | | | | |
| 359210323 - N | NAHX610274 | 0.9549 | | | | | |
| 359210324 - N | NAHX610274 | 0.9549 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210325 | 359210325 - N | 3592.092 | 3592.105 | | | |
| 2 | 359210326 | 359210326 - N | 3592.092 | 3592.105 | | | |
| 3 | 359210327 | 359210327 - N | 3592.092 | 3592.105 | | | |
| 4 | 359210328 | 359210328 - N | 3592.092 | 3592.105 | | | |
| 5 | 359210329 | 359210329 - N | 3592.092 | 3592.105 | | | |
| 6 | 359210330 | 359210330 - N | 3592.098 | 3592.095 | | | |
| 7 | 359210331 | 359210331 - N | 3592.098 | 3592.095 | | | |
| 8 | 359210332 | 359210332 - N | 3592.098 | 3592.095 | | | |
| 9 | 359210333 | 359210333 - N | 3592.098 | 3592.095 | | | |
| 10 | 359210334 | 359210334 - N | 3592.098 | 3592.095 | | | |
| 11 | 359210335 | 359210335 - N | 3592.098 | 3592.095 | | | |
| 12 | 359210336 | 359210336 - N | 3592.098 | 3592.095 | | | |
| 13 | 359210337 | 359210337 - N | 3592.086 | 3592.099 | | | |
| 14 | 359210338 | 359210338 - N | 3592.086 | 3592.099 | | | |
| 15 | 359210339 | 359210339 - N | 3592.086 | 3592.099 | | | |
| 16 | 359210340 | 359210340 - N | 3592.086 | 3592.099 | 1.91 | 4.36 | |
| 17 | 359210341 | 359210341 - N | 3592.086 | 3592.099 | | | |
| 18 | 359210342 | 359210342 - N | 3592.086 | 3592.099 | | | |
| 19 | 359210343 | 359210343 - N | 3592.086 | 3592.099 | | | |
| 20 | 359210344 | 359210344 - N | 3592.104 | 3592.083 | | | |
| 21 | 359210345 | 359210345 - N | 3592.104 | 3592.083 | | | |
| 22 | 359210346 | 359210346 - N | 3592.104 | 3592.083 | | | |
| 23 | 359210347 | 359210347 - N | 3592.104 | 3592.083 | | | |
| 24 | 359210348 | 359210348 - N | 3592.104 | 3592.083 | | | |
| 25 | 359210349 | 359210349 - N | 3592.104 | 3592.083 | | | |
| 26 | 359210350 | 359210350 - N | 3592.104 | 3592.083 | | | |
| 27 | 359210351 | 359210351 - N | 3592.090 | 3592.097 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210325 - N | NAHX610274 | 0.9549 | | | | | |
| 359210326 - N | NAHX610274 | 0.9549 | | | | | |
| 359210327 - N | NAHX610274 | 0.9549 | | | | | |
| 359210328 - N | NAHX610274 | 0.9549 | | | | | |
| 359210329 - N | NAHX610274 | 0.9549 | | | | | |
| 359210330 - N | NAHX610274 | 0.9549 | | | | | |
| 359210331 - N | NAHX610274 | 0.9549 | | | | | |
| 359210332 - N | NAHX610274 | 0.9549 | | | | | |
| 359210333 - N | NAHX610274 | 0.9549 | | | | | |
| 359210334 - N | NAHX610274 | 0.9549 | | | | | |
| 359210335 - N | NAHX610274 | 0.9549 | | | | | |
| 359210336 - N | NAHX610274 | 0.9549 | | | | | |
| 359210337 - N | NAHX610274 | 0.9549 | | | | | |
| 359210338 - N | NAHX610274 | 0.9549 | | | | | |
| 359210339 - N | NAHX610274 | 0.9549 | | | | | |
| 359210340 - N | NAHX610274 | 0.9545 | 0.472 | 368 | 2.48 | 135 | |
| 359210341 - N | NAHX610274 | 0.9545 | | | | | |
| 359210342 - N | NAHX610274 | 0.9545 | | | | | |
| 359210343 - N | NAHX610274 | 0.9545 | | | | | |
| 359210344 - N | NAHX610274 | 0.9545 | | | | | |
| 359210345 - N | NAHX610274 | 0.9545 | | | | | |
| 359210346 - N | NAHX610274 | 0.9545 | | | | | |
| 359210347 - N | NAHX610274 | 0.9545 | | | | | |
| 359210348 - N | NAHX610274 | 0.9545 | | | | | |
| 359210349 - N | NAHX610274 | 0.9545 | | | | | |
| 359210350 - N | NAHX610274 | 0.9545 | | | | | |
| 359210351 - N | NAHX610274 | 0.9545 | | | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210352 | 359210352 - N | 3592.090 | 3592.097 | | | |
| 2 | 359210353 | 359210353 - N | 3592.090 | 3592.097 | | | |
| 3 | 359210354 | 359210354 - N | 3592.090 | 3592.097 | | | |
| 4 | 359210355 | 359210355 - N | 3592.090 | 3592.097 | | | |
| 5 | 359210356 | 359210356 - N | 3592.090 | 3592.097 | | | |
| 6 | 359210357 | 359210357 - N | 3592.090 | 3592.097 | | | |
| 7 | 359210358 | 359210358 - N | 3592.096 | 3592.093 | | | |
| 8 | 359210359 | 359210359 - N | 3592.096 | 3592.093 | | | |
| 9 | 359210360 | 359210360 - N | 3592.096 | 3592.093 | 1.27 | 4.06 | |
| 10 | 359210361 | 359210361 - N | 3592.096 | 3592.093 | | | |
| 11 | 359210362 | 359210362 - N | 3592.096 | 3592.093 | | | |
| 12 | 359210363 | 359210363 - N | 3592.096 | 3592.093 | | | |
| 13 | 359210364 | 359210364 - N | 3592.096 | 3592.093 | | | |
| 14 | 359210365 | 359210365 - N | 3592.082 | 3592.135 | | | |
| 15 | 359210366 | 359210366 - N | 3592.082 | 3592.135 | | | |
| 16 | 359210367 | 359210367 - N | 3592.082 | 3592.135 | | | |
| 17 | 359210368 | 359210368 - N | 3592.082 | 3592.135 | | | |
| 18 | 359210369 | 359210369 - N | 3592.082 | 3592.135 | | | |
| 19 | 359210370 | 359210370 - N | 3592.082 | 3592.135 | | | |
| 20 | 359210371 | 359210371 - N | 3592.082 | 3592.135 | | | |
| 21 | 359210372 | 359210372 - N | 3592.094 | 3592.087 | | | |
| 22 | 359210373 | 359210373 - N | 3592.094 | 3592.087 | | | |
| 23 | 359210374 | 359210374 - N | 3592.094 | 3592.087 | | | |
| 24 | 359210375 | 359210375 - N | 3592.094 | 3592.087 | | | |
| 25 | 359210376 | 359210376 - N | 3592.094 | 3592.087 | | | |
| 26 | 359210377 | 359210377 - N | 3592.094 | 3592.087 | | | |
| 27 | 359210378 | 359210378 - N | 3592.094 | 3592.087 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210352 - N | NAHX610274 | 0.9545 | | | | | |
| 359210353 - N | NAHX610274 | 0.9545 | | | | | |
| 359210354 - N | NAHX610274 | 0.9545 | | | | | |
| 359210355 - N | NAHX610274 | 0.9545 | | | | | |
| 359210356 - N | NAHX610274 | 0.9545 | | | | | |
| 359210357 - N | NAHX610274 | 0.9545 | | | | | |
| 359210358 - N | NAHX610274 | 0.9545 | | | | | |
| 359210359 - N | NAHX610274 | 0.9545 | | | | | |
| 359210360 - N | EQUX632233 | 0.9558 | 0.451 | 359 | 2.74 | 130 | |
| 359210361 - N | EQUX632233 | 0.9558 | | | | | |
| 359210362 - N | EQUX632233 | 0.9558 | | | | | |
| 359210363 - N | EQUX632233 | 0.9558 | | | | | |
| 359210364 - N | EQUX632233 | 0.9558 | | | | | |
| 359210365 - N | EQUX632233 | 0.9558 | | | | | |
| 359210366 - N | EQUX632233 | 0.9558 | | | | | |
| 359210367 - N | EQUX632233 | 0.9558 | | | | | |
| 359210368 - N | EQUX632233 | 0.9558 | | | | | |
| 359210369 - N | EQUX632233 | 0.9558 | | | | | |
| 359210370 - N | EQUX632233 | 0.9558 | | | | | |
| 359210371 - N | EQUX632233 | 0.9558 | | | | | |
| 359210372 - N | EQUX632233 | 0.9558 | | | | | |
| 359210373 - N | EQUX632233 | 0.9558 | | | | | |
| 359210374 - N | EQUX632233 | 0.9558 | | | | | |
| 359210375 - N | EQUX632233 | 0.9558 | | | | | |
| 359210376 - N | EQUX632233 | 0.9558 | | | | | |
| 359210377 - N | EQUX632233 | 0.9558 | | | | | |
| 359210378 - N | EQUX632233 | 0.9558 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210379 | 359210379 - N | 3592.084 | 3592.127 | | | |
| 2 | 359210380 | 359210380 - N | 3592.084 | 3592.127 | 1.88 | 4.31 | |
| 3 | 359210381 | 359210381 - N | 3592.084 | 3592.127 | | | |
| 4 | 359210382 | 359210382 - N | 3592.084 | 3592.127 | | | |
| 5 | 359210383 | 359210383 - N | 3592.084 | 3592.127 | | | |
| 6 | 359210384 | 359210384 - N | 3592.084 | 3592.127 | | | |
| 7 | 359210385 | 359210385 - N | 3592.084 | 3592.127 | | | |
| 8 | 359210386 | 359210386 - N | 3592.132 | 3592.119 | | | |
| 9 | 359210387 | 359210387 - N | 3592.132 | 3592.119 | | | |
| 10 | 359210388 | 359210388 - N | 3592.132 | 3592.119 | | | |
| 11 | 359210389 | 359210389 - N | 3592.132 | 3592.119 | | | |
| 12 | 359210390 | 359210390 - N | 3592.132 | 3592.119 | | | |
| 13 | 359210391 | 359210391 - N | 3592.132 | 3592.119 | | | |
| 14 | 359210392 | 359210392 - N | 3592.132 | 3592.119 | | | |
| 15 | 359210393 | 359210393 - N | 3592.114 | 3592.133 | | | |
| 16 | 359210394 | 359210394 - N | 3592.114 | 3592.133 | | | |
| 17 | 359210395 | 359210395 - N | 3592.114 | 3592.133 | | | |
| 18 | 359210396 | 359210396 - N | 3592.114 | 3592.133 | | | |
| 19 | 359210397 | 359210397 - N | 3592.114 | 3592.133 | | | |
| 20 | 359210398 | 359210398 - N | 3592.114 | 3592.133 | | | |
| 21 | 359210399 | 359210399 - N | 3592.114 | 3592.133 | | | |
| 22 | 359210400 | 359210400 - N | 3592.128 | 3592.111 | 1.30 | 4.00 | |
| 23 | 359210401 | 359210401 - N | 3592.128 | 3592.111 | | | |
| 24 | 359210402 | 359210402 - N | 3592.128 | 3592.111 | | | |
| 25 | 359210403 | 359210403 - N | 3592.128 | 3592.111 | | | |
| 26 | 359210404 | 359210404 - N | 3592.128 | 3592.111 | | | |
| 27 | 359210405 | 359210405 - N | 3592.128 | 3592.111 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210379 - N | EQUX632233 | 0.9558 | | | | | |
| 359210380 - N | EQUX632233 | 0.9547 | 0.469 | 366 | 2.51 | 138 | |
| 359210381 - N | EQUX632233 | 0.9547 | | | | | |
| 359210382 - N | EQUX632233 | 0.9547 | | | | | |
| 359210383 - N | EQUX632233 | 0.9547 | | | | | |
| 359210384 - N | EQUX632233 | 0.9547 | | | | | |
| 359210385 - N | EQUX632233 | 0.9547 | | | | | |
| 359210386 - N | EQUX632233 | 0.9547 | | | | | |
| 359210387 - N | EQUX632233 | 0.9547 | | | | | |
| 359210388 - N | EQUX632233 | 0.9547 | | | | | |
| 359210389 - N | EQUX632233 | 0.9547 | | | | | |
| 359210390 - N | EQUX632233 | 0.9547 | | | | | |
| 359210391 - N | EQUX632233 | 0.9547 | | | | | |
| 359210392 - N | EQUX632233 | 0.9547 | | | | | |
| 359210393 - N | EQUX632233 | 0.9547 | | | | | |
| 359210394 - N | EQUX632233 | 0.9547 | | | | | |
| 359210395 - N | EQUX632233 | 0.9547 | | | | | |
| 359210396 - N | EQUX632233 | 0.9547 | | | | | |
| 359210397 - N | EQUX632233 | 0.9547 | | | | | |
| 359210398 - N | EQUX632233 | 0.9547 | | | | | |
| 359210399 - N | EQUX632233 | 0.9547 | | | | | |
| 359210400 - N | EQUX632233 | 0.9556 | 0.454 | 361 | 2.71 | 125 | |
| 359210401 - N | EQUX632233 | 0.9556 | | | | | |
| 359210402 - N | EQUX632233 | 0.9556 | | | | | |
| 359210403 - N | EQUX632233 | 0.9556 | | | | | |
| 359210404 - N | EQUX632233 | 0.9556 | | | | | |
| 359210405 - N | EQUX632233 | 0.9556 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210406 | 359210406 - N | 3592.128 | 3592.111 | | | |
| 2 | 359210407 | 359210407 - N | 3592.116 | 3592.125 | | | |
| 3 | 359210408 | 359210408 - N | 3592.116 | 3592.125 | | | |
| 4 | 359210409 | 359210409 - N | 3592.116 | 3592.125 | | | |
| 5 | 359210410 | 359210410 - N | 3592.116 | 3592.125 | | | |
| 6 | 359210411 | 359210411 - N | 3592.116 | 3592.125 | | | |
| 7 | 359210412 | 359210412 - N | 3592.116 | 3592.125 | | | |
| 8 | 359210413 | 359210413 - N | 3592.116 | 3592.125 | | | |
| 9 | 359210414 | 359210414 - N | 3592.130 | 3592.117 | | | |
| 10 | 359210415 | 359210415 - N | 3592.130 | 3592.117 | | | |
| 11 | 359210416 | 359210416 - N | 3592.130 | 3592.117 | | | |
| 12 | 359210417 | 359210417 - N | 3592.130 | 3592.117 | | | |
| 13 | 359210418 | 359210418 - N | 3592.130 | 3592.117 | | | |
| 14 | 359210419 | 359210419 - N | 3592.130 | 3592.117 | | | |
| 15 | 359210420 | 359210420 - N | 3592.130 | 3592.117 | 1.85 | 4.44 | |
| 16 | 359210421 | 359210421 - N | 3592.112 | 3592.131 | | | |
| 17 | 359210422 | 359210422 - N | 3592.112 | 3592.131 | | | |
| 18 | 359210423 | 359210423 - N | 3592.112 | 3592.131 | | | |
| 19 | 359210424 | 359210424 - N | 3592.112 | 3592.131 | | | |
| 20 | 359210425 | 359210425 - N | 3592.112 | 3592.131 | | | |
| 21 | 359210426 | 359210426 - N | 3592.112 | 3592.131 | | | |
| 22 | 359210427 | 359210427 - N | 3592.112 | 3592.131 | | | |
| 23 | 359210428 | 359210428 - N | 3592.134 | 3592.115 | | | |
| 24 | 359210429 | 359210429 - N | 3592.134 | 3592.115 | | | |
| 25 | 359210430 | 359210430 - N | 3592.134 | 3592.115 | | | |
| 26 | 359210431 | 359210431 - N | 3592.134 | 3592.115 | | | |
| 27 | 359210432 | 359210432 - N | 3592.134 | 3592.115 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210406 - N | EQUX632233 | 0.9556 | | | | | |
| 359210407 - N | EQUX632233 | 0.9556 | | | | | |
| 359210408 - N | EQUX632233 | 0.9556 | | | | | |
| 359210409 - N | EQUX632233 | 0.9556 | | | | | |
| 359210410 - N | EQUX632233 | 0.9556 | | | | | |
| 359210411 - N | EQUX632233 | 0.9556 | | | | | |
| 359210412 - N | EQUX632233 | 0.9556 | | | | | |
| 359210413 - N | EQUX632233 | 0.9556 | | | | | |
| 359210414 - N | EQUX632233 | 0.9556 | | | | | |
| 359210415 - N | EQUX632233 | 0.9556 | | | | | |
| 359210416 - N | EQUX632233 | 0.9556 | | | | | |
| 359210417 - N | EQUX632233 | 0.9556 | | | | | |
| 359210418 - N | EQUX632233 | 0.9556 | | | | | |
| 359210419 - N | EQUX632233 | 0.9556 | | | | | |
| 359210420 - N | EQUX632233 | 0.9549 | 0.466 | 369 | 2.21 | 132 | |
| 359210421 - N | EQUX632233 | 0.9549 | | | | | |
| 359210422 - N | EQUX632233 | 0.9549 | | | | | |
| 359210423 - N | EQUX632233 | 0.9549 | | | | | |
| 359210424 - N | EQUX632233 | 0.9549 | | | | | |
| 359210425 - N | EQUX632233 | 0.9549 | | | | | |
| 359210426 - N | EQUX632233 | 0.9549 | | | | | |
| 359210427 - N | EQUX632233 | 0.9549 | | | | | |
| 359210428 - N | EQUX632233 | 0.9549 | | | | | |
| 359210429 - N | EQUX632233 | 0.9549 | | | | | |
| 359210430 - N | EQUX632233 | 0.9549 | | | | | |
| 359210431 - N | EQUX632233 | 0.9549 | | | | | |
| 359210432 - N | EQUX632233 | 0.9549 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210433 | 359210433 - N | 3592.134 | 3592.115 | | | |
| 2 | 359210434 | 359210434 - N | 3592.134 | 3592.115 | | | |
| 3 | 359210435 | 359210435 - N | 3592.120 | 3592.129 | | | |
| 4 | 359210436 | 359210436 - N | 3592.120 | 3592.129 | | | |
| 5 | 359210437 | 359210437 - N | 3592.120 | 3592.129 | | | |
| 6 | 359210438 | 359210438 - N | 3592.120 | 3592.129 | | | |
| 7 | 359210439 | 359210439 - N | 3592.120 | 3592.129 | | | |
| 8 | 359210440 | 359210440 - N | 3592.120 | 3592.129 | 1.34 | 4.15 | |
| 9 | 359210441 | 359210441 - N | 3592.120 | 3592.129 | | | |
| 10 | 359210442 | 359210442 - N | 3592.124 | 3592.113 | | | |
| 11 | 359210443 | 359210443 - N | 3592.124 | 3592.113 | | | |
| 12 | 359210444 | 359210444 - N | 3592.124 | 3592.113 | | | |
| 13 | 359210445 | 359210445 - N | 3592.124 | 3592.113 | | | |
| 14 | 359210446 | 359210446 - N | 3592.124 | 3592.113 | | | |
| 15 | 359210447 | 359210447 - N | 3592.124 | 3592.113 | | | |
| 16 | 359210448 | 359210448 - N | 3592.124 | 3592.113 | | | |
| 17 | 359210449 | 359210449 - N | 3592.110 | 3592.123 | | | |
| 18 | 359210450 | 359210450 - N | 3592.110 | 3592.123 | | | |
| 19 | 359210451 | 359210451 - N | 3592.110 | 3592.123 | | | |
| 20 | 359210452 | 359210452 - N | 3592.110 | 3592.123 | | | |
| 21 | 359210453 | 359210453 - N | 3592.110 | 3592.123 | | | |
| 22 | 359210454 | 359210454 - N | 3592.110 | 3592.123 | | | |
| 23 | 359210455 | 359210455 - N | 3592.110 | 3592.123 | | | |
| 24 | 359210456 | 359210456 - N | 3592.126 | 3592.109 | | | |
| 25 | 359210457 | 359210457 - N | 3592.126 | 3592.109 | | | |
| 26 | 359210458 | 359210458 - N | 3592.126 | 3592.109 | | | |
| 27 | 359210459 | 359210459 - N | 3592.126 | 3592.109 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210433 - N | EQUX632233 | 0.9549 | | | | | |
| 359210434 - N | EQUX632233 | 0.9549 | | | | | |
| 359210435 - N | EQUX632233 | 0.9549 | | | | | |
| 359210436 - N | EQUX632233 | 0.9549 | | | | | |
| 359210437 - N | EQUX632233 | 0.9549 | | | | | |
| 359210438 - N | EQUX632233 | 0.9549 | | | | | |
| 359210439 - N | EQUX632233 | 0.9549 | | | | | |
| 359210440 - N | EQUX632233 | 0.9559 | 0.452 | 363 | 2.68 | 127 | |
| 359210441 - N | EQUX632233 | 0.9559 | | | | | |
| 359210442 - N | EQUX632233 | 0.9559 | | | | | |
| 359210443 - N | EQUX632233 | 0.9559 | | | | | |
| 359210444 - N | EQUX632233 | 0.9559 | | | | | |
| 359210445 - N | EQUX632233 | 0.9559 | | | | | |
| 359210446 - N | EQUX632233 | 0.9559 | | | | | |
| 359210447 - N | EQUX632233 | 0.9559 | | | | | |
| 359210448 - N | EQUX632233 | 0.9559 | | | | | |
| 359210449 - N | EQUX632233 | 0.9559 | | | | | |
| 359210450 - N | EQUX632233 | 0.9559 | | | | | |
| 359210451 - N | EQUX632233 | 0.9559 | | | | | |
| 359210452 - N | EQUX632233 | 0.9559 | | | | | |
| 359210453 - N | EQUX632233 | 0.9559 | | | | | |
| 359210454 - N | EQUX632233 | 0.9559 | | | | | |
| 359210455 - N | EQUX632233 | 0.9559 | | | | | |
| 359210456 - N | EQUX632233 | 0.9559 | | | | | |
| 359210457 - N | EQUX632233 | 0.9559 | | | | | |
| 359210458 - N | EQUX632233 | 0.9559 | | | | | |
| 359210459 - N | EQUX632233 | 0.9559 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210460 | 359210460 - N | 3592.126 | 3592.109 | 1.83 | 4.42 | |
| 2 | 359210461 | 359210461 - N | 3592.126 | 3592.109 | | | |
| 3 | 359210462 | 359210462 - N | 3592.126 | 3592.109 | | | |
| 4 | 359210463 | 359210463 - N | 3592.118 | 3592.161 | | | |
| 5 | 359210464 | 359210464 - N | 3592.118 | 3592.161 | | | |
| 6 | 359210465 | 359210465 - N | 3592.118 | 3592.161 | | | |
| 7 | 359210466 | 359210466 - N | 3592.118 | 3592.161 | | | |
| 8 | 359210467 | 359210467 - N | 3592.118 | 3592.161 | | | |
| 9 | 359210468 | 359210468 - N | 3592.118 | 3592.161 | | | |
| 10 | 359210469 | 359210469 - N | 3592.118 | 3592.161 | | | |
| 11 | 359210470 | 359210470 - N | 3592.158 | 3592.121 | | | |
| 12 | 359210471 | 359210471 - N | 3592.158 | 3592.121 | | | |
| 13 | 359210472 | 359210472 - N | 3592.158 | 3592.121 | | | |
| 14 | 359210473 | 359210473 - N | 3592.158 | 3592.121 | | | |
| 15 | 359210474 | 359210474 - N | 3592.158 | 3592.121 | | | |
| 16 | 359210475 | 359210475 - N | 3592.158 | 3592.121 | | | |
| 17 | 359210476 | 359210476 - N | 3592.158 | 3592.121 | | | |
| 18 | 359210477 | 359210477 - N | 3592.122 | 3592.153 | | | |
| 19 | 359210478 | 359210478 - N | 3592.122 | 3592.153 | | | |
| 20 | 359210479 | 359210479 - N | 3592.122 | 3592.153 | | | |
| 21 | 359210480 | 359210480 - N | 3592.122 | 3592.153 | 1.37 | 4.19 | |
| 22 | 359210481 | 359210481 - N | 3592.122 | 3592.153 | | | |
| 23 | 359210482 | 359210482 - N | 3592.122 | 3592.153 | | | |
| 24 | 359210483 | 359210483 - N | 3592.122 | 3592.153 | | | |
| 25 | 359210484 | 359210484 - N | 3592.154 | 3592.141 | | | |
| 26 | 359210485 | 359210485 - N | 3592.154 | 3592.141 | | | |
| 27 | 359210486 | 359210486 - N | 3592.154 | 3592.141 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210460 - N | EQUX632233 | 0.9551 | 0.468 | 365 | 2.31 | 134 | |
| 359210461 - N | EQUX632233 | 0.9551 | | | | | |
| 359210462 - N | EQUX632233 | 0.9551 | | | | | |
| 359210463 - N | EQUX632233 | 0.9551 | | | | | |
| 359210464 - N | EQUX632233 | 0.9551 | | | | | |
| 359210465 - N | EQUX632233 | 0.9551 | | | | | |
| 359210466 - N | EQUX632233 | 0.9551 | | | | | |
| 359210467 - N | EQUX632233 | 0.9551 | | | | | |
| 359210468 - N | EQUX632233 | 0.9551 | | | | | |
| 359210469 - N | EQUX632233 | 0.9551 | | | | | |
| 359210470 - N | EQUX632233 | 0.9551 | | | | | |
| 359210471 - N | EQUX632233 | 0.9551 | | | | | |
| 359210472 - N | EQUX632233 | 0.9551 | | | | | |
| 359210473 - N | EQUX632233 | 0.9551 | | | | | |
| 359210474 - N | EQUX632233 | 0.9551 | | | | | |
| 359210475 - N | EQUX632233 | 0.9551 | | | | | |
| 359210476 - N | EQUX632233 | 0.9551 | | | | | |
| 359210477 - N | EQUX632233 | 0.9551 | | | | | |
| 359210478 - N | EQUX632233 | 0.9551 | | | | | |
| 359210479 - N | EQUX632233 | 0.9551 | | | | | |
| 359210480 - N | EQUX632233 | 0.9557 | 0.455 | 360 | 2.64 | 131 | |
| 359210481 - N | EQUX632233 | 0.9557 | | | | | |
| 359210482 - N | EQUX632233 | 0.9557 | | | | | |
| 359210483 - N | EQUX632233 | 0.9557 | | | | | |
| 359210484 - N | EQUX632233 | 0.9557 | | | | | |
| 359210485 - N | EQUX632233 | 0.9557 | | | | | |
| 359210486 - N | EQUX632233 | 0.9557 | | | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210487 | 359210487 - N | 3592.154 | 3592.141 | | | |
| 2 | 359210488 | 359210488 - N | 3592.154 | 3592.141 | | | |
| 3 | 359210489 | 359210489 - N | 3592.154 | 3592.141 | | | |
| 4 | 359210490 | 359210490 - N | 3592.154 | 3592.141 | | | |
| 5 | 359210491 | 359210491 - N | 3592.144 | 3592.157 | | | |
| 6 | 359210492 | 359210492 - N | 3592.144 | 3592.157 | | | |
| 7 | 359210493 | 359210493 - N | 3592.144 | 3592.157 | | | |
| 8 | 359210494 | 359210494 - N | 3592.144 | 3592.157 | | | |
| 9 | 359210495 | 359210495 - N | 3592.144 | 3592.157 | | | |
| 10 | 359210496 | 359210496 - N | 3592.144 | 3592.157 | | | |
| 11 | 359210497 | 359210497 - N | 3592.144 | 3592.157 | | | |
| 12 | 359210498 | 359210498 - N | 3592.156 | 3592.139 | | | |
| 13 | 359210499 | 359210499 - N | 3592.156 | 3592.139 | | | |
| 14 | 359210500 | 359210500 - N | 3592.156 | 3592.139 | 1.79 | 4.46 | |
| 15 | 359210501 | 359210501 - N | 3592.156 | 3592.139 | | | |
| 16 | 359210502 | 359210502 - N | 3592.156 | 3592.139 | | | |
| 17 | 359210503 | 359210503 - N | 3592.156 | 3592.139 | | | |
| 18 | 359210504 | 359210504 - N | 3592.156 | 3592.139 | | | |
| 19 | 359210505 | 359210505 - N | 3592.140 | 3592.151 | | | |
| 20 | 359210506 | 359210506 - N | 3592.140 | 3592.151 | | | |
| 21 | 359210507 | 359210507 - N | 3592.140 | 3592.151 | | | |
| 22 | 359210508 | 359210508 - N | 3592.140 | 3592.151 | | | |
| 23 | 359210509 | 359210509 - N | 3592.140 | 3592.151 | | | |
| 24 | 359210510 | 359210510 - N | 3592.140 | 3592.151 | | | |
| 25 | 359210511 | 359210511 - N | 3592.140 | 3592.151 | | | |
| 26 | 359210512 | 359210512 - N | 3592.162 | 3592.145 | | | |
| 27 | 359210513 | 359210513 - N | 3592.162 | 3592.145 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210487 - N | EQUX632233 | 0.9557 | | | | | |
| 359210488 - N | EQUX632233 | 0.9557 | | | | | |
| 359210489 - N | EQUX632233 | 0.9557 | | | | | |
| 359210490 - N | EQUX632233 | 0.9557 | | | | | |
| 359210491 - N | EQUX632233 | 0.9557 | | | | | |
| 359210492 - N | EQUX632233 | 0.9557 | | | | | |
| 359210493 - N | EQUX632233 | 0.9557 | | | | | |
| 359210494 - N | EQUX632233 | 0.9557 | | | | | |
| 359210495 - N | EQUX632233 | 0.9557 | | | | | |
| 359210496 - N | EQUX632233 | 0.9557 | | | | | |
| 359210497 - N | EQUX632233 | 0.9557 | | | | | |
| 359210498 - N | EQUX632233 | 0.9557 | | | | | |
| 359210499 - N | EQUX632233 | 0.9557 | | | | | |
| 359210500 - N | EQUX632233 | 0.9548 | 0.464 | 368 | 2.38 | 136 | |
| 359210501 - N | EQUX632233 | 0.9548 | | | | | |
| 359210502 - N | EQUX632233 | 0.9548 | | | | | |
| 359210503 - N | EQUX632233 | 0.9548 | | | | | |
| 359210504 - N | EQUX632233 | 0.9548 | | | | | |
| 359210505 - N | EQUX632233 | 0.9548 | | | | | |
| 359210506 - N | EQUX632233 | 0.9548 | | | | | |
| 359210507 - N | EQUX632233 | 0.9548 | | | | | |
| 359210508 - N | EQUX632233 | 0.9548 | | | | | |
| 359210509 - N | EQUX632233 | 0.9548 | | | | | |
| 359210510 - N | EQUX632233 | 0.9548 | | | | | |
| 359210511 - N | EQUX632233 | 0.9548 | | | | | |
| 359210512 - N | EQUX632233 | 0.9548 | | | | | |
| 359210513 - N | EQUX632233 | 0.9548 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210514 | 359210514 - N | 3592.162 | 3592.145 | | | |
| 2 | 359210515 | 359210515 - N | 3592.162 | 3592.145 | | | |
| 3 | 359210516 | 359210516 - N | 3592.162 | 3592.145 | | | |
| 4 | 359210517 | 359210517 - N | 3592.162 | 3592.145 | | | |
| 5 | 359210518 | 359210518 - N | 3592.162 | 3592.145 | | | |
| 6 | 359210519 | 359210519 - N | 3592.142 | 3592.159 | | | |
| 7 | 359210520 | 359210520 - N | 3592.142 | 3592.159 | 1.40 | 4.16 | |
| 8 | 359210521 | 359210521 - N | 3592.142 | 3592.159 | | | |
| 9 | 359210522 | 359210522 - N | 3592.142 | 3592.159 | | | |
| 10 | 359210523 | 359210523 - N | 3592.142 | 3592.159 | | | |
| 11 | 359210524 | 359210524 - N | 3592.142 | 3592.159 | | | |
| 12 | 359210525 | 359210525 - N | 3592.142 | 3592.159 | | | |
| 13 | 359210526 | 359210526 - N | 3592.160 | 3592.147 | | | |
| 14 | 359210527 | 359210527 - N | 3592.160 | 3592.147 | | | |
| 15 | 359210528 | 359210528 - N | 3592.160 | 3592.147 | | | |
| 16 | 359210529 | 359210529 - N | 3592.160 | 3592.147 | | | |
| 17 | 359210530 | 359210530 - N | 3592.160 | 3592.147 | | | |
| 18 | 359210531 | 359210531 - N | 3592.160 | 3592.147 | | | |
| 19 | 359210532 | 359210532 - N | 3592.160 | 3592.147 | | | |
| 20 | 359210533 | 359210533 - N | 3592.146 | 3592.155 | | | |
| 21 | 359210534 | 359210534 - N | 3592.146 | 3592.155 | | | |
| 22 | 359210535 | 359210535 - N | 3592.146 | 3592.155 | | | |
| 23 | 359210536 | 359210536 - N | 3592.146 | 3592.155 | | | |
| 24 | 359210537 | 359210537 - N | 3592.146 | 3592.155 | | | |
| 25 | 359210538 | 359210538 - N | 3592.146 | 3592.155 | | | |
| 26 | 359210539 | 359210539 - N | 3592.146 | 3592.155 | | | |
| 27 | 359210540 | 359210540 - N | 3592.152 | 3592.137 | 1.76 | 4.29 | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210514 - N | EQUX632233 | 0.9548 | | | | | |
| 359210515 - N | EQUX632233 | 0.9548 | | | | | |
| 359210516 - N | EQUX632233 | 0.9548 | | | | | |
| 359210517 - N | EQUX632233 | 0.9548 | | | | | |
| 359210518 - N | EQUX632233 | 0.9548 | | | | | |
| 359210519 - N | EQUX632233 | 0.9548 | | | | | |
| 359210520 - N | GPLX1010 | 0.9555 | 0.457 | 362 | 2.58 | 129 | |
| 359210521 - N | GPLX1010 | 0.9555 | | | | | |
| 359210522 - N | GPLX1010 | 0.9555 | | | | | |
| 359210523 - N | GPLX1010 | 0.9555 | | | | | |
| 359210524 - N | GPLX1010 | 0.9555 | | | | | |
| 359210525 - N | GPLX1010 | 0.9555 | | | | | |
| 359210526 - N | GPLX1010 | 0.9555 | | | | | |
| 359210527 - N | GPLX1010 | 0.9555 | | | | | |
| 359210528 - N | GPLX1010 | 0.9555 | | | | | |
| 359210529 - N | GPLX1010 | 0.9555 | | | | | |
| 359210530 - N | GPLX1010 | 0.9555 | | | | | |
| 359210531 - N | GPLX1010 | 0.9555 | | | | | |
| 359210532 - N | GPLX1010 | 0.9555 | | | | | |
| 359210533 - N | GPLX1010 | 0.9555 | | | | | |
| 359210534 - N | GPLX1010 | 0.9555 | | | | | |
| 359210535 - N | GPLX1010 | 0.9555 | | | | | |
| 359210536 - N | GPLX1010 | 0.9555 | | | | | |
| 359210537 - N | GPLX1010 | 0.9555 | | | | | |
| 359210538 - N | GPLX1010 | 0.9555 | | | | | |
| 359210539 - N | GPLX1010 | 0.9555 | | | | | |
| 359210540 - N | GPLX1010 | 0.9550 | 0.467 | 366 | 2.41 | 133 | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210541 | 359210541 - N | 3592.152 | 3592.137 | | | |
| 2 | 359210542 | 359210542 - N | 3592.152 | 3592.137 | | | |
| 3 | 359210543 | 359210543 - N | 3592.152 | 3592.137 | | | |
| 4 | 359210544 | 359210544 - N | 3592.152 | 3592.137 | | | |
| 5 | 359210545 | 359210545 - N | 3592.152 | 3592.137 | | | |
| 6 | 359210546 | 359210546 - N | 3592.152 | 3592.137 | | | |
| 7 | 359210547 | 359210547 - N | 3592.138 | 3592.149 | | | |
| 8 | 359210548 | 359210548 - N | 3592.138 | 3592.149 | | | |
| 9 | 359210549 | 359210549 - N | 3592.138 | 3592.149 | | | |
| 10 | 359210550 | 359210550 - N | 3592.138 | 3592.149 | | | |
| 11 | 359210551 | 359210551 - N | 3592.138 | 3592.149 | | | |
| 12 | 359210552 | 359210552 - N | 3592.138 | 3592.149 | | | |
| 13 | 359210553 | 359210553 - N | 3592.138 | 3592.149 | | | |
| 14 | 359210554 | 359210554 - N | 3592.150 | 3592.143 | | | |
| 15 | 359210555 | 359210555 - N | 3592.150 | 3592.143 | | | |
| 16 | 359210556 | 359210556 - N | 3592.150 | 3592.143 | | | |
| 17 | 359210557 | 359210557 - N | 3592.150 | 3592.143 | | | |
| 18 | 359210558 | 359210558 - N | 3592.150 | 3592.143 | | | |
| 19 | 359210559 | 359210559 - N | 3592.150 | 3592.143 | | | |
| 20 | 359210560 | 359210560 - N | 3592.150 | 3592.143 | 1.43 | 4.18 | |
| 21 | 359210561 | 359210561 - N | 3592.136 | 3592.187 | | | |
| 22 | 359210562 | 359210562 - N | 3592.136 | 3592.187 | | | |
| 23 | 359210563 | 359210563 - N | 3592.136 | 3592.187 | | | |
| 24 | 359210564 | 359210564 - N | 3592.136 | 3592.187 | | | |
| 25 | 359210565 | 359210565 - N | 3592.136 | 3592.187 | | | |
| 26 | 359210566 | 359210566 - N | 3592.136 | 3592.187 | | | |
| 27 | 359210567 | 359210567 - N | 3592.136 | 3592.187 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210541 - N | GPLX1010 | 0.9550 | | | | | |
| 359210542 - N | GPLX1010 | 0.9550 | | | | | |
| 359210543 - N | GPLX1010 | 0.9550 | | | | | |
| 359210544 - N | GPLX1010 | 0.9550 | | | | | |
| 359210545 - N | GPLX1010 | 0.9550 | | | | | |
| 359210546 - N | GPLX1010 | 0.9550 | | | | | |
| 359210547 - N | GPLX1010 | 0.9550 | | | | | |
| 359210548 - N | GPLX1010 | 0.9550 | | | | | |
| 359210549 - N | GPLX1010 | 0.9550 | | | | | |
| 359210550 - N | GPLX1010 | 0.9550 | | | | | |
| 359210551 - N | GPLX1010 | 0.9550 | | | | | |
| 359210552 - N | GPLX1010 | 0.9550 | | | | | |
| 359210553 - N | GPLX1010 | 0.9550 | | | | | |
| 359210554 - N | GPLX1010 | 0.9550 | | | | | |
| 359210555 - N | GPLX1010 | 0.9550 | | | | | |
| 359210556 - N | GPLX1010 | 0.9550 | | | | | |
| 359210557 - N | GPLX1010 | 0.9550 | | | | | |
| 359210558 - N | GPLX1010 | 0.9550 | | | | | |
| 359210559 - N | GPLX1010 | 0.9550 | | | | | |
| 359210560 - N | GPLX1010 | 0.9553 | 0.440 | 359 | 2.56 | 126 | |
| 359210561 - N | GPLX1010 | 0.9553 | | | | | |
| 359210562 - N | GPLX1010 | 0.9553 | | | | | |
| 359210563 - N | GPLX1010 | 0.9553 | | | | | |
| 359210564 - N | GPLX1010 | 0.9553 | | | | | |
| 359210565 - N | GPLX1010 | 0.9553 | | | | | |
| 359210566 - N | GPLX1010 | 0.9553 | | | | | |
| 359210567 - N | GPLX1010 | 0.9553 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210568 | 359210568 - N | 3592.180 | 3592.172 | | | |
| 2 | 359210569 | 359210569 - N | 3592.180 | 3592.172 | | | |
| 3 | 359210570 | 359210570 - N | 3592.180 | 3592.172 | | | |
| 4 | 359210571 | 359210571 - N | 3592.180 | 3592.172 | | | |
| 5 | 359210572 | 359210572 - N | 3592.180 | 3592.172 | | | |
| 6 | 359210573 | 359210573 - N | 3592.180 | 3592.172 | | | |
| 7 | 359210574 | 359210574 - N | 3592.180 | 3592.172 | | | |
| 8 | 359210575 | 359210575 - N | 3592.148 | 3592.189 | | | |
| 9 | 359210576 | 359210576 - N | 3592.148 | 3592.189 | | | |
| 10 | 359210577 | 359210577 - N | 3592.148 | 3592.189 | | | |
| 11 | 359210578 | 359210578 - N | 3592.148 | 3592.189 | | | |
| 12 | 359210579 | 359210579 - N | 3592.148 | 3592.189 | | | |
| 13 | 359210580 | 359210580 - N | 3592.148 | 3592.189 | 1.73 | 4.26 | |
| 14 | 359210581 | 359210581 - N | 3592.148 | 3592.189 | | | |
| 15 | 359210582 | 359210582 - N | 3592.184 | 3592.166 | | | |
| 16 | 359210583 | 359210583 - N | 3592.184 | 3592.166 | | | |
| 17 | 359210584 | 359210584 - N | 3592.184 | 3592.166 | | | |
| 18 | 359210585 | 359210585 - N | 3592.184 | 3592.166 | | | |
| 19 | 359210586 | 359210586 - N | 3592.184 | 3592.166 | | | |
| 20 | 359210587 | 359210587 - N | 3592.184 | 3592.166 | | | |
| 21 | 359210588 | 359210588 - N | 3592.184 | 3592.166 | | | |
| 22 | 359210589 | 359210589 - N | 3592.169 | 3592.181 | | | |
| 23 | 359210590 | 359210590 - N | 3592.169 | 3592.181 | | | |
| 24 | 359210591 | 359210591 - N | 3592.169 | 3592.181 | | | |
| 25 | 359210592 | 359210592 - N | 3592.169 | 3592.181 | | | |
| 26 | 359210593 | 359210593 - N | 3592.169 | 3592.181 | | | |
| 27 | 359210594 | 359210594 - N | 3592.169 | 3592.181 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210568 - N | GPLX1010 | 0.9553 | | | | | |
| 359210569 - N | GPLX1010 | 0.9553 | | | | | |
| 359210570 - N | GPLX1010 | 0.9553 | | | | | |
| 359210571 - N | GPLX1010 | 0.9553 | | | | | |
| 359210572 - N | GPLX1010 | 0.9553 | | | | | |
| 359210573 - N | GPLX1010 | 0.9553 | | | | | |
| 359210574 - N | GPLX1010 | 0.9553 | | | | | |
| 359210575 - N | GPLX1010 | 0.9553 | | | | | |
| 359210576 - N | GPLX1010 | 0.9553 | | | | | |
| 359210577 - N | GPLX1010 | 0.9553 | | | | | |
| 359210578 - N | GPLX1010 | 0.9553 | | | | | |
| 359210579 - N | GPLX1010 | 0.9553 | | | | | |
| 359210580 - N | GPLX1010 | 0.9547 | 0.463 | 369 | 2.22 | 130 | |
| 359210581 - N | GPLX1010 | 0.9547 | | | | | |
| 359210582 - N | GPLX1010 | 0.9547 | | | | | |
| 359210583 - N | GPLX1010 | 0.9547 | | | | | |
| 359210584 - N | GPLX1010 | 0.9547 | | | | | |
| 359210585 - N | GPLX1010 | 0.9547 | | | | | |
| 359210586 - N | GPLX1010 | 0.9547 | | | | | |
| 359210587 - N | GPLX1010 | 0.9547 | | | | | |
| 359210588 - N | GPLX1010 | 0.9547 | | | | | |
| 359210589 - N | GPLX1010 | 0.9547 | | | | | |
| 359210590 - N | GPLX1010 | 0.9547 | | | | | |
| 359210591 - N | GPLX1010 | 0.9547 | | | | | |
| 359210592 - N | GPLX1010 | 0.9547 | | | | | |
| 359210593 - N | GPLX1010 | 0.9547 | | | | | |
| 359210594 - N | GPLX1010 | 0.9547 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210595 | 359210595 - N | 3592.169 | 3592.181 | | | |
| 2 | 359210596 | 359210596 - N | 3592.186 | 3592.168 | | | |
| 3 | 359210597 | 359210597 - N | 3592.186 | 3592.168 | | | |
| 4 | 359210598 | 359210598 - N | 3592.186 | 3592.168 | | | |
| 5 | 359210599 | 359210599 - N | 3592.186 | 3592.168 | | | |
| 6 | 359210600 | 359210600 - N | 3592.186 | 3592.168 | 1.45 | 3.95 | |
| 7 | 359210601 | 359210601 - N | 3592.186 | 3592.168 | | | |
| 8 | 359210602 | 359210602 - N | 3592.186 | 3592.168 | | | |
| 9 | 359210603 | 359210603 - N | 3592.175 | 3592.185 | | | |
| 10 | 359210604 | 359210604 - N | 3592.175 | 3592.185 | | | |
| 11 | 359210605 | 359210605 - N | 3592.175 | 3592.185 | | | |
| 12 | 359210606 | 359210606 - N | 3592.175 | 3592.185 | | | |
| 13 | 359210607 | 359210607 - N | 3592.175 | 3592.185 | | | |
| 14 | 359210608 | 359210608 - N | 3592.175 | 3592.185 | | | |
| 15 | 359210609 | 359210609 - N | 3592.175 | 3592.185 | | | |
| 16 | 359210610 | 359210610 - N | 3592.182 | 3592.164 | | | |
| 17 | 359210611 | 359210611 - N | 3592.182 | 3592.164 | | | |
| 18 | 359210612 | 359210612 - N | 3592.182 | 3592.164 | | | |
| 19 | 359210613 | 359210613 - N | 3592.182 | 3592.164 | | | |
| 20 | 359210614 | 359210614 - N | 3592.182 | 3592.164 | | | |
| 21 | 359210615 | 359210615 - N | 3592.182 | 3592.164 | | | |
| 22 | 359210616 | 359210616 - N | 3592.182 | 3592.164 | | | |
| 23 | 359210617 | 359210617 - N | 3592.171 | 3592.183 | | | |
| 24 | 359210618 | 359210618 - N | 3592.171 | 3592.183 | | | |
| 25 | 359210619 | 359210619 - N | 3592.171 | 3592.183 | | | |
| 26 | 359210620 | 359210620 - N | 3592.171 | 3592.183 | 1.69 | 4.41 | |
| 27 | 359210621 | 359210621 - N | 3592.171 | 3592.183 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210595 - N | GPLX1010 | 0.9547 | | | | | |
| 359210596 - N | GPLX1010 | 0.9547 | | | | | |
| 359210597 - N | GPLX1010 | 0.9547 | | | | | |
| 359210598 - N | GPLX1010 | 0.9547 | | | | | |
| 359210599 - N | GPLX1010 | 0.9547 | | | | | |
| 359210600 - N | GPLX1010 | 0.9556 | 0.446 | 361 | 2.63 | 128 | |
| 359210601 - N | GPLX1010 | 0.9556 | | | | | |
| 359210602 - N | GPLX1010 | 0.9556 | | | | | |
| 359210603 - N | GPLX1010 | 0.9556 | | | | | |
| 359210604 - N | GPLX1010 | 0.9556 | | | | | |
| 359210605 - N | GPLX1010 | 0.9556 | | | | | |
| 359210606 - N | GPLX1010 | 0.9556 | | | | | |
| 359210607 - N | GPLX1010 | 0.9556 | | | | | |
| 359210608 - N | GPLX1010 | 0.9556 | | | | | |
| 359210609 - N | GPLX1010 | 0.9556 | | | | | |
| 359210610 - N | GPLX1010 | 0.9556 | | | | | |
| 359210611 - N | GPLX1010 | 0.9556 | | | | | |
| 359210612 - N | GPLX1010 | 0.9556 | | | | | |
| 359210613 - N | GPLX1010 | 0.9556 | | | | | |
| 359210614 - N | GPLX1010 | 0.9556 | | | | | |
| 359210615 - N | GPLX1010 | 0.9556 | | | | | |
| 359210616 - N | GPLX1010 | 0.9556 | | | | | |
| 359210617 - N | GPLX1010 | 0.9556 | | | | | |
| 359210618 - N | GPLX1010 | 0.9556 | | | | | |
| 359210619 - N | GPLX1010 | 0.9556 | | | | | |
| 359210620 - N | GPLX1010 | 0.9552 | 0.465 | 367 | 2.33 | 134 | |
| 359210621 - N | GPLX1010 | 0.9552 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210622 | 359210622 - N | 3592.171 | 3592.183 | | | |
| 2 | 359210623 | 359210623 - N | 3592.171 | 3592.183 | | | |
| 3 | 359210624 | 359210624 - N | 3592.178 | 3592.174 | | | |
| 4 | 359210625 | 359210625 - N | 3592.178 | 3592.174 | | | |
| 5 | 359210626 | 359210626 - N | 3592.178 | 3592.174 | | | |
| 6 | 359210627 | 359210627 - N | 3592.178 | 3592.174 | | | |
| 7 | 359210628 | 359210628 - N | 3592.178 | 3592.174 | | | |
| 8 | 359210629 | 359210629 - N | 3592.178 | 3592.174 | | | |
| 9 | 359210630 | 359210630 - N | 3592.178 | 3592.174 | | | |
| 10 | 359210631 | 359210631 - N | 3592.165 | 3592.177 | | | |
| 11 | 359210632 | 359210632 - N | 3592.165 | 3592.177 | | | |
| 12 | 359210633 | 359210633 - N | 3592.165 | 3592.177 | | | |
| 13 | 359210634 | 359210634 - N | 3592.165 | 3592.177 | | | |
| 14 | 359210635 | 359210635 - N | 3592.165 | 3592.177 | | | |
| 15 | 359210636 | 359210636 - N | 3592.165 | 3592.177 | | | |
| 16 | 359210637 | 359210637 - N | 3592.165 | 3592.177 | | | |
| 17 | 359210638 | 359210638 - N | 3592.188 | 3592.170 | | | |
| 18 | 359210639 | 359210639 - N | 3592.188 | 3592.170 | | | |
| 19 | 359210640 | 359210640 - N | 3592.188 | 3592.170 | 1.48 | 3.91 | |
| 20 | 359210641 | 359210641 - N | 3592.188 | 3592.170 | | | |
| 21 | 359210642 | 359210642 - N | 3592.188 | 3592.170 | | | |
| 22 | 359210643 | 359210643 - N | 3592.188 | 3592.170 | | | |
| 23 | 359210644 | 359210644 - N | 3592.188 | 3592.170 | | | |
| 24 | 359210645 | 359210645 - N | 3592.167 | 3592.179 | | | |
| 25 | 359210646 | 359210646 - N | 3592.167 | 3592.179 | | | |
| 26 | 359210647 | 359210647 - N | 3592.167 | 3592.179 | | | |
| 27 | 359210648 | 359210648 - N | 3592.167 | 3592.179 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210622 - N | GPLX1010 | 0.9552 | | | | | |
| 359210623 - N | GPLX1010 | 0.9552 | | | | | |
| 359210624 - N | GPLX1010 | 0.9552 | | | | | |
| 359210625 - N | GPLX1010 | 0.9552 | | | | | |
| 359210626 - N | GPLX1010 | 0.9552 | | | | | |
| 359210627 - N | GPLX1010 | 0.9552 | | | | | |
| 359210628 - N | GPLX1010 | 0.9552 | | | | | |
| 359210629 - N | GPLX1010 | 0.9552 | | | | | |
| 359210630 - N | GPLX1010 | 0.9552 | | | | | |
| 359210631 - N | GPLX1010 | 0.9552 | | | | | |
| 359210632 - N | GPLX1010 | 0.9552 | | | | | |
| 359210633 - N | GPLX1010 | 0.9552 | | | | | |
| 359210634 - N | GPLX1010 | 0.9552 | | | | | |
| 359210635 - N | GPLX1010 | 0.9552 | | | | | |
| 359210636 - N | GPLX1010 | 0.9552 | | | | | |
| 359210637 - N | GPLX1010 | 0.9552 | | | | | |
| 359210638 - N | GPLX1010 | 0.9552 | | | | | |
| 359210639 - N | GPLX1010 | 0.9552 | | | | | |
| 359210640 - N | GPLX1010 | 0.9558 | 0.458 | 363 | 2.76 | 125 | |
| 359210641 - N | GPLX1010 | 0.9558 | | | | | |
| 359210642 - N | GPLX1010 | 0.9558 | | | | | |
| 359210643 - N | GPLX1010 | 0.9558 | | | | | |
| 359210644 - N | GPLX1010 | 0.9558 | | | | | |
| 359210645 - N | GPLX1010 | 0.9558 | | | | | |
| 359210646 - N | GPLX1010 | 0.9558 | | | | | |
| 359210647 - N | GPLX1010 | 0.9558 | | | | | |
| 359210648 - N | GPLX1010 | 0.9558 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210649 | 359210649 - N | 3592.167 | 3592.179 | | | |
| 2 | 359210650 | 359210650 - N | 3592.167 | 3592.179 | | | |
| 3 | 359210651 | 359210651 - N | 3592.167 | 3592.179 | | | |
| 4 | 359210652 | 359210652 - N | 3592.176 | 3592.195 | | | |
| 5 | 359210653 | 359210653 - N | 3592.176 | 3592.195 | | | |
| 6 | 359210654 | 359210654 - N | 3592.176 | 3592.195 | | | |
| 7 | 359210655 | 359210655 - N | 3592.176 | 3592.195 | | | |
| 8 | 359210656 | 359210656 - N | 3592.176 | 3592.195 | | | |
| 9 | 359210657 | 359210657 - N | 3592.176 | 3592.195 | | | |
| 10 | 359210658 | 359210658 - N | 3592.176 | 3592.195 | | | |
| 11 | 359210659 | 359210659 - N | 3592.163 | 3592.209 | | | |
| 12 | 359210660 | 359210660 - N | 3592.163 | 3592.209 | 1.66 | 4.23 | |
| 13 | 359210661 | 359210661 - N | 3592.163 | 3592.209 | | | |
| 14 | 359210662 | 359210662 - N | 3592.163 | 3592.209 | | | |
| 15 | 359210663 | 359210663 - N | 3592.163 | 3592.209 | | | |
| 16 | 359210664 | 359210664 - N | 3592.163 | 3592.209 | | | |
| 17 | 359210665 | 359210665 - N | 3592.163 | 3592.209 | | | |
| 18 | 359210666 | 359210666 - N | 3592.212 | 3592.199 | | | |
| 19 | 359210667 | 359210667 - N | 3592.212 | 3592.199 | | | |
| 20 | 359210668 | 359210668 - N | 3592.212 | 3592.199 | | | |
| 21 | 359210669 | 359210669 - N | 3592.212 | 3592.199 | | | |
| 22 | 359210670 | 359210670 - N | 3592.212 | 3592.199 | | | |
| 23 | 359210671 | 359210671 - N | 3592.212 | 3592.199 | | | |
| 24 | 359210672 | 359210672 - N | 3592.212 | 3592.199 | | | |
| 25 | 359210673 | 359210673 - N | 3592.173 | 3592.205 | | | |
| 26 | 359210674 | 359210674 - N | 3592.173 | 3592.205 | | | |
| 27 | 359210675 | 359210675 - N | 3592.173 | 3592.205 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210649 - N | GPLX1010 | 0.9558 | | | | | |
| 359210650 - N | GPLX1010 | 0.9558 | | | | | |
| 359210651 - N | GPLX1010 | 0.9558 | | | | | |
| 359210652 - N | GPLX1010 | 0.9558 | | | | | |
| 359210653 - N | GPLX1010 | 0.9558 | | | | | |
| 359210654 - N | GPLX1010 | 0.9558 | | | | | |
| 359210655 - N | GPLX1010 | 0.9558 | | | | | |
| 359210656 - N | GPLX1010 | 0.9558 | | | | | |
| 359210657 - N | GPLX1010 | 0.9558 | | | | | |
| 359210658 - N | GPLX1010 | 0.9558 | | | | | |
| 359210659 - N | GPLX1010 | 0.9558 | | | | | |
| 359210660 - N | GPLX1010 | 0.9549 | 0.475 | 370 | 2.23 | 136 | |
| 359210661 - N | GPLX1010 | 0.9549 | | | | | |
| 359210662 - N | GPLX1010 | 0.9549 | | | | | |
| 359210663 - N | GPLX1010 | 0.9549 | | | | | |
| 359210664 - N | GPLX1010 | 0.9549 | | | | | |
| 359210665 - N | GPLX1010 | 0.9549 | | | | | |
| 359210666 - N | GPLX1010 | 0.9549 | | | | | |
| 359210667 - N | GPLX1010 | 0.9549 | | | | | |
| 359210668 - N | GPLX1010 | 0.9549 | | | | | |
| 359210669 - N | GPLX1010 | 0.9549 | | | | | |
| 359210670 - N | GPLX1010 | 0.9549 | | | | | |
| 359210671 - N | GPLX1010 | 0.9549 | | | | | |
| 359210672 - N | GPLX1010 | 0.9549 | | | | | |
| 359210673 - N | GPLX1010 | 0.9549 | | | | | |
| 359210674 - N | GPLX1010 | 0.9549 | | | | | |
| 359210675 - N | GPLX1010 | 0.9549 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210676 | 359210676 - N | 3592.173 | 3592.205 | | | |
| 2 | 359210677 | 359210677 - N | 3592.173 | 3592.205 | | | |
| 3 | 359210678 | 359210678 - N | 3592.173 | 3592.205 | | | |
| 4 | 359210679 | 359210679 - N | 3592.173 | 3592.205 | | | |
| 5 | 359210680 | 359210680 - N | 3592.210 | 3592.197 | 1.51 | 3.88 | |
| 6 | 359210681 | 359210681 - N | 3592.210 | 3592.197 | | | |
| 7 | 359210682 | 359210682 - N | 3592.210 | 3592.197 | | | |
| 8 | 359210683 | 359210683 - N | 3592.210 | 3592.197 | | | |
| 9 | 359210684 | 359210684 - N | 3592.210 | 3592.197 | | | |
| 10 | 359210685 | 359210685 - N | 3592.210 | 3592.197 | | | |
| 11 | 359210686 | 359210686 - N | 3592.210 | 3592.197 | | | |
| 12 | 359210687 | 359210687 - N | 3592.198 | 3592.213 | | | |
| 13 | 359210688 | 359210688 - N | 3592.198 | 3592.213 | | | |
| 14 | 359210689 | 359210689 - N | 3592.198 | 3592.213 | | | |
| 15 | 359210690 | 359210690 - N | 3592.198 | 3592.213 | | | |
| 16 | 359210691 | 359210691 - N | 3592.198 | 3592.213 | | | |
| 17 | 359210692 | 359210692 - N | 3592.198 | 3592.213 | | | |
| 18 | 359210693 | 359210693 - N | 3592.198 | 3592.213 | | | |
| 19 | 359210694 | 359210694 - N | 3592.214 | 3592.201 | | | |
| 20 | 359210695 | 359210695 - N | 3592.214 | 3592.201 | | | |
| 21 | 359210696 | 359210696 - N | 3592.214 | 3592.201 | | | |
| 22 | 359210697 | 359210697 - N | 3592.214 | 3592.201 | | | |
| 23 | 359210698 | 359210698 - N | 3592.214 | 3592.201 | | | |
| 24 | 359210699 | 359210699 - N | 3592.214 | 3592.201 | | | |
| 25 | 359210700 | 359210700 - N | 3592.214 | 3592.201 | 1.92 | 4.34 | |
| 26 | 359210701 | 359210701 - N | 3592.194 | 3592.215 | | | |
| 27 | 359210702 | 359210702 - N | 3592.194 | 3592.215 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210676 - N | GPLX1010 | 0.9549 | | | | | |
| 359210677 - N | GPLX1010 | 0.9549 | | | | | |
| 359210678 - N | GPLX1010 | 0.9549 | | | | | |
| 359210679 - N | GPLX1010 | 0.9549 | | | | | |
| 359210680 - N | GPLX1010 | 0.9554 | 0.447 | 365 | 2.61 | 129 | |
| 359210681 - N | GPLX1010 | 0.9554 | | | | | |
| 359210682 - N | GPLX1010 | 0.9554 | | | | | |
| 359210683 - N | GPLX1010 | 0.9554 | | | | | |
| 359210684 - N | GPLX1010 | 0.9554 | | | | | |
| 359210685 - N | GPLX1010 | 0.9554 | | | | | |
| 359210686 - N | GPLX1010 | 0.9554 | | | | | |
| 359210687 - N | GPLX1010 | 0.9554 | | | | | |
| 359210688 - N | GPLX1010 | 0.9554 | | | | | |
| 359210689 - N | GPLX1010 | 0.9554 | | | | | |
| 359210690 - N | GPLX1010 | 0.9554 | | | | | |
| 359210691 - N | GPLX1010 | 0.9554 | | | | | |
| 359210692 - N | GPLX1010 | 0.9554 | | | | | |
| 359210693 - N | GPLX1010 | 0.9554 | | | | | |
| 359210694 - N | GPLX1010 | 0.9554 | | | | | |
| 359210695 - N | GPLX1010 | 0.9554 | | | | | |
| 359210696 - N | GPLX1010 | 0.9554 | | | | | |
| 359210697 - N | GPLX1010 | 0.9554 | | | | | |
| 359210698 - N | GPLX1010 | 0.9554 | | | | | |
| 359210699 - N | GPLX1010 | 0.9554 | | | | | |
| 359210700 - N | GPLX1010 | 0.9551 | 0.472 | 368 | 2.35 | 138 | |
| 359210701 - N | GPLX1010 | 0.9551 | | | | | |
| 359210702 - N | GPLX1010 | 0.9551 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210703 | 359210703 - N | 3592.194 | 3592.215 | | | |
| 2 | 359210704 | 359210704 - N | 3592.194 | 3592.215 | | | |
| 3 | 359210705 | 359210705 - N | 3592.194 | 3592.215 | | | |
| 4 | 359210706 | 359210706 - N | 3592.194 | 3592.215 | | | |
| 5 | 359210707 | 359210707 - N | 3592.194 | 3592.215 | | | |
| 6 | 359210708 | 359210708 - N | 3592.208 | 3592.191 | | | |
| 7 | 359210709 | 359210709 - N | 3592.208 | 3592.191 | | | |
| 8 | 359210710 | 359210710 - N | 3592.208 | 3592.191 | | | |
| 9 | 359210711 | 359210711 - N | 3592.208 | 3592.191 | | | |
| 10 | 359210712 | 359210712 - N | 3592.208 | 3592.191 | | | |
| 11 | 359210713 | 359210713 - N | 3592.208 | 3592.191 | | | |
| 12 | 359210714 | 359210714 - N | 3592.208 | 3592.191 | | | |
| 13 | 359210715 | 359210715 - N | 3592.192 | 3592.207 | | | |
| 14 | 359210716 | 359210716 - N | 3592.192 | 3592.207 | | | |
| 15 | 359210717 | 359210717 - N | 3592.192 | 3592.207 | | | |
| 16 | 359210718 | 359210718 - N | 3592.192 | 3592.207 | | | |
| 17 | 359210719 | 359210719 - N | 3592.192 | 3592.207 | | | |
| 18 | 359210720 | 359210720 - N | 3592.192 | 3592.207 | 1.54 | 3.96 | |
| 19 | 359210721 | 359210721 - N | 3592.192 | 3592.207 | | | |
| 20 | 359210722 | 359210722 - N | 3592.204 | 3592.193 | | | |
| 21 | 359210723 | 359210723 - N | 3592.204 | 3592.193 | | | |
| 22 | 359210724 | 359210724 - N | 3592.204 | 3592.193 | | | |
| 23 | 359210725 | 359210725 - N | 3592.204 | 3592.193 | | | |
| 24 | 359210726 | 359210726 - N | 3592.204 | 3592.193 | | | |
| 25 | 359210727 | 359210727 - N | 3592.204 | 3592.193 | | | |
| 26 | 359210728 | 359210728 - N | 3592.204 | 3592.193 | | | |
| 27 | 359210729 | 359210729 - N | 3592.196 | 3592.211 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210703 - N | GPLX1010 | 0.9551 | | | | | |
| 359210704 - N | GPLX1010 | 0.9551 | | | | | |
| 359210705 - N | GPLX1010 | 0.9551 | | | | | |
| 359210706 - N | GPLX1010 | 0.9551 | | | | | |
| 359210707 - N | GPLX1010 | 0.9551 | | | | | |
| 359210708 - N | GPLX1010 | 0.9551 | | | | | |
| 359210709 - N | GPLX1010 | 0.9551 | | | | | |
| 359210710 - N | GPLX1010 | 0.9551 | | | | | |
| 359210711 - N | GPLX1010 | 0.9551 | | | | | |
| 359210712 - N | GPLX1010 | 0.9551 | | | | | |
| 359210713 - N | GPLX1010 | 0.9551 | | | | | |
| 359210714 - N | GPLX1010 | 0.9551 | | | | | |
| 359210715 - N | GPLX1010 | 0.9551 | | | | | |
| 359210716 - N | GPLX1010 | 0.9551 | | | | | |
| 359210717 - N | GPLX1010 | 0.9551 | | | | | |
| 359210718 - N | GPLX1010 | 0.9551 | | | | | |
| 359210719 - N | GPLX1010 | 0.9551 | | | | | |
| 359210720 - N | CHVX896817 | 0.9568 | 0.456 | 362 | 2.72 | 131 | |
| 359210721 - N | CHVX896817 | 0.9568 | | | | | |
| 359210722 - N | CHVX896817 | 0.9568 | | | | | |
| 359210723 - N | CHVX896817 | 0.9568 | | | | | |
| 359210724 - N | CHVX896817 | 0.9568 | | | | | |
| 359210725 - N | CHVX896817 | 0.9568 | | | | | |
| 359210726 - N | CHVX896817 | 0.9568 | | | | | |
| 359210727 - N | CHVX896817 | 0.9568 | | | | | |
| 359210728 - N | CHVX896817 | 0.9568 | | | | | |
| 359210729 - N | CHVX896817 | 0.9568 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210730 | 359210730 - N | 3592.196 | 3592.211 | | | |
| 2 | 359210731 | 359210731 - N | 3592.196 | 3592.211 | | | |
| 3 | 359210732 | 359210732 - N | 3592.196 | 3592.211 | | | |
| 4 | 359210733 | 359210733 - N | 3592.196 | 3592.211 | | | |
| 5 | 359210734 | 359210734 - N | 3592.196 | 3592.211 | | | |
| 6 | 359210735 | 359210735 - N | 3592.196 | 3592.211 | | | |
| 7 | 359210736 | 359210736 - N | 3592.206 | 3592.203 | | | |
| 8 | 359210737 | 359210737 - N | 3592.206 | 3592.203 | | | |
| 9 | 359210738 | 359210738 - N | 3592.206 | 3592.203 | | | |
| 10 | 359210739 | 359210739 - N | 3592.206 | 3592.203 | | | |
| 11 | 359210740 | 359210740 - N | 3592.206 | 3592.203 | 1.68 | 4.28 | |
| 12 | 359210741 | 359210741 - N | 3592.206 | 3592.203 | | | |
| 13 | 359210742 | 359210742 - N | 3592.206 | 3592.203 | | | |
| 14 | 359210743 | 359210743 - N | 3592.200 | 3592.237 | | | |
| 15 | 359210744 | 359210744 - N | 3592.200 | 3592.237 | | | |
| 16 | 359210745 | 359210745 - N | 3592.200 | 3592.237 | | | |
| 17 | 359210746 | 359210746 - N | 3592.200 | 3592.237 | | | |
| 18 | 359210747 | 359210747 - N | 3592.200 | 3592.237 | | | |
| 19 | 359210748 | 359210748 - N | 3592.200 | 3592.237 | | | |
| 20 | 359210749 | 359210749 - N | 3592.200 | 3592.237 | | | |
| 21 | 359210750 | 359210750 - N | 3592.216 | 3592.190 | | | |
| 22 | 359210751 | 359210751 - N | 3592.216 | 3592.190 | | | |
| 23 | 359210752 | 359210752 - N | 3592.216 | 3592.190 | | | |
| 24 | 359210753 | 359210753 - N | 3592.216 | 3592.190 | | | |
| 25 | 359210754 | 359210754 - N | 3592.216 | 3592.190 | | | |
| 26 | 359210755 | 359210755 - N | 3592.216 | 3592.190 | | | |
| 27 | 359210756 | 359210756 - N | 3592.216 | 3592.190 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210730 - N | CHVX896817 | 0.9568 | | | | | |
| 359210731 - N | CHVX896817 | 0.9568 | | | | | |
| 359210732 - N | CHVX896817 | 0.9568 | | | | | |
| 359210733 - N | CHVX896817 | 0.9568 | | | | | |
| 359210734 - N | CHVX896817 | 0.9568 | | | | | |
| 359210735 - N | CHVX896817 | 0.9568 | | | | | |
| 359210736 - N | CHVX896817 | 0.9568 | | | | | |
| 359210737 - N | CHVX896817 | 0.9568 | | | | | |
| 359210738 - N | CHVX896817 | 0.9568 | | | | | |
| 359210739 - N | CHVX896817 | 0.9568 | | | | | |
| 359210740 - N | CHVX896817 | 0.9561 | 0.477 | 366 | 2.27 | 135 | |
| 359210741 - N | CHVX896817 | 0.9561 | | | | | |
| 359210742 - N | CHVX896817 | 0.9561 | | | | | |
| 359210743 - N | CHVX896817 | 0.9561 | | | | | |
| 359210744 - N | CHVX896817 | 0.9561 | | | | | |
| 359210745 - N | CHVX896817 | 0.9561 | | | | | |
| 359210746 - N | CHVX896817 | 0.9561 | | | | | |
| 359210747 - N | CHVX896817 | 0.9561 | | | | | |
| 359210748 - N | CHVX896817 | 0.9561 | | | | | |
| 359210749 - N | CHVX896817 | 0.9561 | | | | | |
| 359210750 - N | CHVX896817 | 0.9561 | | | | | |
| 359210751 - N | CHVX896817 | 0.9561 | | | | | |
| 359210752 - N | CHVX896817 | 0.9561 | | | | | |
| 359210753 - N | CHVX896817 | 0.9561 | | | | | |
| 359210754 - N | CHVX896817 | 0.9561 | | | | | |
| 359210755 - N | CHVX896817 | 0.9561 | | | | | |
| 359210756 - N | CHVX896817 | 0.9561 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210757 | 359210757 - N | 3592.202 | 3592.233 | | | |
| 2 | 359210758 | 359210758 - N | 3592.202 | 3592.233 | | | |
| 3 | 359210759 | 359210759 - N | 3592.202 | 3592.233 | | | |
| 4 | 359210760 | 359210760 - N | 3592.202 | 3592.233 | 1.50 | 3.90 | |
| 5 | 359210761 | 359210761 - N | 3592.202 | 3592.233 | | | |
| 6 | 359210762 | 359210762 - N | 3592.202 | 3592.233 | | | |
| 7 | 359210763 | 359210763 - N | 3592.202 | 3592.233 | | | |
| 8 | 359210764 | 359210764 - N | 3592.240 | 3592.228 | | | |
| 9 | 359210765 | 359210765 - N | 3592.240 | 3592.228 | | | |
| 10 | 359210766 | 359210766 - N | 3592.240 | 3592.228 | | | |
| 11 | 359210767 | 359210767 - N | 3592.240 | 3592.228 | | | |
| 12 | 359210768 | 359210768 - N | 3592.240 | 3592.228 | | | |
| 13 | 359210769 | 359210769 - N | 3592.240 | 3592.228 | | | |
| 14 | 359210770 | 359210770 - N | 3592.240 | 3592.228 | | | |
| 15 | 359210771 | 359210771 - N | 3592.225 | 3592.241 | | | |
| 16 | 359210772 | 359210772 - N | 3592.225 | 3592.241 | | | |
| 17 | 359210773 | 359210773 - N | 3592.225 | 3592.241 | | | |
| 18 | 359210774 | 359210774 - N | 3592.225 | 3592.241 | | | |
| 19 | 359210775 | 359210775 - N | 3592.225 | 3592.241 | | | |
| 20 | 359210776 | 359210776 - N | 3592.225 | 3592.241 | | | |
| 21 | 359210777 | 359210777 - N | 3592.225 | 3592.241 | | | |
| 22 | 359210778 | 359210778 - N | 3592.236 | 3592.222 | | | |
| 23 | 359210779 | 359210779 - N | 3592.236 | 3592.222 | | | |
| 24 | 359210780 | 359210780 - N | 3592.236 | 3592.222 | 1.65 | 4.37 | |
| 25 | 359210781 | 359210781 - N | 3592.236 | 3592.222 | | | |
| 26 | 359210782 | 359210782 - N | 3592.236 | 3592.222 | | | |
| 27 | 359210783 | 359210783 - N | 3592.236 | 3592.222 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210757 - N | CHVX896817 | 0.9561 | | | | | |
| 359210758 - N | CHVX896817 | 0.9561 | | | | | |
| 359210759 - N | CHVX896817 | 0.9561 | | | | | |
| 359210760 - N | CHVX896817 | 0.9566 | 0.453 | 359 | 2.66 | 127 | |
| 359210761 - N | CHVX896817 | 0.9566 | | | | | |
| 359210762 - N | CHVX896817 | 0.9566 | | | | | |
| 359210763 - N | CHVX896817 | 0.9566 | | | | | |
| 359210764 - N | CHVX896817 | 0.9566 | | | | | |
| 359210765 - N | CHVX896817 | 0.9566 | | | | | |
| 359210766 - N | CHVX896817 | 0.9566 | | | | | |
| 359210767 - N | CHVX896817 | 0.9566 | | | | | |
| 359210768 - N | CHVX896817 | 0.9566 | | | | | |
| 359210769 - N | CHVX896817 | 0.9566 | | | | | |
| 359210770 - N | CHVX896817 | 0.9566 | | | | | |
| 359210771 - N | CHVX896817 | 0.9566 | | | | | |
| 359210772 - N | CHVX896817 | 0.9566 | | | | | |
| 359210773 - N | CHVX896817 | 0.9566 | | | | | |
| 359210774 - N | CHVX896817 | 0.9566 | | | | | |
| 359210775 - N | CHVX896817 | 0.9566 | | | | | |
| 359210776 - N | CHVX896817 | 0.9566 | | | | | |
| 359210777 - N | CHVX896817 | 0.9566 | | | | | |
| 359210778 - N | CHVX896817 | 0.9566 | | | | | |
| 359210779 - N | CHVX896817 | 0.9566 | | | | | |
| 359210780 - N | CHVX896817 | 0.9559 | 0.471 | 364 | 2.39 | 133 | |
| 359210781 - N | CHVX896817 | 0.9559 | | | | | |
| 359210782 - N | CHVX896817 | 0.9559 | | | | | |
| 359210783 - N | CHVX896817 | 0.9559 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210784 | 359210784 - N | 3592.236 | 3592.222 | | | |
| 2 | 359210785 | 359210785 - N | 3592.227 | 3592.231 | | | |
| 3 | 359210786 | 359210786 - N | 3592.227 | 3592.231 | | | |
| 4 | 359210787 | 359210787 - N | 3592.227 | 3592.231 | | | |
| 5 | 359210788 | 359210788 - N | 3592.227 | 3592.231 | | | |
| 6 | 359210789 | 359210789 - N | 3592.227 | 3592.231 | | | |
| 7 | 359210790 | 359210790 - N | 3592.227 | 3592.231 | | | |
| 8 | 359210791 | 359210791 - N | 3592.227 | 3592.231 | | | |
| 9 | 359210792 | 359210792 - N | 3592.242 | 3592.218 | | | |
| 10 | 359210793 | 359210793 - N | 3592.242 | 3592.218 | | | |
| 11 | 359210794 | 359210794 - N | 3592.242 | 3592.218 | | | |
| 12 | 359210795 | 359210795 - N | 3592.242 | 3592.218 | | | |
| 13 | 359210796 | 359210796 - N | 3592.242 | 3592.218 | | | |
| 14 | 359210797 | 359210797 - N | 3592.242 | 3592.218 | | | |
| 15 | 359210798 | 359210798 - N | 3592.242 | 3592.218 | | | |
| 16 | 359210799 | 359210799 - N | 3592.221 | 3592.235 | | | |
| 17 | 359210800 | 359210800 - N | 3592.221 | 3592.235 | 1.23 | 3.85 | |
| 18 | 359210801 | 359210801 - N | 3592.221 | 3592.235 | | | |
| 19 | 359210802 | 359210802 - N | 3592.221 | 3592.235 | | | |
| 20 | 359210803 | 359210803 - N | 3592.221 | 3592.235 | | | |
| 21 | 359210804 | 359210804 - N | 3592.221 | 3592.235 | | | |
| 22 | 359210805 | 359210805 - N | 3592.221 | 3592.235 | | | |
| 23 | 359210806 | 359210806 - N | 3592.238 | 3592.226 | | | |
| 24 | 359210807 | 359210807 - N | 3592.238 | 3592.226 | | | |
| 25 | 359210808 | 359210808 - N | 3592.238 | 3592.226 | | | |
| 26 | 359210809 | 359210809 - N | 3592.238 | 3592.226 | | | |
| 27 | 359210810 | 359210810 - N | 3592.238 | 3592.226 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210784 - N | CHVX896817 | 0.9559 | | | | | |
| 359210785 - N | CHVX896817 | 0.9559 | | | | | |
| 359210786 - N | CHVX896817 | 0.9559 | | | | | |
| 359210787 - N | CHVX896817 | 0.9559 | | | | | |
| 359210788 - N | CHVX896817 | 0.9559 | | | | | |
| 359210789 - N | CHVX896817 | 0.9559 | | | | | |
| 359210790 - N | CHVX896817 | 0.9559 | | | | | |
| 359210791 - N | CHVX896817 | 0.9559 | | | | | |
| 359210792 - N | CHVX896817 | 0.9559 | | | | | |
| 359210793 - N | CHVX896817 | 0.9559 | | | | | |
| 359210794 - N | CHVX896817 | 0.9559 | | | | | |
| 359210795 - N | CHVX896817 | 0.9559 | | | | | |
| 359210796 - N | CHVX896817 | 0.9559 | | | | | |
| 359210797 - N | CHVX896817 | 0.9559 | | | | | |
| 359210798 - N | CHVX896817 | 0.9559 | | | | | |
| 359210799 - N | CHVX896817 | 0.9559 | | | | | |
| 359210800 - N | CHVX896817 | 0.9569 | 0.461 | 361 | 2.75 | 125 | |
| 359210801 - N | CHVX896817 | 0.9569 | | | | | |
| 359210802 - N | CHVX896817 | 0.9569 | | | | | |
| 359210803 - N | CHVX896817 | 0.9569 | | | | | |
| 359210804 - N | CHVX896817 | 0.9569 | | | | | |
| 359210805 - N | CHVX896817 | 0.9569 | | | | | |
| 359210806 - N | CHVX896817 | 0.9569 | | | | | |
| 359210807 - N | CHVX896817 | 0.9569 | | | | | |
| 359210808 - N | CHVX896817 | 0.9569 | | | | | |
| 359210809 - N | CHVX896817 | 0.9569 | | | | | |
| 359210810 - N | CHVX896817 | 0.9569 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210811 | 359210811 - N | 3592.238 | 3592.226 | | | |
| 2 | 359210812 | 359210812 - N | 3592.238 | 3592.226 | | | |
| 3 | 359210813 | 359210813 - N | 3592.229 | 3592.239 | | | |
| 4 | 359210814 | 359210814 - N | 3592.229 | 3592.239 | | | |
| 5 | 359210815 | 359210815 - N | 3592.229 | 3592.239 | | | |
| 6 | 359210816 | 359210816 - N | 3592.229 | 3592.239 | | | |
| 7 | 359210817 | 359210817 - N | 3592.229 | 3592.239 | | | |
| 8 | 359210818 | 359210818 - N | 3592.229 | 3592.239 | | | |
| 9 | 359210819 | 359210819 - N | 3592.229 | 3592.239 | | | |
| 10 | 359210820 | 359210820 - N | 3592.234 | 3592.220 | 1.78 | 4.33 | |
| 11 | 359210821 | 359210821 - N | 3592.234 | 3592.220 | | | |
| 12 | 359210822 | 359210822 - N | 3592.234 | 3592.220 | | | |
| 13 | 359210823 | 359210823 - N | 3592.234 | 3592.220 | | | |
| 14 | 359210824 | 359210824 - N | 3592.234 | 3592.220 | | | |
| 15 | 359210825 | 359210825 - N | 3592.234 | 3592.220 | | | |
| 16 | 359210826 | 359210826 - N | 3592.234 | 3592.220 | | | |
| 17 | 359210827 | 359210827 - N | 3592.219 | 3592.243 | | | |
| 18 | 359210828 | 359210828 - N | 3592.219 | 3592.243 | | | |
| 19 | 359210829 | 359210829 - N | 3592.219 | 3592.243 | | | |
| 20 | 359210830 | 359210830 - N | 3592.219 | 3592.243 | | | |
| 21 | 359210831 | 359210831 - N | 3592.219 | 3592.243 | | | |
| 22 | 359210832 | 359210832 - N | 3592.219 | 3592.243 | | | |
| 23 | 359210833 | 359210833 - N | 3592.219 | 3592.243 | | | |
| 24 | 359210834 | 359210834 - N | 3592.232 | 3592.224 | | | |
| 25 | 359210835 | 359210835 - N | 3592.232 | 3592.224 | | | |
| 26 | 359210836 | 359210836 - N | 3592.232 | 3592.224 | | | |
| 27 | 359210837 | 359210837 - N | 3592.232 | 3592.224 | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210811 - N | CHVX896817 | 0.9569 | | | | | |
| 359210812 - N | CHVX896817 | 0.9569 | | | | | |
| 359210813 - N | CHVX896817 | 0.9569 | | | | | |
| 359210814 - N | CHVX896817 | 0.9569 | | | | | |
| 359210815 - N | CHVX896817 | 0.9569 | | | | | |
| 359210816 - N | CHVX896817 | 0.9569 | | | | | |
| 359210817 - N | CHVX896817 | 0.9569 | | | | | |
| 359210818 - N | CHVX896817 | 0.9569 | | | | | |
| 359210819 - N | CHVX896817 | 0.9569 | | | | | |
| 359210820 - N | CHVX896817 | 0.9562 | 0.468 | 367 | 2.28 | 136 | |
| 359210821 - N | CHVX896817 | 0.9562 | | | | | |
| 359210822 - N | CHVX896817 | 0.9562 | | | | | |
| 359210823 - N | CHVX896817 | 0.9562 | | | | | |
| 359210824 - N | CHVX896817 | 0.9562 | | | | | |
| 359210825 - N | CHVX896817 | 0.9562 | | | | | |
| 359210826 - N | CHVX896817 | 0.9562 | | | | | |
| 359210827 - N | CHVX896817 | 0.9562 | | | | | |
| 359210828 - N | CHVX896817 | 0.9562 | | | | | |
| 359210829 - N | CHVX896817 | 0.9562 | | | | | |
| 359210830 - N | CHVX896817 | 0.9562 | | | | | |
| 359210831 - N | CHVX896817 | 0.9562 | | | | | |
| 359210832 - N | CHVX896817 | 0.9562 | | | | | |
| 359210833 - N | CHVX896817 | 0.9562 | | | | | |
| 359210834 - N | CHVX896817 | 0.9562 | | | | | |
| 359210835 - N | CHVX896817 | 0.9562 | | | | | |
| 359210836 - N | CHVX896817 | 0.9562 | | | | | |
| 359210837 - N | CHVX896817 | 0.9562 | | | | | |

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571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210838 | 359210838 - N | 3592.232 | 3592.224 | | | |
| 2 | 359210839 | 359210839 - N | 3592.232 | 3592.224 | | | |
| 3 | 359210840 | 359210840 - N | 3592.232 | 3592.224 | 1.26 | 3.82 | |
| 4 | 359210841 | 359210841 - N | 3592.223 | 3592.249 | | | |
| 5 | 359210842 | 359210842 - N | 3592.223 | 3592.249 | | | |
| 6 | 359210843 | 359210843 - N | 3592.223 | 3592.249 | | | |
| 7 | 359210844 | 359210844 - N | 3592.223 | 3592.249 | | | |
| 8 | 359210845 | 359210845 - N | 3592.223 | 3592.249 | | | |
| 9 | 359210846 | 359210846 - N | 3592.223 | 3592.249 | | | |
| 10 | 359210847 | 359210847 - N | 3592.223 | 3592.249 | | | |
| 11 | 359210848 | 359210848 - N | 3592.230 | 3592.245 | | | |
| 12 | 359210849 | 359210849 - N | 3592.230 | 3592.245 | | | |
| 13 | 359210850 | 359210850 - N | 3592.230 | 3592.245 | | | |
| 14 | 359210851 | 359210851 - N | 3592.230 | 3592.245 | | | |
| 15 | 359210852 | 359210852 - N | 3592.230 | 3592.245 | | | |
| 16 | 359210853 | 359210853 - N | 3592.230 | 3592.245 | | | |
| 17 | 359210854 | 359210854 - N | 3592.230 | 3592.245 | | | |
| 18 | 359210855 | 359210855 - N | 3592.217 | 3592.255 | | | |
| 19 | 359210856 | 359210856 - N | 3592.217 | 3592.255 | | | |
| 20 | 359210857 | 359210857 - N | 3592.217 | 3592.255 | | | |
| 21 | 359210858 | 359210858 - N | 3592.217 | 3592.255 | | | |
| 22 | 359210859 | 359210859 - N | 3592.217 | 3592.255 | | | |
| 23 | 359210860 | 359210860 - N | 3592.217 | 3592.255 | 1.71 | 4.27 | |
| 24 | 359210861 | 359210861 - N | 3592.217 | 3592.255 | | | |
| 25 | 359210862 | 359210862 - N | 3592.252 | 3592.247 | | | |
| 26 | 359210863 | 359210863 - N | 3592.252 | 3592.247 | | | |
| 27 | 359210864 | 359210864 - N | 3592.252 | 3592.247 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210838 - N | CHVX896817 | 0.9562 | | | | | |
| 359210839 - N | CHVX896817 | 0.9562 | | | | | |
| 359210840 - N | CHVX896817 | 0.9567 | 0.459 | 363 | 2.59 | 130 | |
| 359210841 - N | CHVX896817 | 0.9567 | | | | | |
| 359210842 - N | CHVX896817 | 0.9567 | | | | | |
| 359210843 - N | CHVX896817 | 0.9567 | | | | | |
| 359210844 - N | CHVX896817 | 0.9567 | | | | | |
| 359210845 - N | CHVX896817 | 0.9567 | | | | | |
| 359210846 - N | CHVX896817 | 0.9567 | | | | | |
| 359210847 - N | CHVX896817 | 0.9567 | | | | | |
| 359210848 - N | CHVX896817 | 0.9567 | | | | | |
| 359210849 - N | CHVX896817 | 0.9567 | | | | | |
| 359210850 - N | CHVX896817 | 0.9567 | | | | | |
| 359210851 - N | CHVX896817 | 0.9567 | | | | | |
| 359210852 - N | CHVX896817 | 0.9567 | | | | | |
| 359210853 - N | CHVX896817 | 0.9567 | | | | | |
| 359210854 - N | CHVX896817 | 0.9567 | | | | | |
| 359210855 - N | CHVX896817 | 0.9567 | | | | | |
| 359210856 - N | CHVX896817 | 0.9567 | | | | | |
| 359210857 - N | CHVX896817 | 0.9567 | | | | | |
| 359210858 - N | CHVX896817 | 0.9567 | | | | | |
| 359210859 - N | CHVX896817 | 0.9567 | | | | | |
| 359210860 - N | CHVX896817 | 0.9564 | 0.476 | 370 | 2.34 | 134 | |
| 359210861 - N | CHVX896817 | 0.9564 | | | | | |
| 359210862 - N | CHVX896817 | 0.9564 | | | | | |
| 359210863 - N | CHVX896817 | 0.9564 | | | | | |
| 359210864 - N | CHVX896817 | 0.9564 | | | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

**SKAPS Industries**

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delivered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 359210865 | 359210865 - N | 3592.252 | 3592.247 | | | |
| 2 | 359210866 | 359210866 - N | 3592.252 | 3592.247 | | | |
| 3 | 359210867 | 359210867 - N | 3592.252 | 3592.247 | | | |
| 4 | 359210868 | 359210868 - N | 3592.252 | 3592.247 | | | |
| 5 | 359210869 | 359210869 - N | 3592.248 | 3592.251 | | | |
| 6 | 359210870 | 359210870 - N | 3592.248 | 3592.251 | | | |
| 7 | 359210871 | 359210871 - N | 3592.248 | 3592.251 | | | |
| 8 | 359210872 | 359210872 - N | 3592.248 | 3592.251 | | | |
| 9 | 359210873 | 359210873 - N | 3592.248 | 3592.251 | | | |
| 10 | 359210874 | 359210874 - N | 3592.248 | 3592.251 | | | |
| 11 | 359210875 | 359210875 - N | 3592.248 | 3592.251 | | | |
| 12 | 359210876 | 359210876 - N | 3592.254 | 3592.244 | | | |
| 13 | 359210877 | 359210877 - N | 3592.254 | 3592.244 | | | |
| 14 | 359210878 | 359210878 - N | 3592.254 | 3592.244 | | | |
| 15 | 359210879 | 359210879 - N | 3592.254 | 3592.244 | | | |
| 16 | 359210880 | 359210880 - N | 3592.254 | 3592.244 | 1.32 | 3.98 | |
| 17 | 359210881 | 359210881 - N | 3592.254 | 3592.244 | | | |
| 18 | 359210882 | 359210882 - N | 3592.254 | 3592.244 | | | |
| 19 | 359210883 | 359210883 - N | 3592.250 | 3592.253 | | | |
| 20 | 359210884 | 359210884 - N | 3592.250 | 3592.253 | | | |
| 21 | 359210885 | 359210885 - N | 3592.250 | 3592.253 | | | |
| 22 | 359210886 | 359210886 - N | 3592.250 | 3592.253 | | | |
| 23 | 359210887 | 359210887 - N | 3592.250 | 3592.253 | | | |
| 24 | 359210888 | 359210888 - N | 3592.250 | 3592.253 | | | |
| 25 | 359210889 | 359210889 - N | 3592.250 | 3592.253 | | | |
| 26 | 359210890 | 359210890 - N | 3592.256 | 3592.246 | | | |
| 27 | 359210891 | 359210891 - N | 3592.256 | 3592.246 | | | |

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN330-2-8**
**Project :** **Duke Energy Marshall Steam Station, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 359210865 - N | CHVX896817 | 0.9564 | | | | | |
| 359210866 - N | CHVX896817 | 0.9564 | | | | | |
| 359210867 - N | CHVX896817 | 0.9564 | | | | | |
| 359210868 - N | CHVX896817 | 0.9564 | | | | | |
| 359210869 - N | CHVX896817 | 0.9564 | | | | | |
| 359210870 - N | CHVX896817 | 0.9564 | | | | | |
| 359210871 - N | CHVX896817 | 0.9564 | | | | | |
| 359210872 - N | CHVX896817 | 0.9564 | | | | | |
| 359210873 - N | CHVX896817 | 0.9564 | | | | | |
| 359210874 - N | CHVX896817 | 0.9564 | | | | | |
| 359210875 - N | CHVX896817 | 0.9564 | | | | | |
| 359210876 - N | CHVX896817 | 0.9564 | | | | | |
| 359210877 - N | CHVX896817 | 0.9564 | | | | | |
| 359210878 - N | CHVX896817 | 0.9564 | | | | | |
| 359210879 - N | CHVX896817 | 0.9564 | | | | | |
| 359210880 - N | CHVX896817 | 0.9570 | 0.462 | 360 | 2.69 | 128 | |
| 359210881 - N | CHVX896817 | 0.9570 | | | | | |
| 359210882 - N | CHVX896817 | 0.9570 | | | | | |
| 359210883 - N | CHVX896817 | 0.9570 | | | | | |
| 359210884 - N | CHVX896817 | 0.9570 | | | | | |
| 359210885 - N | CHVX896817 | 0.9570 | | | | | |
| 359210886 - N | CHVX896817 | 0.9570 | | | | | |
| 359210887 - N | CHVX896817 | 0.9570 | | | | | |
| 359210888 - N | CHVX896817 | 0.9570 | | | | | |
| 359210889 - N | CHVX896817 | 0.9570 | | | | | |
| 359210890 - N | CHVX896817 | 0.9570 | | | | | |
| 359210891 - N | CHVX896817 | 0.9570 | | | | | |

APPROVED 5 QA

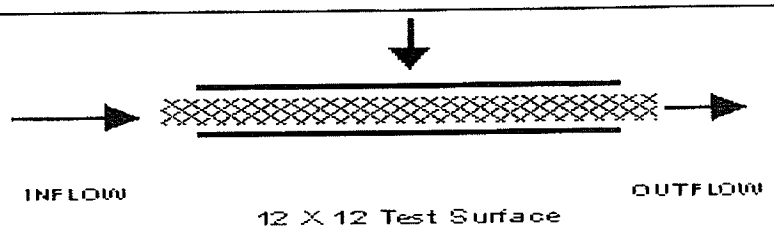
571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

# ASTM D 4716

| | | | |
|---|---|---|---|
| **Client:** | Environmental Specialties International | **Job #** | 3592 |
| **Project:** | Duke Energy Marshall Steam Station, NC | | |
| **Product:** | TN330-2-8 | | |

**Test Configuration:**




**Test Information:**

| | | | |
|---|---|---|---|
| **Boundary Conditions:** | Ottawa Sand<br>Geocomposite<br>Liner | **Normal Load:** | 7200 psf |
| | | **Gradient:** | 0.03 ft |
| | | **Seating Time:** | 100 hours |
| | | **Flow Direction:** | MD |

**Test Results:**

| Roll No. | Pressure (psf) | Gradient, ft | Transmissivity, $m^2$/sec 100 hours |
|---|---|---|---|
| 359210001 | 7200 | 0.03 | $3.02 \times 10^{-3}$ |
| 359210480 | | | $3.15 \times 10^{-3}$ |

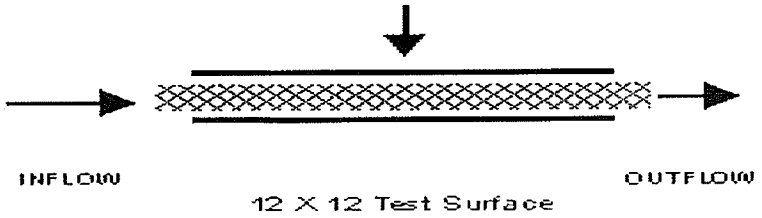
571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

# ASTM D 4716

| | | | |
|---|---|---|---|
| **Client:** | Environmental Specialties International | **Job #** | 3592 |
| **Project:** | Duke Energy Marshall Steam Station, NC | | |
| **Product:** | TN330-2-8 | | |

**Test Configuration:**




**Test Information:**

| | | | |
|---|---|---|---|
| **Boundary Conditions:** | Liner<br>Geocomposite<br>Liner | **Normal Load:** | 7200 psf |
| | | **Gradient:** | 0.03 ft |
| | | **Seating Time:** | 100 hours |
| | | **Flow Direction:** | MD |

**Test Results:**

| Roll No. | Pressure (psf) | Gradient, ft | Transmissivity, $m^2$/sec 100 hours |
|---|---|---|---|
| 359210240 | 7200 | 0.03 | $3.81 \times 10^{-3}$ |
| 359210720 | | | $3.92 \times 10^{-3}$ |

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

# POLYETHYLENE RESIN CERTIFICATION

**Customer Name :** Environmental Specialties International
**Project Name :** Duke Energy Marshall Steam Station, NC
**Geocomposite Manufacturer :** SKAPS Industries
**Geocomposite Production Plant :** Commerce, GA
**Geocomposite Brand Name :** TN330-2-8

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

| Resin Supplier | Resin Production Plant | Resin Brand Name | Resin Lot Number | Property | Test Method | Units | Resin Supplier Value | Tested Value* |
|---|---|---|---|---|---|---|---|---|
| Trademark Plastics Corporation | Chevron, TX | HDPE | CHVX898541 | Density | ASTM D 1505 | gm/cc | 0.949 | 0.949 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.09 | 0.10 |
| | | | NAHX610274 | Density | ASTM D 1505 | gm/cc | 0.948 | 0.949 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.105 | 0.11 |
| Marco Polo International | | | EQUX632233 | Density | ASTM D 1505 | gm/cc | 0.950 | 0.950 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.35 | 0.36 |
| | | | GPLX1010 | Density | ASTM D 1505 | gm/cc | 0.950 | 0.950 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.30 | 0.32 |
| Osterman and Company | | | CHVX896817 | Density | ASTM D 1505 | gm/cc | 0.9528 | 0.9510 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.231 | 0.240 |

(a) Condition 190/2.16
* Data from SKAPS Quality Control

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN330-2-8**
**Project : Duke Energy Marshall Steam Station, NC**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

| GEOCOMP ROLL# | FABRIC ROLL# | WEIGHT oz/sq yd | MD TENSILE lbs. | MD ELONG % | XMD TENSILE lbs. | XMD ELONG % | PUNCTURE lbs. | AOS us sieve | PERM-ABL cm/sec |
|---|---|---|---|---|---|---|---|---|---|
| 359210001 | 3592.008 | 8.41 | 232 | 74 | 244 | 81 | 132 | 80 | 0.41 |
| | 3592.016 | 8.60 | 234 | 72 | 240 | 85 | 136 | 80 | 0.41 |
| 359210040 | 3592.025 | 8.47 | 231 | 70 | 242 | 83 | 130 | 80 | 0.41 |
| | 3592.003 | 8.16 | 228 | 68 | 232 | 79 | 132 | 80 | 0.41 |
| 359210080 | 3592.027 | 8.47 | 231 | 70 | 242 | 83 | 130 | 80 | 0.41 |
| | 3592.013 | 8.33 | 230 | 66 | 236 | 75 | 136 | 80 | 0.41 |
| 359210120 | 3592.048 | 8.43 | 235 | 71 | 243 | 84 | 134 | 80 | 0.41 |
| | 3592.029 | 8.47 | 231 | 70 | 242 | 83 | 130 | 80 | 0.41 |
| 359210160 | 3592.030 | 8.31 | 229 | 67 | 234 | 76 | 138 | 80 | 0.41 |
| | 3592.049 | 8.43 | 235 | 71 | 243 | 84 | 134 | 80 | 0.41 |
| 359210200 | 3592.058 | 8.56 | 230 | 75 | 241 | 82 | 140 | 80 | 0.44 |
| | 3592.081 | 8.20 | 230 | 65 | 234 | 76 | 133 | 80 | 0.44 |
| 359210240 | 3592.062 | 8.12 | 226 | 68 | 235 | 77 | 131 | 80 | 0.44 |
| | 3592.079 | 8.50 | 232 | 74 | 245 | 81 | 137 | 80 | 0.44 |
| 359210280 | 3592.106 | 8.49 | 233 | 75 | 240 | 82 | 135 | 80 | 0.40 |
| | 3592.055 | 8.56 | 230 | 75 | 241 | 82 | 140 | 80 | 0.44 |

571 Industrial Parkway, Commerce, GA 30529 Phone: 706-336-7000 Fax: 706-336-7007 Email: skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN330-2-8**
**Project : Duke Energy Marshall Steam Station, NC**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

| GEOCOMP ROLL# | FABRIC ROLL# | WEIGHT oz/sq yd | MD TENSILE lbs. | MD ELONG % | XMD TENSILE lbs. | XMD ELONG % | PUNCTURE lbs. | AOS us sieve | PERM-ABL cm/sec |
|---|---|---|---|---|---|---|---|---|---|
| 359210320 | 3592.100 | 8.14 | 227 | 69 | 232 | 76 | 135 | 80 | 0.40 |
| | 3592.089 | 8.39 | 235 | 71 | 242 | 83 | 133 | 80 | 0.44 |
| 359210360 | 3592.096 | 8.46 | 231 | 73 | 238 | 80 | 139 | 80 | 0.44 |
| | 3592.093 | 8.31 | 225 | 67 | 230 | 78 | 139 | 80 | 0.44 |
| 359210400 | 3592.128 | 8.53 | 234 | 74 | 243 | 81 | 130 | 80 | 0.40 |
| | 3592.111 | 8.17 | 229 | 66 | 236 | 75 | 138 | 80 | 0.40 |
| 359210440 | 3592.120 | 8.30 | 226 | 68 | 231 | 77 | 130 | 80 | 0.40 |
| | 3592.129 | 8.53 | 234 | 74 | 243 | 81 | 130 | 80 | 0.40 |
| 359210480 | 3592.122 | 8.30 | 226 | 68 | 231 | 77 | 130 | 80 | 0.40 |
| | 3592.153 | 8.13 | 227 | 69 | 237 | 78 | 140 | 80 | 0.42 |
| 359210520 | 3592.142 | 8.22 | 225 | 67 | 235 | 75 | 132 | 80 | 0.40 |
| | 3592.159 | 8.54 | 231 | 71 | 245 | 84 | 140 | 80 | 0.42 |
| 359210560 | 3592.150 | 8.13 | 227 | 69 | 237 | 78 | 140 | 80 | 0.42 |
| | 3592.143 | 8.22 | 225 | 67 | 235 | 75 | 132 | 80 | 0.40 |
| 359210600 | 3592.186 | 8.55 | 234 | 74 | 242 | 85 | 131 | 80 | 0.42 |
| | 3592.168 | 8.59 | 235 | 73 | 240 | 80 | 134 | 80 | 0.42 |

571 Industrial Parkway, Commerce, GA 30529 Phone: 706-336-7000 Fax: 706-336-7007 Email: skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN330-2-8**
**Project : Duke Energy Marshall Steam Station, NC**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

| GEOCOMP ROLL# | FABRIC ROLL# | WEIGHT oz/sq yd | MD TENSILE lbs. | MD ELONG % | XMD TENSILE lbs. | XMD ELONG % | PUNCTURE lbs. | AOS us sieve | PERM-ABL cm/sec |
|---|---|---|---|---|---|---|---|---|---|
| 359210640 | 3592.188 | 8.55 | 234 | 74 | 242 | 85 | 131 | 80 | 0.42 |
| | 3592.170 | 8.15 | 226 | 68 | 234 | 75 | 138 | 80 | 0.42 |
| 359210680 | 3592.210 | 8.21 | 227 | 66 | 231 | 78 | 139 | 80 | 0.44 |
| | 3592.197 | 8.48 | 231 | 72 | 238 | 81 | 137 | 80 | 0.42 |
| 359210720 | 3592.192 | 8.19 | 228 | 67 | 230 | 79 | 137 | 80 | 0.42 |
| | 3592.207 | 8.57 | 233 | 75 | 241 | 83 | 133 | 80 | 0.44 |
| 359210760 | 3592.202 | 8.32 | 225 | 69 | 233 | 76 | 133 | 80 | 0.44 |
| | 3592.233 | 8.23 | 226 | 65 | 237 | 77 | 138 | 80 | 0.44 |
| 359210800 | 3592.221 | 8.26 | 229 | 68 | 235 | 75 | 135 | 80 | 0.44 |
| | 3592.235 | 8.60 | 230 | 74 | 245 | 82 | 138 | 80 | 0.44 |
| 359210840 | 3592.232 | 8.23 | 226 | 65 | 237 | 77 | 138 | 80 | 0.44 |
| | 3592.224 | 8.26 | 229 | 68 | 235 | 75 | 135 | 80 | 0.44 |
| 359210880 | 3592.254 | 8.27 | 225 | 69 | 232 | 76 | 136 | 80 | 0.41 |
| | 3592.244 | 8.11 | 228 | 67 | 230 | 79 | 130 | 80 | 0.44 |

571 Industrial Parkway, Commerce, GA 30529 Phone: 706-336-7000 Fax: 706-336-7007 Email: skaps@skaps.com

SKAPS Industries

# ASTM D 1621

**Client:** Environmental Specialties International
**Project:** Duke Energy Marshall Steam Station, NC
**Product:** TN330-2-8

**Job #** 3592

| Sr. No. | Geonet Roll Number | Compressive Strength , psf |
|---|---|---|
| 1 | 359210001 - N | 55,320 |
| 2 | 359210045 - N | 55,367 |
| 3 | 359210090 - N | 54,684 |
| 4 | 359210135 - N | 55,490 |
| 5 | 359210180 - N | 54,819 |
| 6 | 359210225 - N | 54,899 |
| 7 | 359210270 - N | 54,646 |
| 8 | 359210315 - N | 55,424 |
| 9 | 359210360 - N | 54,690 |
| 10 | 359210405 - N | 55,232 |
| 11 | 359210450 - N | 54,636 |
| 12 | 359210495 - N | 55,412 |
| 13 | 359210540 - N | 55,178 |
| 14 | 359210585 - N | 55,195 |
| 15 | 359210630 - N | 55,097 |
| 16 | 359210675 - N | 55,382 |
| 17 | 359210720 - N | 55,075 |
| 18 | 359210765 - N | 55,120 |
| 19 | 359210810 - N | 55,035 |
| 20 | 359210855 - N | 54,861 |

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

# 330-mil LPS and PCS Geocomposite Performance Test Results

| CELL 1 GEOCOMPOSITE CONFORMANCE TESTING SUMMARY TABLE | | | | | | | |
|---|---|---|---|---|---|---|---|
| GEOTECHNICS PROJECT NUMBER | GEOTECHNICS ID NUMBER | MANUFACTURER ROLL NUMBER | THICKNESS (ASTM D5199) inches | DENSITY (ASTM D1505) g/cc | PLY ADHESION (ASTM D7005) MD-lb/in SIDE "A"/SIDE "B" | TRANSMISSIVITY SETUP | TRANSMISSIVITY (ASTM D4716) $M^2$/SEC |
| L10017-04 | L10017-04-01 | 359210001 | 0.4231 | 0.9513 | 5.91/2.52 | GM-GC-GM | 4.63E-03 |
| L10017-04 | L10017-04-02 | 359210045 | 0.4065 | 0.949 | 6.15/2.54 | GM-GC-GM | 4.41E-03 |
| L10017-04 | L10017-04-03 | 359210090 | 0.4007 | 0.9484 | 6.48/3.24 | GM-GC-GM | 5.16E-03 |
| L10017-04 | L10017-04-04 | 359210135 | 0.3929 | 0.9518 | 7.25/3.44 | GM-GC-GM | 4.08E-03 |
| L10017-04 | L10017-04-05 | 359210180 | 0.4094 | 0.9518 | 5.11/2.17 | GM-GC-GM | 3.98E-03 |
| L10017-05 | L10017-05-01 | 359210225 | 0.3955 | 0.9515 | 10.41/5.22 | PC-GC-GM | 2.95E-03 |
| L10017-05 | L10017-05-02 | 359210270 | 0.3946 | 0.9508 | 7.56/5.19 | PC-GC-GM | 2.89E-03 |
| L10017-05 | L10017-05-03 | 359210315 | 0.3898 | 0.955 | 6.66/4.61 | PC-GC-GM | 3.91E-03 |
| L10017-05 | L10017-05-04 | 359210360 | 0.4085 | 0.952 | 6.88/4.17 | PC-GC-GM | 2.99E-03 |
| L10017-05 | L10017-05-05 | 359210405 | 0.3855 | 0.9523 | 9.42/4.63 | PC-GC-GM | 4.53E-03 |

geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-04
LAB ID NO.: L10017-04-01
MATERIAL: SKAPS TN 330-2-8 GEOCOMPOSITE
ROLL NO: 359210001

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4247 | 0.4234 | 0.4238 | 0.4286 | 0.4308 | | |
| | | | 0.4134 | 0.4209 | 0.4219 | 0.4179 | 0.4257 | **0.4231** | 0.0050 |
| **DENSITY** | D 1505 | g/cc | 0.9521 | 0.9508 | 0.9510 | | | **0.9513** | 0.0007 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 6.8 | 4.4 | 2.5 | 8.6 | 7.3 | **5.91** | 2.454 |
| | SIDE"B" | MD-lb/in | 3.4 | 3.0 | 1.5 | 2.5 | 2.2 | **2.52** | 0.724 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: BF DATE: 4-12-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

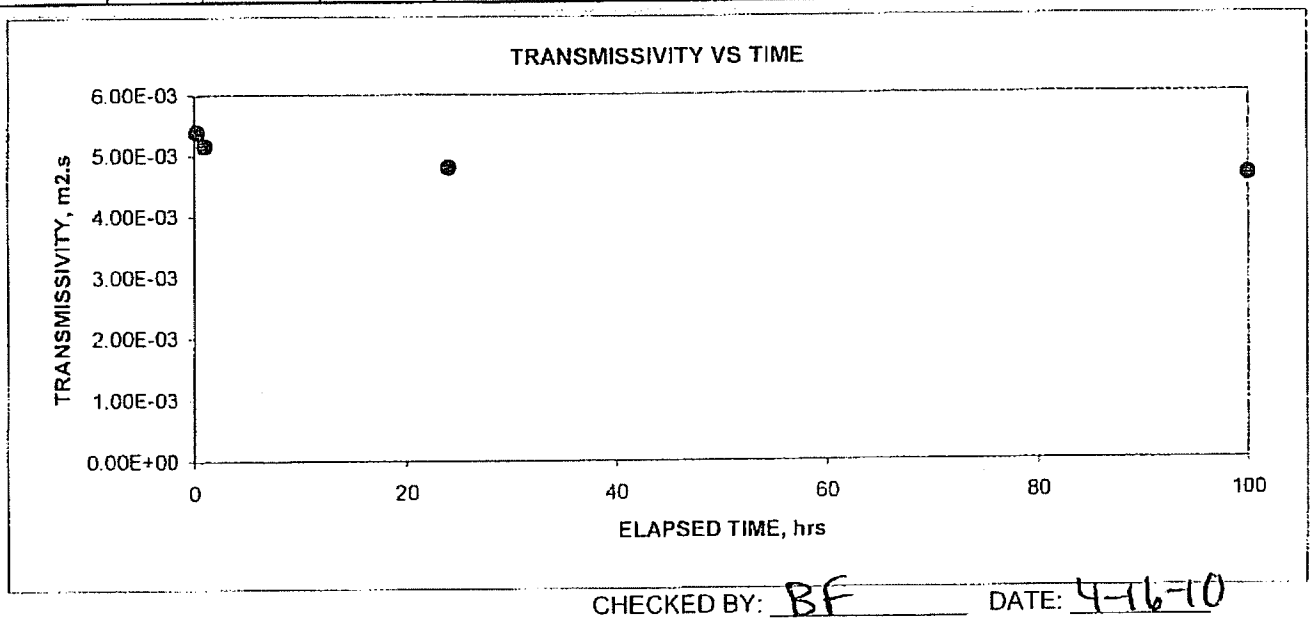
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-04
LAB I.D. NO.: L10017-04-01
ROLL NO.: 359210001
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.86 | 0.50 | 0.03 | 990<br>990<br>990 | 20<br>20<br>20 | 19.1 | 1.61E-01 | 0.780 | 5.38E-03 |
| 1 | 0.86 | 0.50 | 0.03 | 950<br>950<br>950 | 20<br>20<br>20 | 19.2 | 1.55E-01 | 0.747 | 5.15E-03 |
| 24 | 0.86 | 0.50 | 0.03 | 880<br>880<br>880 | 20<br>20<br>20 | 19.0 | 1.44E-01 | 0.695 | 4.80E-03 |
| 100 | 0.86 | 0.50 | 0.03 | 850<br>850<br>850 | 20<br>20<br>20 | 19.0 | 1.39E-01 | 0.671 | 4.63E-03 |




CHECKED BY: BF DATE: 4-16-10

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-04
LAB ID NO.: L10017-04-02
MATERIAL: SKAPS TN 330-2-8 GEOCOMPOSITE
ROLL NO: 359210045

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3991 | 0.4071 | 0.4104 | 0.4206 | 0.4077 | | |
| | | | 0.4085 | 0.3976 | 0.4020 | 0.4043 | 0.4072 | **0.4065** | 0.0065 |
| **DENSITY** | D 1505 | g/cc | 0.9487 | 0.9494 | 0.9487 | | | **0.9490** | 0.0004 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 9.4 | 4.9 | 5.9 | 5.8 | 4.7 | **6.15** | 1.867 |
| | SIDE"B" | MD-lb/in | 1.9 | 2.3 | 2.9 | 3.0 | 2.6 | **2.54** | 0.432 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: BF DATE: 4-12-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

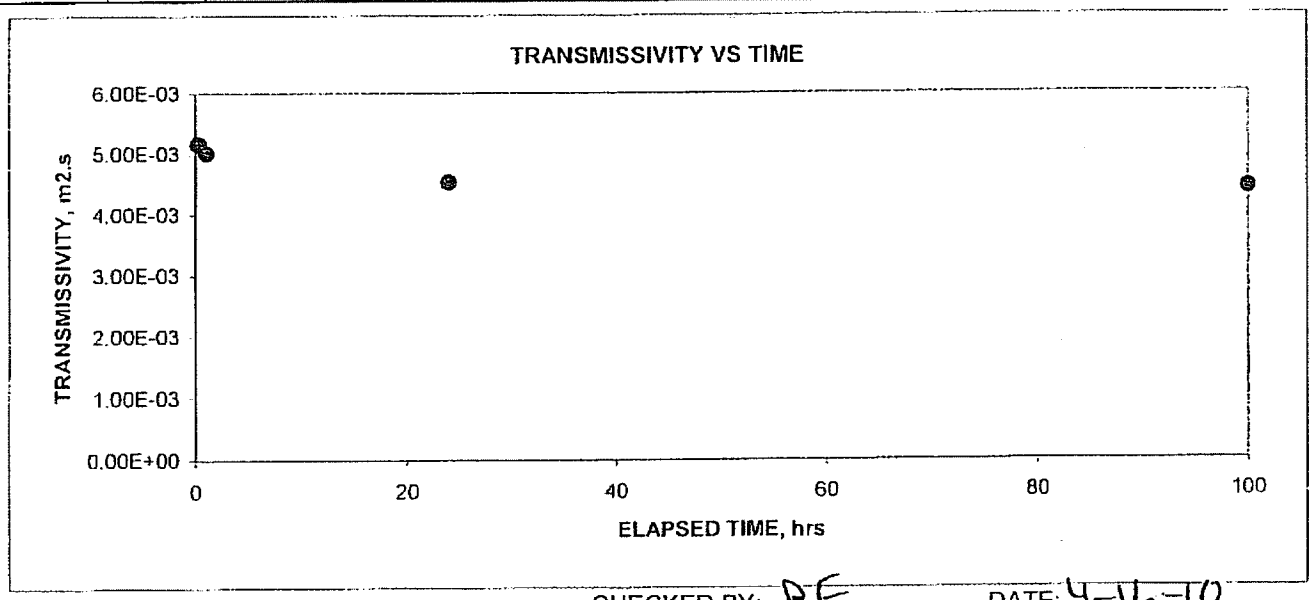
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-04
LAB I.D. NO.: L10017-04-02
ROLL NO.: 359210045
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.62 | 0.26 | 0.03 | 950<br>950<br>950 | 20<br>20<br>20 | 19.1 | 1.55E-01 | 0.749 | 5.17E-03 |
| 1 | 0.62 | 0.26 | 0.03 | 925<br>925<br>920 | 20<br>20<br>20 | 19.2 | 1.50E-01 | 0.726 | 5.01E-03 |
| 24 | 0.62 | 0.26 | 0.03 | 830<br>830<br>830 | 20<br>20<br>20 | 19.0 | 1.36E-01 | 0.656 | 4.52E-03 |
| 100 | 0.62 | 0.26 | 0.03 | 810<br>810<br>810 | 20<br>20<br>20 | 19.0 | 1.32E-01 | 0.640 | 4.41E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-04
LAB ID NO.: L10017-04-03
MATERIAL: SKAPS TN 330-2-8 GEOCOMPOSITE
ROLL NO: 359210090

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.3991 | 0.3966 | 0.3949 | 0.3787 | 0.3981 | | |
| | | | 0.3970 | 0.4180 | 0.4088 | 0.4165 | 0.3989 | **0.4007** | 0.0114 |
| DENSITY | D 1505 | g/cc | 0.9486 | 0.9478 | 0.9487 | | | **0.9484** | 0.0005 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 6.8 | 3.0 | 6.5 | 9.9 | 6.2 | **6.48** | 2.468 |
| | SIDE"B" | MD-lb/in | 2.8 | 3.2 | 2.4 | 5.0 | 2.9 | **3.24** | 1.040 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: BF DATE: 4-12-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

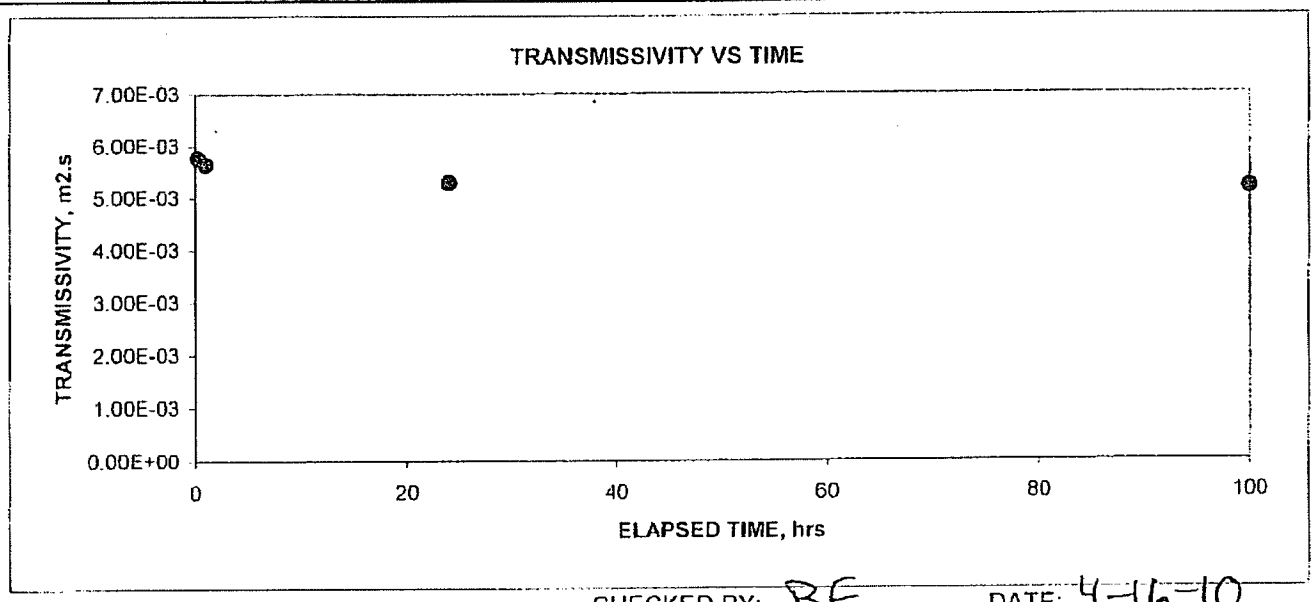
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-04
LAB I.D. NO.: L10017-04-03
ROLL NO.: 359210090
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 1060<br>1060<br>1060 | 20<br>20<br>20 | 19.1 | 1.73E-01 | 0.835 | 5.76E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 1040<br>1040<br>1040 | 20<br>20<br>20 | 19.2 | 1.69E-01 | 0.818 | 5.64E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 970<br>970<br>970 | 20<br>20<br>20 | 19.0 | 1.59E-01 | 0.766 | 5.29E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 950<br>950<br>950 | 20<br>20<br>20 | 19.0 | 1.55E-01 | 0.750 | 5.18E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-04
LAB ID NO.: L10017-04-04
MATERIAL: SKAPS TN 330-2-8 GEOCOMPOSITE
ROLL NO: 359210135

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.3835 | 0.4009 | 0.3990 | 0.3925 | 0.3991 | | |
| | | | 0.3918 | 0.3955 | 0.3980 | 0.3882 | 0.3808 | 0.3929 | 0.0069 |
| DENSITY | D 1505 | g/cc | 0.9517 | 0.9515 | 0.9522 | | | 0.9518 | 0.0003 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 5.3 | 6.5 | 10.9 | 6.6 | 7.0 | 7.25 | 2.140 |
| | SIDE"B" | MD-lb/in | 2.4 | 4.3 | 2.2 | 3.1 | 5.3 | 3.44 | 1.303 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: BF DATE: 4-12-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

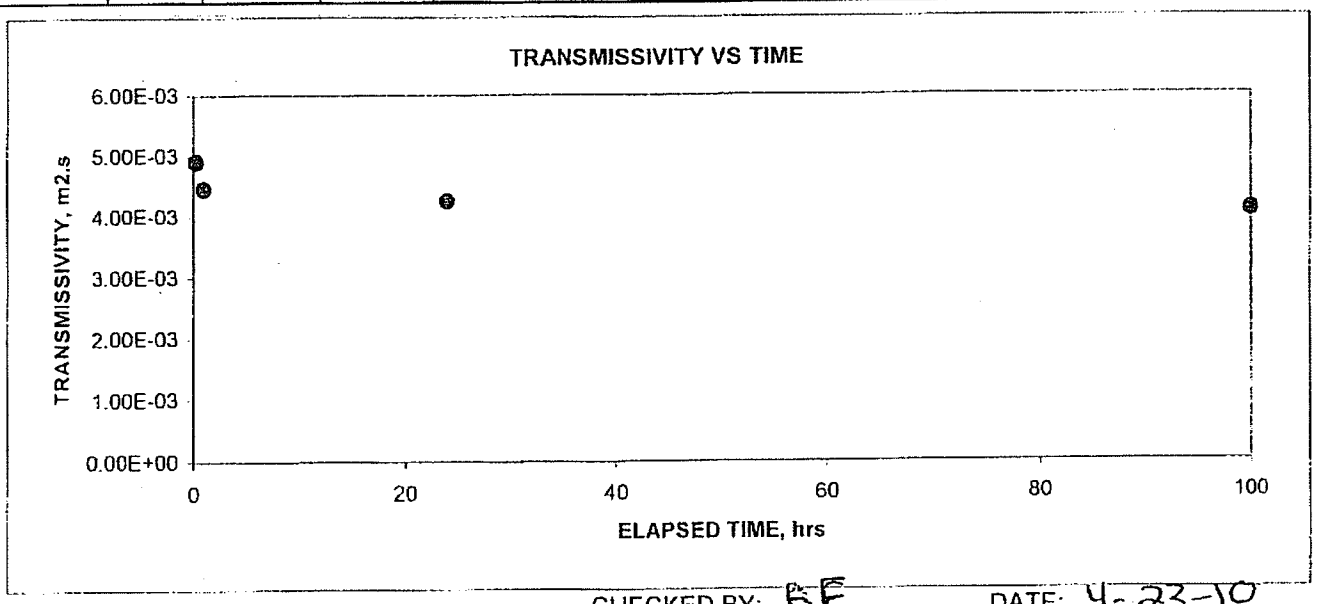
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-04
LAB I.D. NO.: L10017-04-04
ROLL NO.: 359210135
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 900<br>900<br>900 | 20<br>20<br>20 | 19.0 | 1.47E-01 | 0.711 | 4.91E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 820<br>820<br>820 | 20<br>20<br>20 | 19.1 | 1.34E-01 | 0.646 | 4.46E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 780<br>780<br>780 | 20<br>20<br>20 | 19.0 | 1.28E-01 | 0.616 | 4.25E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 750<br>750<br>750 | 20<br>20<br>20 | 19.1 | 1.22E-01 | 0.591 | 4.08E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-04
LAB ID NO.: L10017-04-05
MATERIAL: SKAPS TN 330-2-8 GEOCOMPOSITE
ROLL NO: 359210180

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4054 | 0.3994 | 0.4206 | 0.4130 | 0.3989 | | |
| | | | 0.3976 | 0.4019 | 0.4113 | 0.4220 | 0.4243 | **0.4094** | 0.0102 |
| **DENSITY** | D 1505 | g/cc | 0.9524 | 0.9522 | 0.9508 | | | **0.9518** | 0.0009 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 5.8 | 5.7 | 3.4 | 5.8 | 4.9 | **5.11** | 1.010 |
| | SIDE"B" | MD-lb/in | 3.0 | 3.0 | 1.8 | 1.6 | 1.5 | **2.17** | 0.781 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: BF DATE: 4-12-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

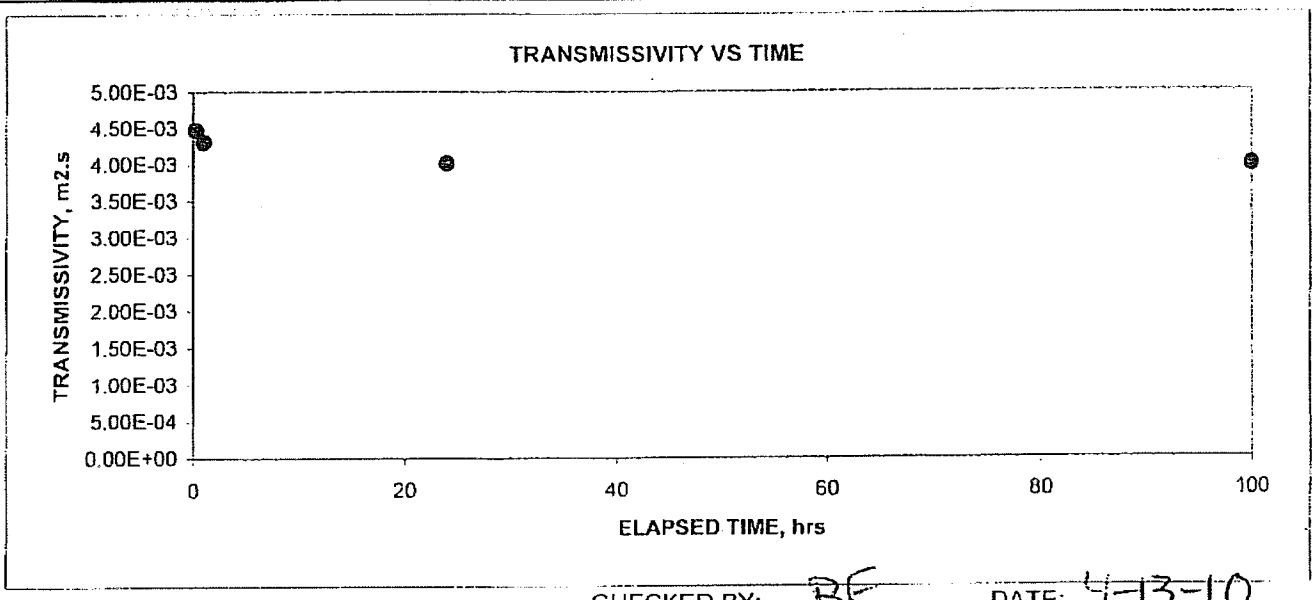
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-04
LAB I.D. NO.: L10017-04-05
ROLL NO.: 359210180
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 850<br>850<br>850 | 20<br>20<br>20 | 20.4 | 1.34E-01 | 0.649 | 4.48E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 820<br>820<br>820 | 20<br>20<br>20 | 20.5 | 1.29E-01 | 0.625 | 4.31E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 760<br>760<br>760 | 20<br>20<br>20 | 20.3 | 1.20E-01 | 0.582 | 4.02E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 740<br>740<br>740 | 20<br>20<br>20 | 19.6 | 1.19E-01 | 0.576 | 3.98E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-05
LAB ID NO.: L10017-05-01
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210225

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3972 | 0.3987 | 0.3994 | 0.3865 | 0.3887 | | |
| | | | 0.4011 | 0.3913 | 0.3894 | 0.4023 | 0.4001 | **0.3955** | 0.0059 |
| **DENSITY** | D 1505 | g/cc | 0.9501 | 0.9510 | 0.9533 | | | **0.9515** | 0.0016 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 10.5 | 11.8 | 14.5 | 7.1 | 8.1 | **10.41** | 2.949 |
| | SIDE"B" | MD-lb/in | 6.7 | 6.3 | 6.3 | 4.2 | 2.6 | **5.22** | 1.751 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: T. O DATE: 4-30-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

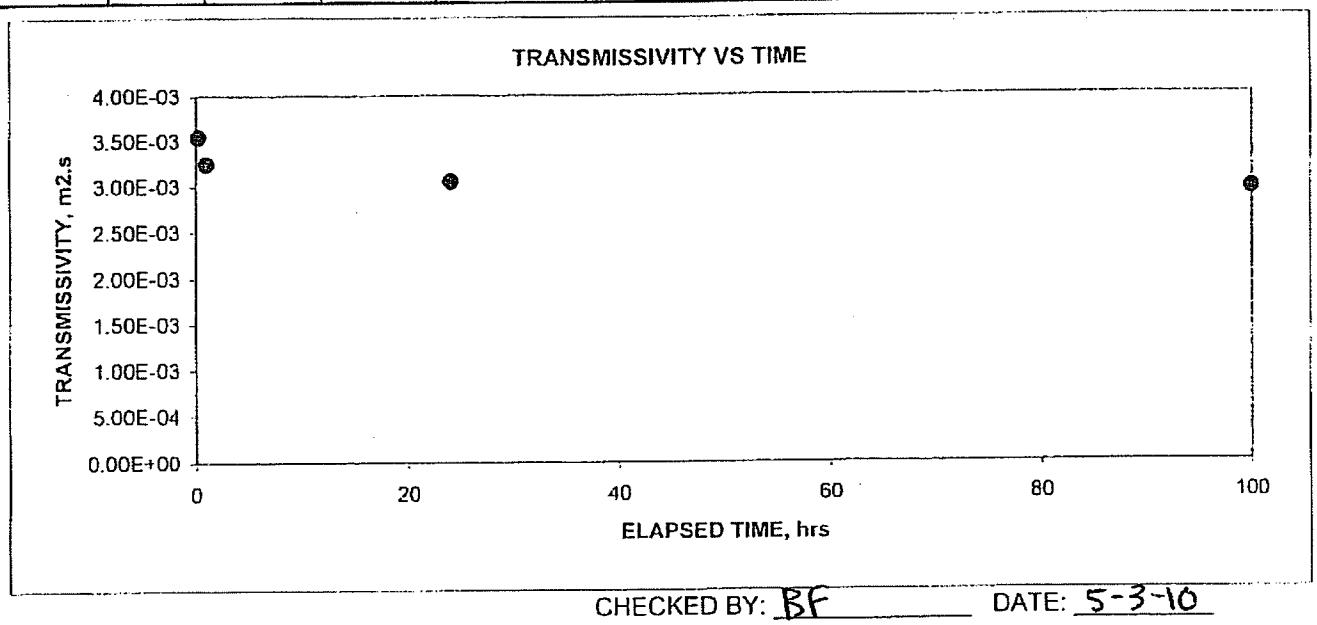
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-05
LAB I.D. NO.: L10017-05-01
ROLL NO.: 359210225
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.82 | 0.46 | 0.03 | 980<br>980<br>975 | 30<br>30<br>30 | 19.1 | 1.06E-01 | 0.514 | 3.55E-03 |
| 1 | 0.82 | 0.46 | 0.03 | 900<br>900<br>900 | 30<br>30<br>30 | 19.3 | 9.74E-02 | 0.471 | 3.25E-03 |
| 24 | 0.82 | 0.46 | 0.03 | 840<br>840<br>840 | 30<br>30<br>30 | 19.0 | 9.16E-02 | 0.442 | 3.05E-03 |
| 100 | 0.82 | 0.46 | 0.03 | 820<br>820<br>820 | 30<br>30<br>30 | 19.4 | 8.85E-02 | 0.428 | 2.95E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-05
LAB ID NO.: L10017-05-02
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210270

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3998 | 0.4014 | 0.3802 | 0.3835 | 0.4012 | | |
| | | | 0.4023 | 0.3999 | 0.3977 | 0.3824 | 0.3977 | **0.3946** | 0.0088 |
| **DENSITY** | D 1505 | g/cc | 0.9512 | 0.9511 | 0.9500 | | | **0.9508** | 0.0007 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 6.2 | 9.2 | 5.1 | 11.0 | 6.3 | **7.56** | 2.465 |
| | SIDE"B" | MD-lb/in | 3.9 | 5.0 | 5.7 | 6.4 | 5.0 | **5.19** | 0.926 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 4-30-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

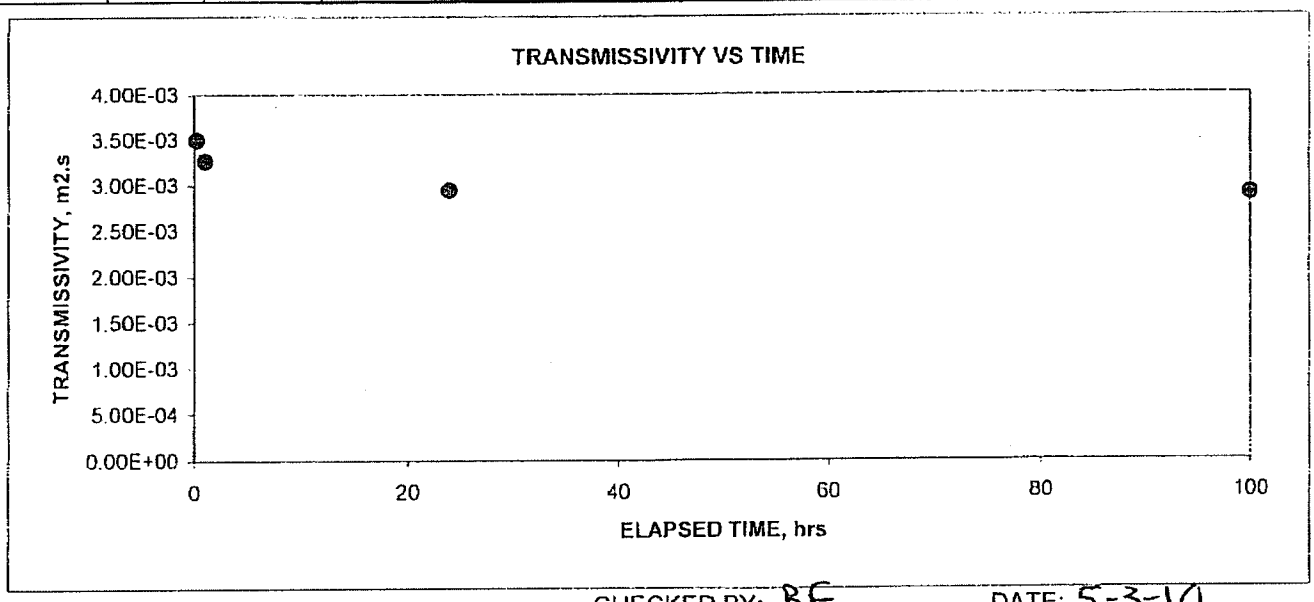
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-05
LAB I.D. NO.: L10017-05-02
ROLL NO.: 359210270
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.62 | 0.26 | 0.03 | 970<br>970<br>970 | 30<br>30<br>30 | 19.3 | 1.05E-01 | 0.507 | 3.50E-03 |
| 1 | 0.62 | 0.26 | 0.03 | 910<br>910<br>910 | 30<br>30<br>30 | 19.5 | 9.80E-02 | 0.474 | 3.27E-03 |
| 24 | 0.62 | 0.26 | 0.03 | 810<br>810<br>810 | 30<br>30<br>30 | 19.0 | 8.83E-02 | 0.427 | 2.94E-03 |
| 100 | 0.62 | 0.26 | 0.03 | 800<br>800<br>800 | 30<br>30<br>30 | 19.2 | 8.68E-02 | 0.419 | 2.89E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-05
LAB ID NO.: L10017-05-03
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210315

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.4101 | 0.4098 | 0.3843 | 0.3866 | 0.3909 | | |
| | | | 0.3845 | 0.3809 | 0.3812 | 0.3799 | 0.3899 | **0.3898** | 0.0112 |
| DENSITY | D 1505 | g/cc | 0.9549 | 0.9555 | 0.9545 | | | **0.9550** | 0.0005 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 6.3 | 6.8 | 6.8 | 7.2 | 6.2 | **6.66** | 0.408 |
| | SIDE"B" | MD-lb/in | 4.6 | 3.6 | 4.3 | 5.5 | 5.1 | **4.61** | 0.728 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 4-30-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

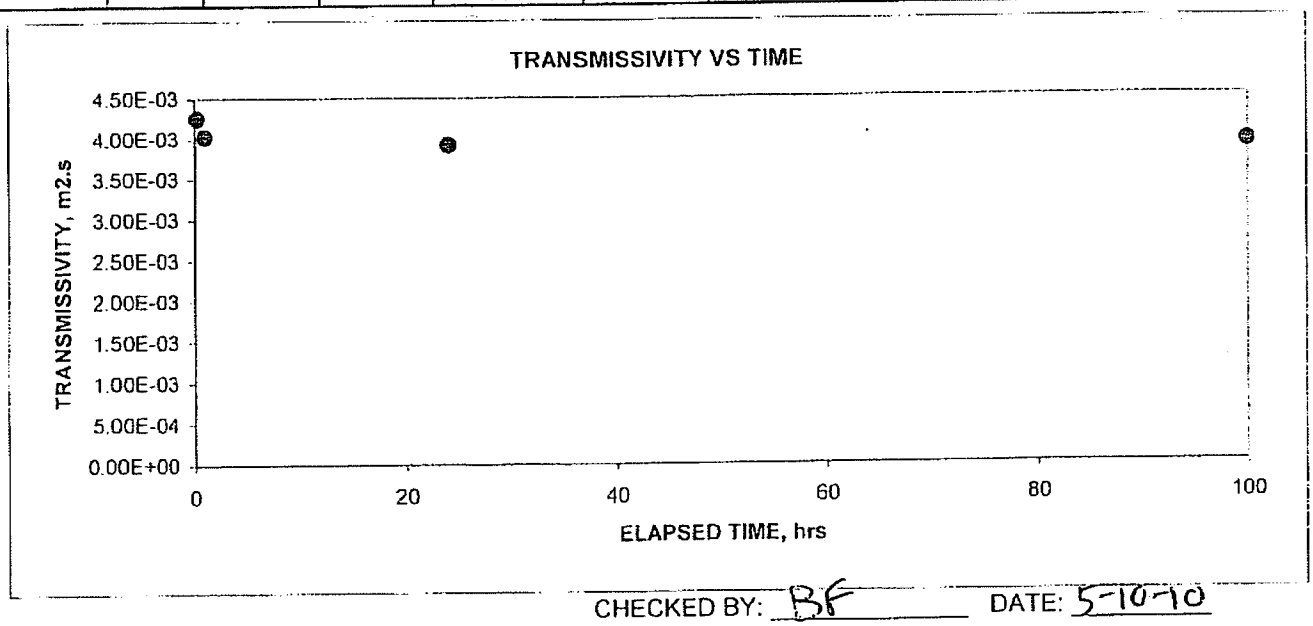
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-05
LAB I.D. NO.: L10017-05-03
ROLL NO.: 359210315
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.86 | 0.50 | 0.03 | 1200<br>1200<br>1200 | 30<br>30<br>30 | 20.0 | 1.28E-01 | 0.617 | 4.26E-03 |
| 1 | 0.86 | 0.50 | 0.03 | 1140<br>1140<br>1140 | 30<br>30<br>30 | 20.2 | 1.21E-01 | 0.583 | 4.03E-03 |
| 24 | 0.86 | 0.50 | 0.03 | 1120<br>1120<br>1120 | 30<br>30<br>30 | 20.6 | 1.17E-01 | 0.568 | 3.92E-03 |
| 100 | 0.86 | 0.50 | 0.03 | 1110<br>1110<br>1110 | 30<br>30<br>30 | 20.3 | 1.17E-01 | 0.567 | 3.91E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-05
LAB ID NO.: L10017-05-04
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210360

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.4144 | 0.4111 | 0.4109 | 0.4098 | 0.4035 | | |
| | | | 0.4122 | 0.4197 | 0.4008 | 0.4013 | 0.4012 | **0.4085** | 0.0065 |
| DENSITY | D 1505 | g/cc | 0.9527 | 0.9530 | 0.9503 | | | **0.9520** | 0.0015 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 4.8 | 8.6 | 8.0 | 6.9 | 6.1 | **6.88** | 1.524 |
| | SIDE"B" | MD-lb/in | 2.8 | 3.7 | 4.5 | 5.0 | 4.9 | **4.17** | 0.937 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 4-30-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

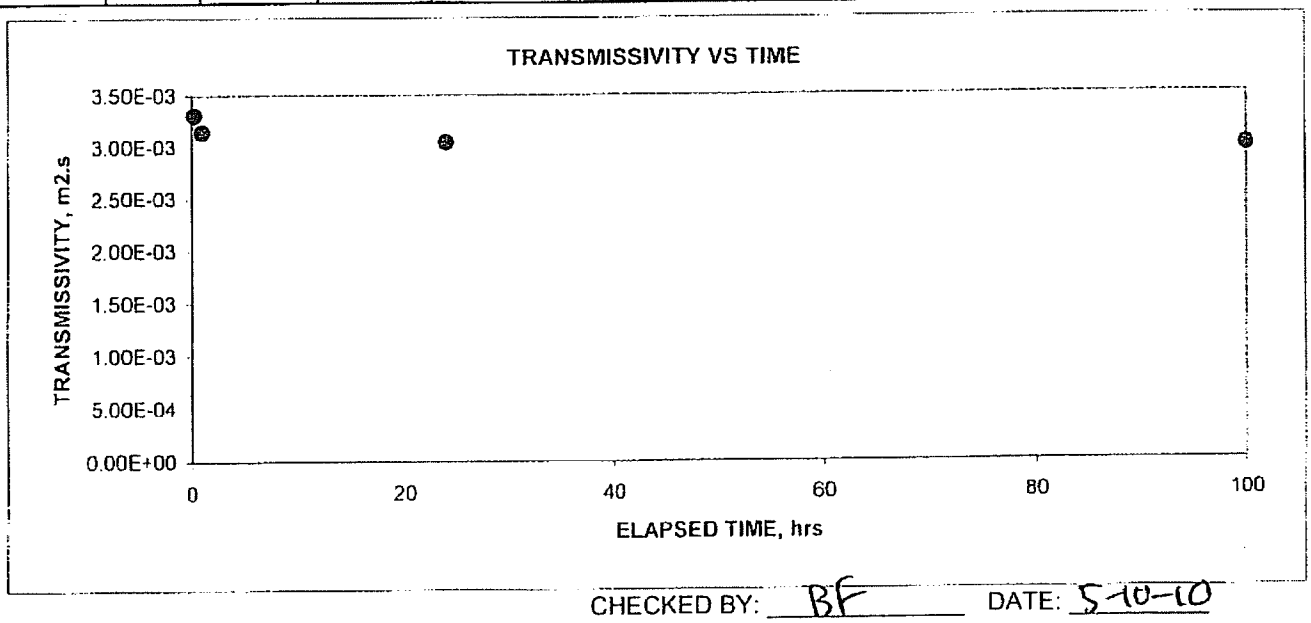
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-05
LAB I.D. NO.: L10017-05-04
ROLL NO.: 359210360
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.64 | 0.28 | 0.03 | 965<br>960<br>955 | 30<br>30<br>30 | 21.2 | 9.92E-02 | 0.479 | 3.31E-03 |
| 1 | 0.64 | 0.28 | 0.03 | 910<br>910<br>910 | 30<br>30<br>30 | 21.1 | 9.43E-02 | 0.456 | 3.14E-03 |
| 24 | 0.64 | 0.28 | 0.03 | 875<br>875<br>875 | 30<br>30<br>30 | 20.8 | 9.13E-02 | 0.441 | 3.04E-03 |
| 100 | 0.64 | 0.28 | 0.03 | 850<br>850<br>850 | 30<br>30<br>30 | 20.4 | 8.96E-02 | 0.433 | 2.99E-03 |

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INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-05
LAB ID NO.: L10017-05-05
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210405

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3901 | 0.3898 | 0.3887 | 0.3856 | 0.3876 | | |
| | | | 0.3866 | 0.3924 | 0.3934 | 0.3700 | 0.3711 | **0.3855** | 0.0083 |
| **DENSITY** | D 1505 | g/cc | 0.9527 | 0.9525 | 0.9518 | | | **0.9523** | 0.0005 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 12.7 | 8.4 | 8.9 | 9.7 | 7.4 | **9.42** | 2.021 |
| | SIDE"B" | MD-lb/in | 7.0 | 3.6 | 4.3 | 5.1 | 3.2 | **4.63** | 1.496 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 4-30-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

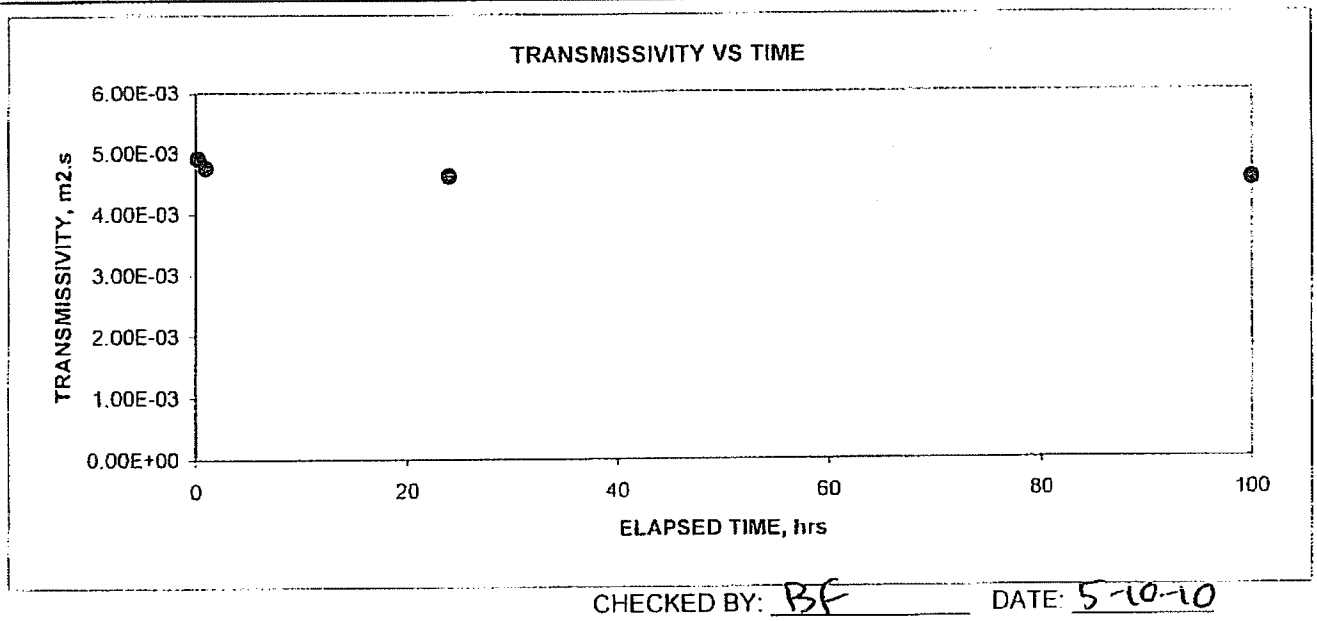
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-05
LAB I.D. NO.: L10017-05-05
ROLL NO.: 359210405
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 930<br>930<br>930 | 20<br>20<br>20 | 20.3 | 1.47E-01 | 0.712 | 4.91E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 900<br>900<br>900 | 20<br>20<br>20 | 20.3 | 1.43E-01 | 0.689 | 4.76E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 870<br>870<br>870 | 20<br>20<br>20 | 20.2 | 1.38E-01 | 0.668 | 4.61E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 840<br>840<br>840 | 20<br>20<br>20 | 19.4 | 1.36E-01 | 0.657 | 4.53E-03 |

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| CELL 2 GEOCOMPOSITE CONFORMANCE TESTING SUMMARY TABLE | | | | | | | |
|---|---|---|---|---|---|---|---|
| GEOTECHNICS PROJECT NUMBER | GEOTECHNICS ID NUMBER | MANUFACTURER ROLL NUMBER | THICKNESS (ASTM D5199) Inches | DENSITY (ASTM D1505) g/cc | PLY ADHESION (ASTM D7005) MD-lb/in SIDE "A"/SIDE "B" | TRANSMISSIVITY SETUP | TRANSMISSIVITY (ASTM D4716) $M^2$/SEC |
| L10017-07 | L10017-07-01 | 359210450 | 0.3976 | 0.9492 | 10.06/3.85 | GM-GC-GM | 4.63E-03 |
| L10017-07 | L10017-07-02 | 359210495 | 0.4089 | 0.9527 | 6.63/3.08 | GM-GC-GM | 4.04E-03 |
| L10017-07 | L10017-07-03 | 359210540 | 0.4143 | 0.9528 | 6.20/2.78 | GM-GC-GM | 4.90E-03 |
| L10017-07 | L10017-07-04 | 359210585 | 0.4047 | 0.9527 | 7.42/3.04 | GM-GC-GM | 4.31E-03 |
| L10017-07 | L10017-07-05 | 359210585 | 0.3941 | 0.9518 | 8.08/3.31 | GM-GC-GM | 5.51E-03 |
| L10017-09 | L10017-09-01 | 359210675 | 0.4095 | 0.9538 | 5.62/2.75 | PC-GC-GM | 3.67E-03 |
| L10017-09 | L10017-09-02 | 359210720 | 0.415 | 0.9541 | 6.90/3.75 | PC-GC-GM | 2.87E-03 |
| L10017-09 | L10017-09-03 | 359210765 | 0.4003 | 0.9536 | 8.16/4.45 | PC-GC-GM | 3.22E-03 |
| L10017-09 | L10017-09-04 | 359210810 | 0.3939 | 0.9538 | 7.90/4.66 | PC-GC-GM | 3.63E-03 |
| L10017-09 | L10017-09-05 | 359210855 | 0.398 | 0.9549 | 8.96/3.84 | PC-GC-GM | 3.33E-03 |

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# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-07
LAB ID NO.: L10017-07-01
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210450

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4013 | 0.4098 | 0.4077 | 0.4012 | 0.3901 | | |
| | | | 0.3811 | 0.4098 | 0.4124 | 0.3802 | 0.3825 | **0.3976** | 0.0129 |
| **DENSITY** | D 1505 | g/cc | 0.9498 | 0.9491 | 0.9486 | | | **0.9492** | 0.0006 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 10.8 | 8.8 | 9.5 | 11.2 | 10.1 | **10.06** | 0.967 |
| | SIDE"B" | MD-lb/in | 6.7 | 3.8 | 2.5 | 2.8 | 3.3 | **3.85** | 1.684 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J. O DATE: 5-4-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

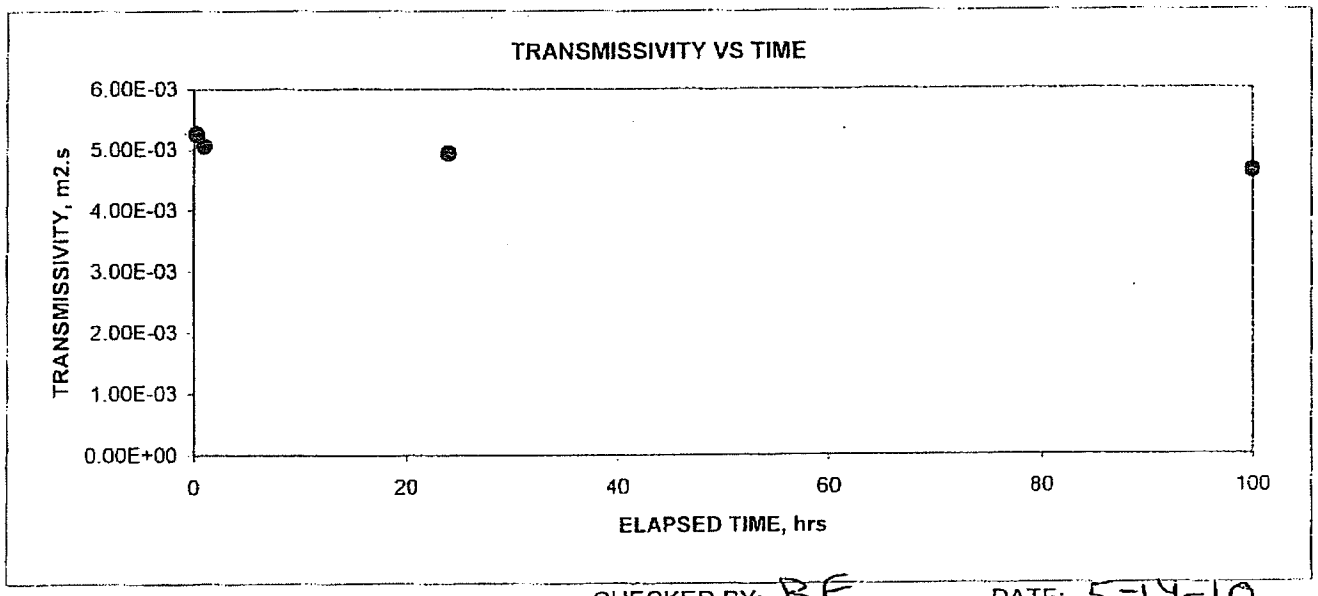
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-07
LAB I.D. NO.: L10017-07-01
ROLL NO.: 359210450
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.72 | 0.36 | 0.03 | 970<br>970<br>970 | 20<br>20<br>20 | 19.2 | 1.58E-01 | 0.763 | 5.26E-03 |
| 1 | 0.72 | 0.36 | 0.03 | 940<br>940<br>940 | 20<br>20<br>20 | 19.5 | 1.52E-01 | 0.734 | 5.06E-03 |
| 24 | 0.72 | 0.36 | 0.03 | 910<br>910<br>910 | 20<br>20<br>20 | 19.2 | 1.48E-01 | 0.716 | 4.94E-03 |
| 100 | 0.72 | 0.36 | 0.03 | 870<br>870<br>870 | 20<br>20<br>20 | 20.0 | 1.39E-01 | 0.671 | 4.63E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-07
LAB ID NO.: L10017-07-02
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210495

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4109 | 0.4024 | 0.4109 | 0.4100 | 0.4066 | | |
| | | | 0.4122 | 0.4108 | 0.4144 | 0.4012 | 0.4099 | **0.4089** | 0.0042 |
| **DENSITY** | D 1505 | g/cc | 0.9522 | 0.9524 | 0.9536 | | | **0.9527** | 0.0008 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 9.0 | 8.3 | 8.2 | 4.8 | 2.9 | **6.63** | 2.664 |
| | SIDE"B" | MD-lb/in | 4.0 | 2.2 | 4.3 | 2.6 | 2.3 | **3.08** | 1.018 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J. O DATE: 5-4-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

Geotechnics
INTEGRITY IN TESTING

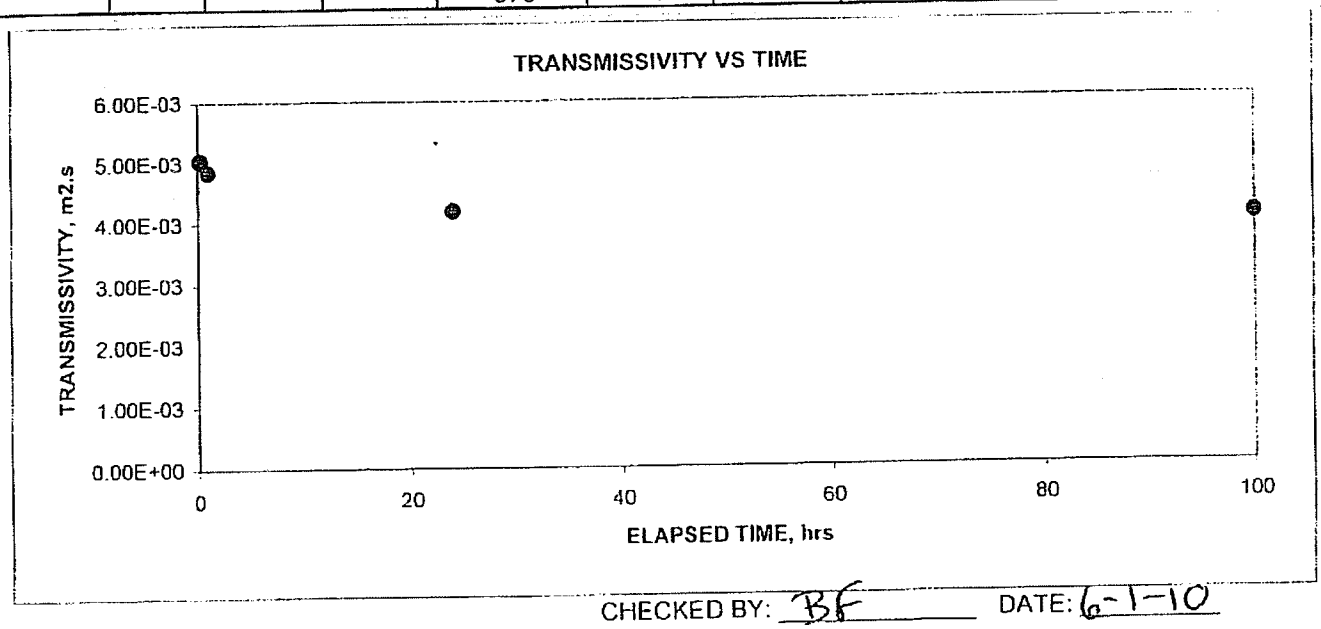
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-07
LAB I.D. NO.: L10017-07-02
ROLL NO.: 359210495
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.74 | 0.38 | 0.03 | 1200<br>1200<br>1200 | 25<br>25<br>25 | 20.5 | 1.51E-01 | 0.732 | 5.05E-03 |
| 1 | 0.74 | 0.38 | 0.03 | 1160<br>1160<br>1160 | 25<br>25<br>25 | 20.7 | 1.46E-01 | 0.704 | 4.86E-03 |
| 24 | 0.74 | 0.38 | 0.03 | 1010<br>1000<br>1000 | 25<br>25<br>25 | 20.8 | 1.26E-01 | 0.607 | 4.19E-03 |
| 100 | 0.74 | 0.38 | 0.03 | 970<br>970<br>970 | 25<br>25<br>25 | 20.9 | 1.21E-01 | 0.586 | 4.04E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-07
LAB ID NO.: L10017-07-03
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210540

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4097 | 0.4086 | 0.4208 | 0.4186 | 0.4098 | | |
| | | | 0.4056 | 0.4200 | 0.4201 | 0.4122 | 0.4178 | **0.4143** | 0.0057 |
| **DENSITY** | D 1505 | g/cc | 0.9532 | 0.9531 | 0.9522 | | | **0.9528** | 0.0005 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 9.2 | 9.1 | 2.5 | 5.6 | 4.7 | **6.20** | 2.895 |
| | SIDE"B" | MD-lb/in | 2.2 | 5.2 | 1.9 | 2.5 | 2.2 | **2.78** | 1.367 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 5-4-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

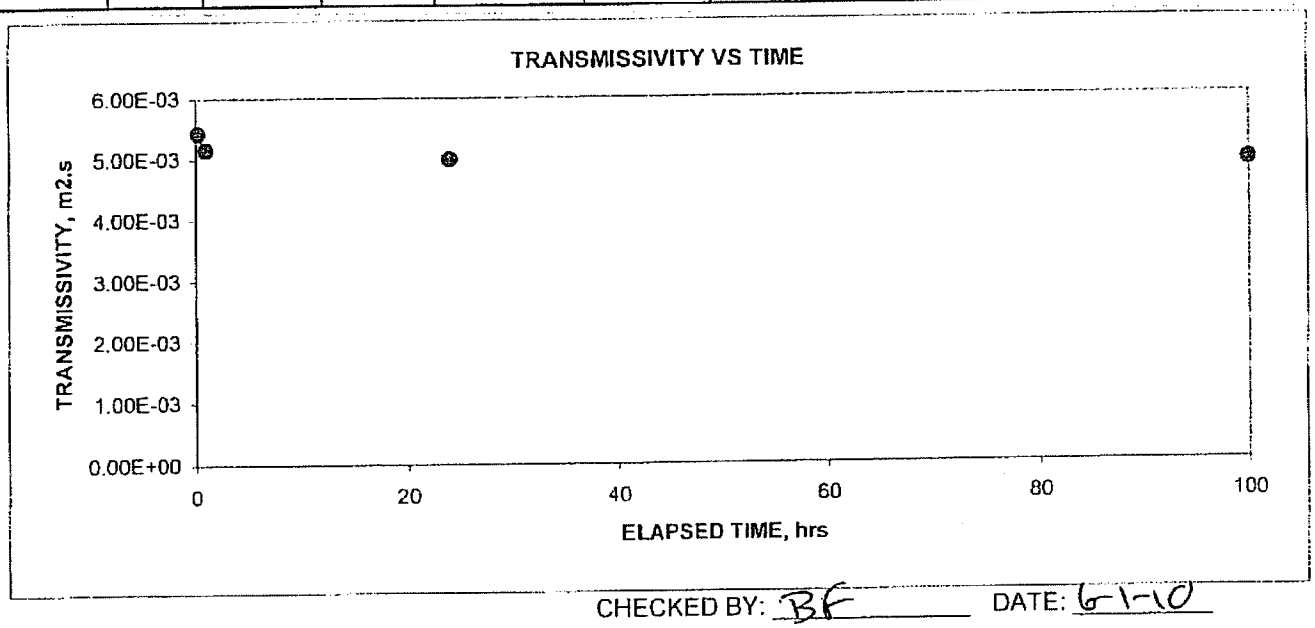
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-07
LAB I.D. NO.: L10017-07-03
ROLL NO.: 359210540
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 1050<br>1050<br>1050 | 20<br>20<br>20 | 21.2 | 1.63E-01 | 0.787 | 5.43E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 1000<br>1000<br>1000 | 20<br>20<br>20 | 21.3 | 1.55E-01 | 0.747 | 5.16E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 970<br>970<br>970 | 20<br>20<br>20 | 21.4 | 1.50E-01 | 0.723 | 4.99E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 955<br>955<br>955 | 20<br>20<br>20 | 21.5 | 1.47E-01 | 0.710 | 4.90E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-07
LAB ID NO.: L10017-07-04
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210585

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.4109 | 0.4087 | 0.4086 | 0.4100 | 0.4013 | | |
| | | | 0.4045 | 0.4076 | 0.4034 | 0.3999 | 0.3922 | **0.4047** | 0.0058 |
| **DENSITY** | D 1505 | g/cc | 0.9519 | 0.9532 | 0.9531 | | | **0.9527** | 0.0007 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 11.1 | 5.9 | 10.2 | 5.4 | 4.6 | **7.42** | 2.993 |
| | SIDE"B" | MD-lb/in | 3.3 | 2.4 | 5.6 | 1.8 | 2.1 | **3.04** | 1.531 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 5-4-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

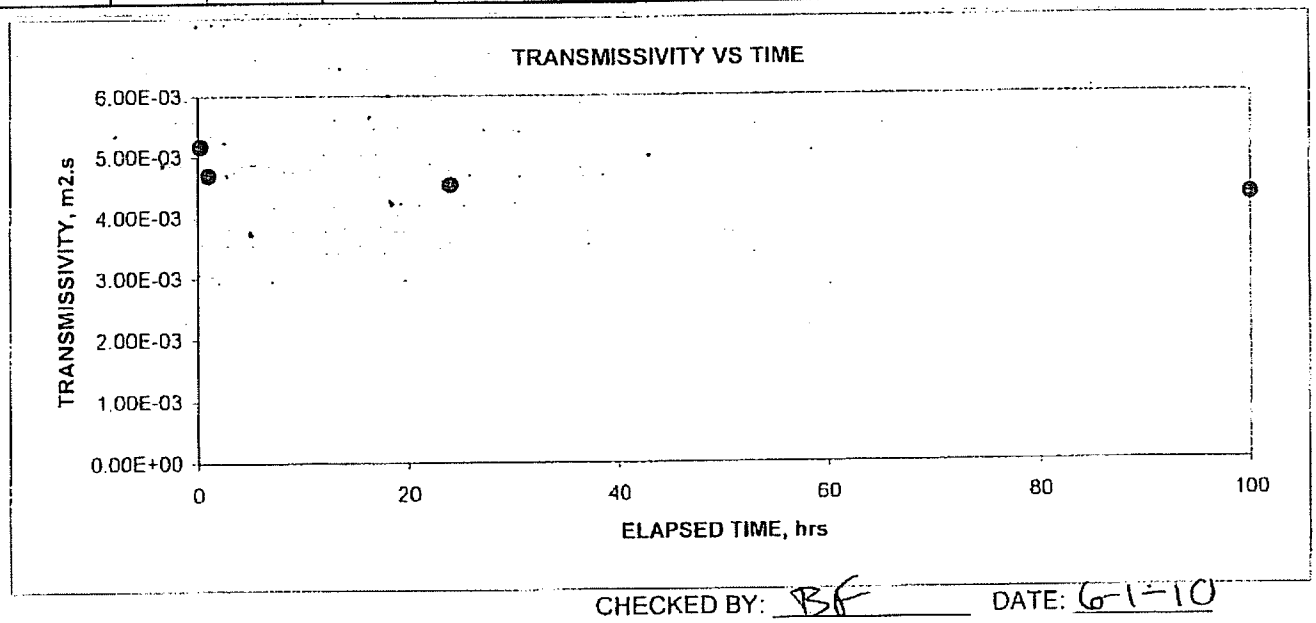
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-07
LAB I.D. NO.: L10017-07-04
ROLL NO.: 359210585
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.86 | 0.50 | 0.03 | 1000<br>1000<br>1000 | 20<br>20<br>20 | 21.2 | 1.55E-01 | 0.749 | 5.17E-03 |
| 1 | 0.86 | 0.50 | 0.03 | 910<br>910<br>910 | 20<br>20<br>20 | 21.3 | 1.41E-01 | 0.680 | 4.69E-03 |
| 24 | 0.86 | 0.50 | 0.03 | 880<br>880<br>880 | 20<br>20<br>20 | 21.4 | 1.36E-01 | 0.656 | 4.53E-03 |
| 100 | 0.86 | 0.50 | 0.03 | 840<br>840<br>840 | 20<br>20<br>20 | 21.5 | 1.29E-01 | 0.625 | 4.31E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-07
LAB ID NO.: L10017-07-05
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210630

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3798 | 0.3799 | 0.3888 | 0.3888 | 0.3913 | | |
| | | | 0.3966 | 0.4066 | 0.4076 | 0.3999 | 0.4013 | **0.3941** | 0.0100 |
| **DENSITY** | D 1505 | g/cc | 0.9514 | 0.9515 | 0.9524 | | | **0.9518** | 0.0005 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 3.5 | 9.7 | 11.4 | 11.0 | 4.9 | **8.08** | 3.643 |
| | SIDE"B" | MD-lb/in | 1.6 | 4.1 | 2.0 | 5.5 | 3.4 | **3.31** | 1.592 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 5-4-10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

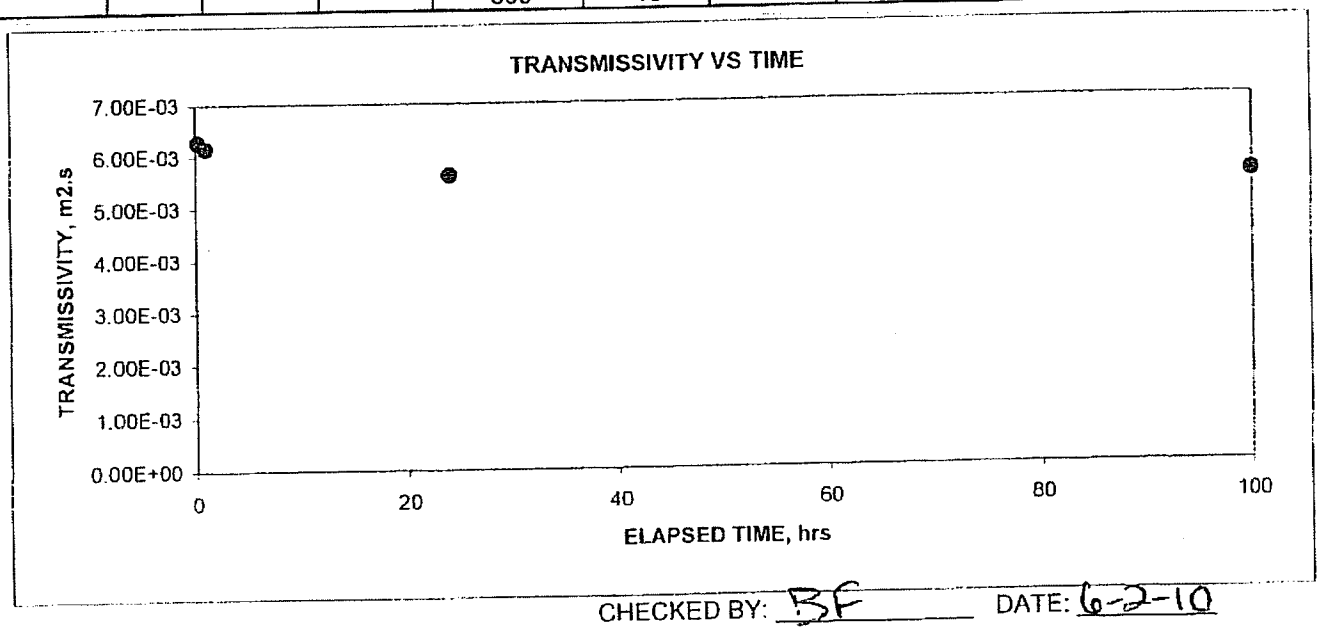
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-07
LAB I.D. NO.: L10017-07-05
ROLL NO.: 359210630
REPLICATE NO.: 1 of 1

TEST SECTION: AGRU 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.88 | 0.52 | 0.03 | 920<br>920<br>915 | 15<br>15<br>15 | 21.5 | 1.88E-01 | 0.910 | 6.28E-03 |
| 1 | 0.88 | 0.52 | 0.03 | 900<br>900<br>900 | 15<br>15<br>15 | 21.5 | 1.85E-01 | 0.892 | 6.16E-03 |
| 24 | 0.88 | 0.52 | 0.03 | 820<br>820<br>820 | 15<br>15<br>15 | 21.5 | 1.68E-01 | 0.813 | 5.61E-03 |
| 100 | 0.88 | 0.52 | 0.03 | 800<br>800<br>800 | 15<br>15<br>15 | 21.2 | 1.65E-01 | 0.799 | 5.51E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-09
LAB ID NO.: L10017-09-01
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210675

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.4065<br>0.4190 | 0.4095<br>0.4062 | 0.4114<br>0.4001 | 0.4045<br>0.4113 | 0.4148<br>0.4112 | **0.4095** | 0.0054 |
| DENSITY | D 1505 | g/cc | 0.9539 | 0.9538 | 0.9538 | | | **0.9538** | 0.0001 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 5.4 | 7.5 | 5.5 | 5.6 | 4.1 | **5.62** | 1.212 |
| | SIDE"B" | MD-lb/in | 3.4 | 2.0 | 2.4 | 3.7 | 2.3 | **2.75** | 0.752 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

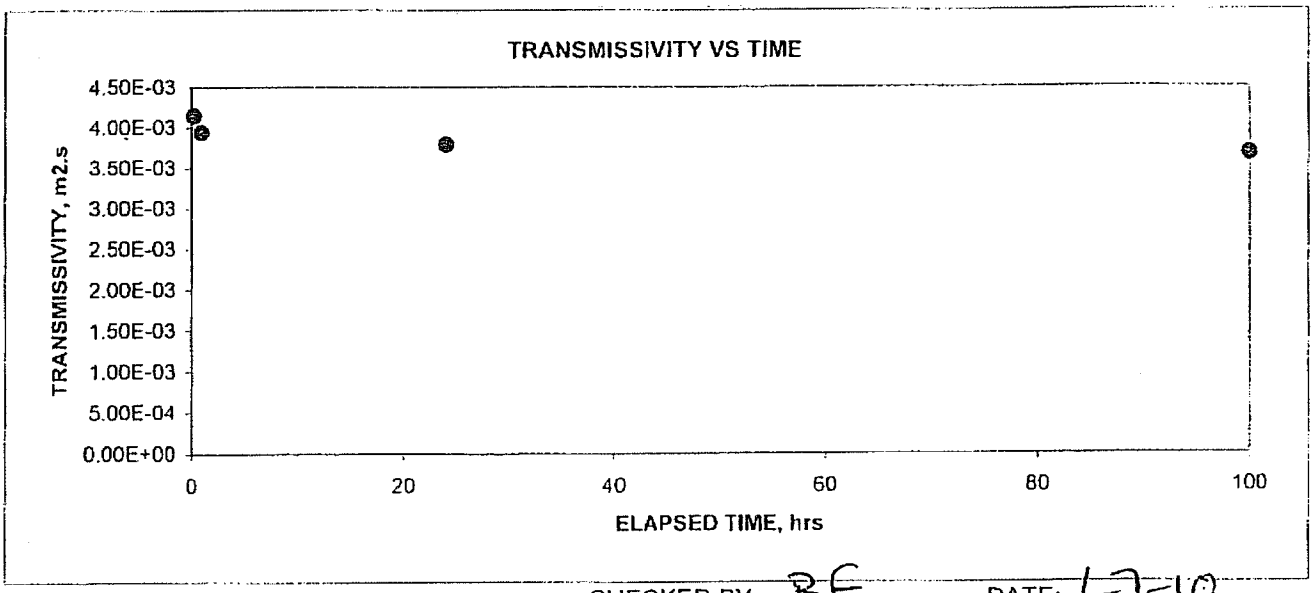
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-09
LAB I.D. NO.: L10017-09-01
ROLL NO.: 359210675
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.62 | 0.26 | 0.03 | 800<br>800<br>800 | 20<br>20<br>20 | 21.1 | 1.24E-01 | 0.601 | 4.14E-03 |
| 1 | 0.62 | 0.26 | 0.03 | 760<br>760<br>760 | 20<br>20<br>20 | 21.1 | 1.18E-01 | 0.571 | 3.94E-03 |
| 24 | 0.62 | 0.26 | 0.03 | 740<br>740<br>740 | 20<br>20<br>20 | 21.6 | 1.14E-01 | 0.549 | 3.79E-03 |
| 100 | 0.62 | 0.26 | 0.03 | 720<br>720<br>720 | 20<br>20<br>20 | 21.8 | 1.10E-01 | 0.531 | 3.67E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-09
LAB ID NO.: L10017-09-02
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210720

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.4144<br>0.4198 | 0.4143<br>0.4225 | 0.4115<br>0.4129 | 0.4109<br>0.4088 | 0.4215<br>0.4138 | **0.4150** | 0.0047 |
| DENSITY | D 1505 | g/cc | 0.9539 | 0.9541 | 0.9542 | | | **0.9541** | 0.0001 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 8.6 | 11.1 | 4.6 | 4.2 | 6.0 | **6.90** | 2.913 |
| | SIDE"B" | MD-lb/in | 3.7 | 3.7 | 5.6 | 3.5 | 2.3 | **3.75** | 1.182 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: CK DATE: 5/21/10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

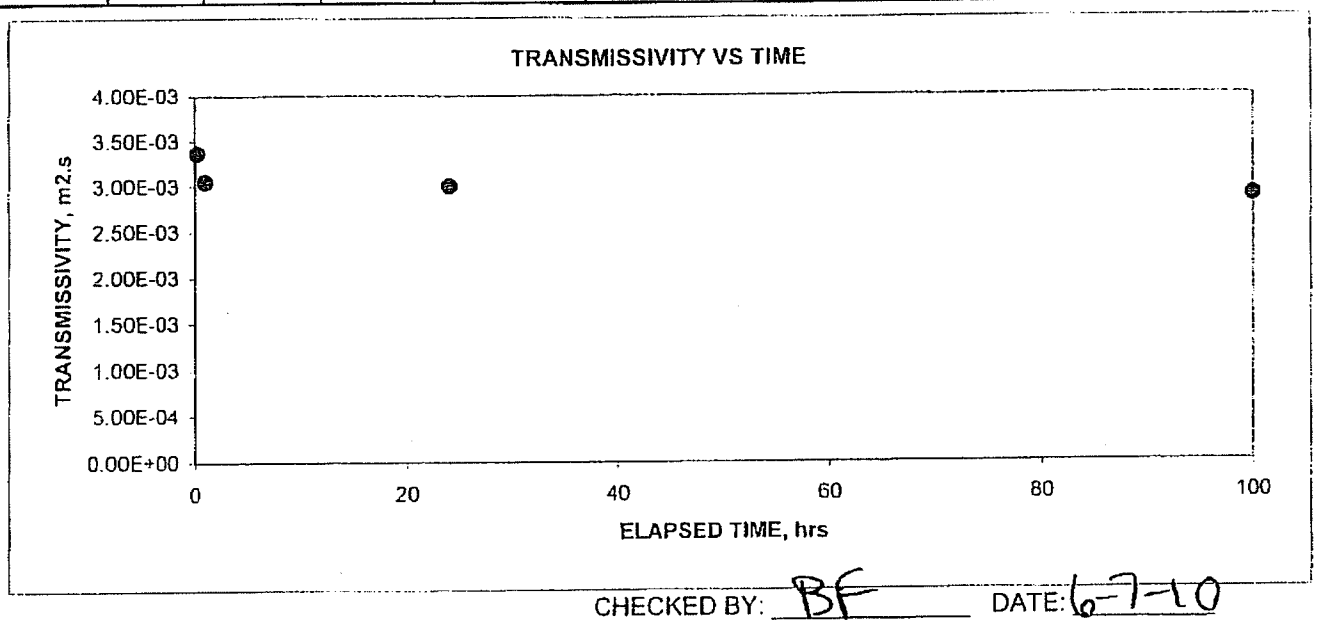
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-09
LAB I.D. NO.: L10017-09-02
ROLL NO.: 359210720
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.86 | 0.50 | 0.03 | 650<br>650<br>650 | 20<br>20<br>20 | 21.1 | 1.01E-01 | 0.488 | 3.37E-03 |
| 1 | 0.86 | 0.50 | 0.03 | 590<br>590<br>590 | 20<br>20<br>20 | 21.2 | 9.15E-02 | 0.442 | 3.05E-03 |
| 24 | 0.86 | 0.50 | 0.03 | 580<br>580<br>580 | 20<br>20<br>20 | 21.2 | 8.99E-02 | 0.434 | 3.00E-03 |
| 100 | 0.86 | 0.50 | 0.03 | 560<br>560<br>560 | 20<br>20<br>20 | 21.5 | 8.62E-02 | 0.416 | 2.87E-03 |

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geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-09
LAB ID NO.: L10017-09-03
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210765

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.3921 | 0.3939 | 0.3997 | 0.4019 | 0.4124 | **0.4003** | 0.0074 |
| | | | 0.4131 | 0.3975 | 0.4008 | 0.3923 | 0.3993 | | |
| DENSITY | D 1505 | g/cc | 0.9536 | 0.9536 | 0.9535 | | | **0.9536** | 0.0001 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 12.3 | 7.4 | 8.0 | 5.5 | 7.5 | **8.16** | 2.503 |
| | SIDE"B" | MD-lb/in | 3.2 | 7.5 | 5.5 | 2.9 | 3.1 | **4.45** | 2.019 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: CK DATE: 5/21/10

\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-09-03 COMP MARSHALL.xls]Sheet1 L10017-09-03 5/21/2010

# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

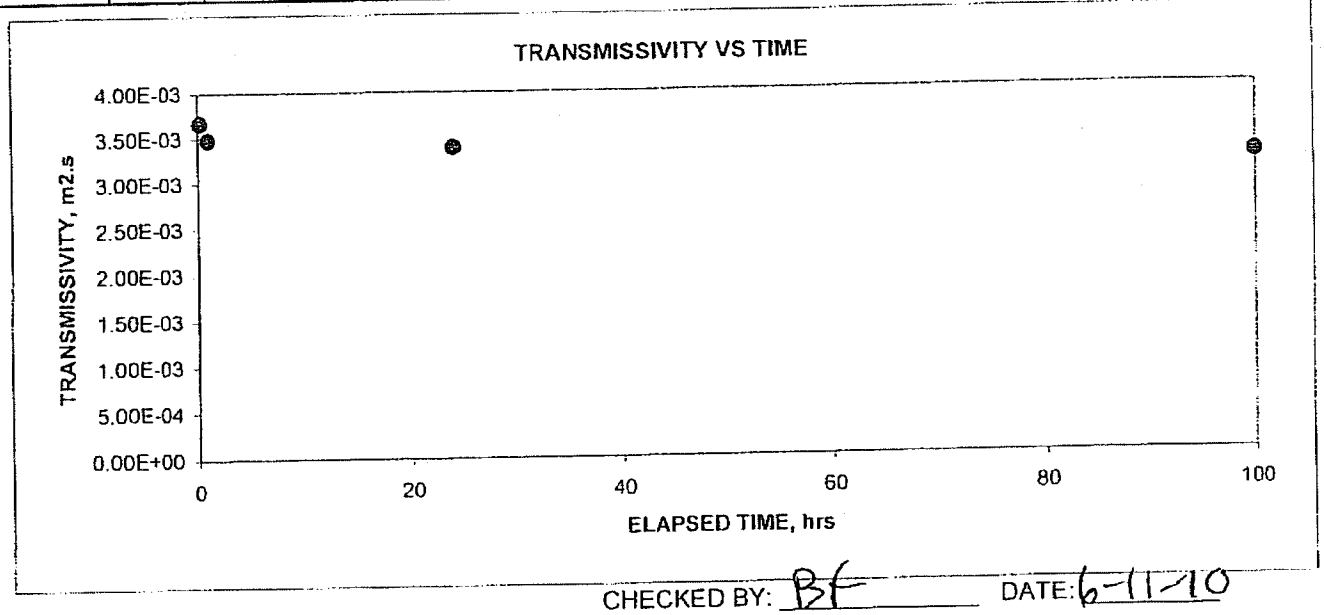
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-09
LAB I.D. NO.: L10017-09-03
ROLL NO.: 359210765
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.60 | 0.24 | 0.03 | 710<br>710<br>710 | 20<br>20<br>20 | 21.2 | 1.10E-01 | 0.532 | 3.67E-03 |
| 1 | 0.60 | 0.24 | 0.03 | 675<br>675<br>675 | 20<br>20<br>20 | 21.3 | 1.04E-01 | 0.504 | 3.48E-03 |
| 24 | 0.60 | 0.24 | 0.03 | 655<br>655<br>655 | 20<br>20<br>20 | 21.2 | 1.02E-01 | 0.491 | 3.38E-03 |
| 100 | 0.60 | 0.24 | 0.03 | 630<br>630<br>630 | 20<br>20<br>20 | 21.6 | 9.67E-02 | 0.467 | 3.22E-03 |




CHECKED BY: BF DATE: 6-11-10

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-09-03 TRANS MARSHALL.xls]Rep1 L10017-09-03 6/11/2010

geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-09
LAB ID NO.: L10017-09-04
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210810

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.3919<br>0.3971 | 0.3937<br>0.3935 | 0.3930<br>0.3904 | 0.3950<br>0.3949 | 0.3971<br>0.3926 | **0.3939** | 0.0022 |
| DENSITY | D 1505 | g/cc | 0.9539 | 0.9538 | 0.9536 | | | **0.9538** | 0.0001 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 9.0 | 11.3 | 9.4 | 3.7 | 6.1 | **7.90** | 2.989 |
| | SIDE"B" | MD-lb/in | 6.0 | 7.5 | 3.9 | 2.0 | 3.9 | **4.66** | 2.141 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: CK DATE: 5/21/10

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INTEGRITY IN TESTING

# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

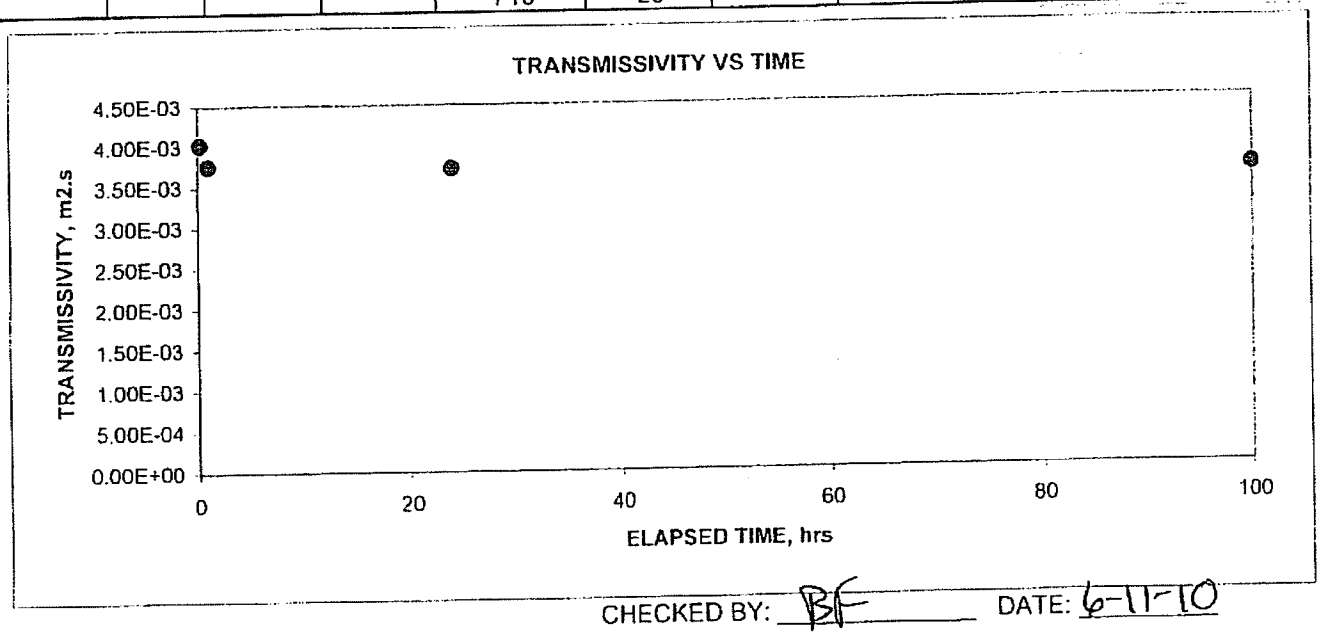
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-09
LAB I.D. NO.: L10017-09-04
ROLL NO.: 359210810
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.60 | 0.24 | 0.03 | 780<br>780<br>780 | 20<br>20<br>20 | 21.3 | 1.21E-01 | 0.583 | 4.02E-03 |
| 1 | 0.60 | 0.24 | 0.03 | 730<br>730<br>730 | 20<br>20<br>20 | 21.4 | 1.13E-01 | 0.544 | 3.75E-03 |
| 24 | 0.60 | 0.24 | 0.03 | 720<br>720<br>720 | 20<br>20<br>20 | 21.3 | 1.11E-01 | 0.538 | 3.71E-03 |
| 100 | 0.60 | 0.24 | 0.03 | 710<br>710<br>710 | 20<br>20<br>20 | 21.6 | 1.09E-01 | 0.527 | 3.63E-03 |

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-09-04 TRANS MARSHALL.xls]Rep1 L10017-09-04 6/11/2010

geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-09
LAB ID NO.: L10017-09-05
MATERIAL: SKAPS TN 330-2-8
ROLL NO: 359210855

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| **THICKNESS** | D 5199 | inches | 0.3938<br>0.3943 | 0.3837<br>0.3986 | 0.4020<br>0.4000 | 0.4038<br>0.4045 | 0.3961<br>0.4033 | **0.3980** | 0.0064 |
| **DENSITY** | D 1505 | g/cc | 0.9549 | 0.9548 | 0.9549 | | | **0.9549** | 0.0001 |
| **Geocomposite** | | | | | | | | | |
| **PLY ADHESION** | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 17.3 | 6.1 | 7.6 | 10.4 | 3.4 | **8.96** | 5.290 |
| | SIDE"B" | MD-lb/in | 6.6 | 5.5 | 4.1 | 1.0 | 2.0 | **3.84** | 2.327 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: CK DATE: 5/21/10

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# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

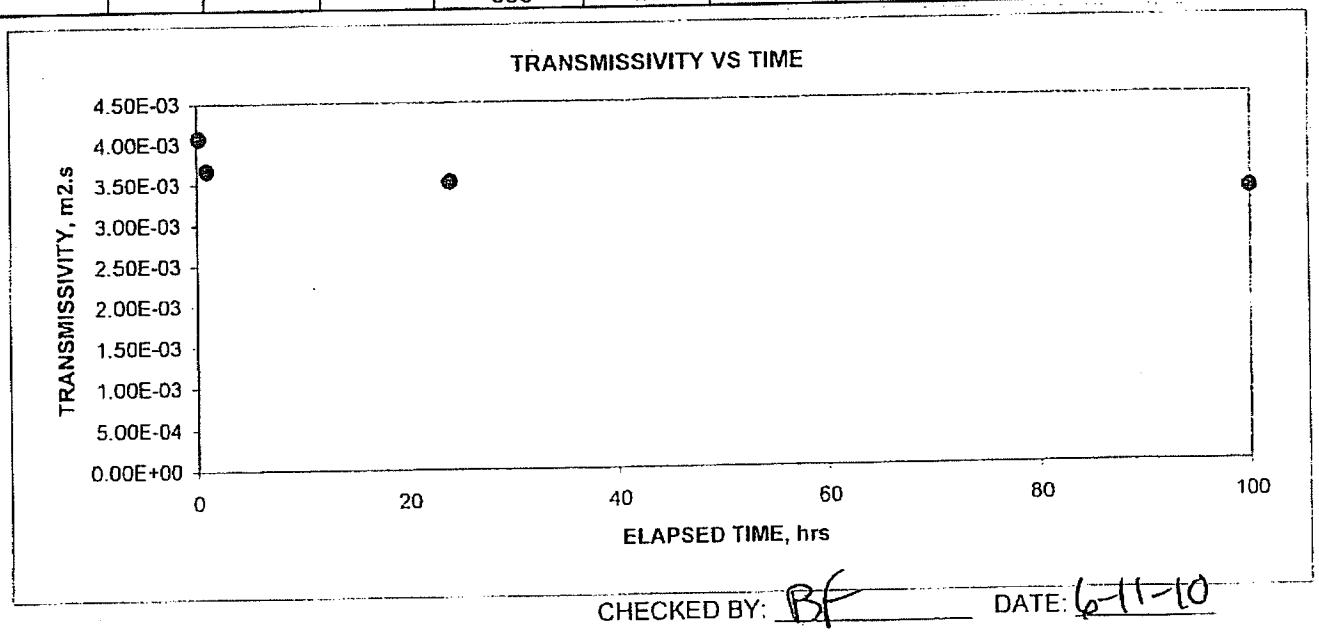
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-09
LAB I.D. NO.: L10017-09-05
ROLL NO.: 359210855
REPLICATE NO.: 1 of 1

TEST SECTION: PROTECTIVE COVER
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
AGRU 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.86 | 0.50 | 0.03 | 790<br>790<br>790 | 20<br>20<br>20 | 21.3 | 1.22E-01 | 0.590 | 4.07E-03 |
| 1 | 0.86 | 0.50 | 0.03 | 710<br>710<br>710 | 20<br>20<br>20 | 21.2 | 1.10E-01 | 0.532 | 3.67E-03 |
| 24 | 0.86 | 0.50 | 0.03 | 680<br>680<br>680 | 20<br>20<br>20 | 21.2 | 1.05E-01 | 0.509 | 3.51E-03 |
| 100 | 0.86 | 0.50 | 0.03 | 650<br>650<br>650 | 20<br>20<br>20 | 21.6 | 9.98E-02 | 0.482 | 3.33E-03 |

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# 350-mil, LDS Geocomposite Alternate Manufacturer's Quality Control (MQC) Test Results

S&ME

SKAPS Industries

**Engineered Synthetic Products, Inc.**

April 16, 2010
Environmental Specialties International
7943 Pecue Lane, Suite A
Baton Rouge, LA 70809

**Ref. :Duke Energy**
**Customer P.O. #**
**Transnet 350-2-8**

We certify that the Transnet 350-2-8 drainage composite, meets the project requirements as stated in the specifications. The properties listed in this section are:

| Property | Test Method | Unit | Required Value | Qualifier |
|---|---|---|---|---|
| **Geonet[5]** | | | | |
| Mass per Unit Area | ASTM D 5261 | $lbs/ft^2$ | 0.162 | Minimum |
| Thickness | ASTM D 5199 | mil | 200 | Minimum |
| Carbon Black | ASTM D 4218 | % | 2 - 3 | Range |
| Tensile Strength | ASTM D 5035 | lbs/in | 45 | Minimum |
| Melt Flow | ASTM D 1238[4] | g/10 min | 1.0 | Maximum |
| Density | ASTM D 1505 | $g/cm^3$ | 0.94 | Minimum |
| **Composite** | | | | |
| Ply Adhesion | ASTM D 7005 | lb/in | 1.0 | MARV[7] |
| **Geotextile[5 & 6]** | | | | |
| Fabric Weight | ASTM D 5261 | $oz/yd^2$ | 8.0 | MARV |
| Grab Strength | ASTM D 4632 | lbs | 200 | MARV |
| Tear Strength | ASTM D 4533 | lbs | 75 | MARV |
| Puncture Resistance | ASTM D 4833 | lbs | 90 | MARV |
| Static Puncture Strength | ASTM D 4833 | lbs | 500 | MARV |
| Permittivity | ASTM D 4491 | $sec^{-1}$ | 0.5 | MARV |
| AOS | ASTM D 4751 | US Sieve | 80 | MARV |
| UV Resistance | ASTM D 4355 | %/hrs | 70/500 | MARV |

**Notes:**

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.33 and a confining pressure of 500 psf between soil & liner after 24 hours.

2 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.02 and a confining pressure of 1000 psf between soil & liner after 24 hours.

3 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.02 and a confining pressure of 12000 psf between soil & liner after 100 hours.

4 Condition 190/2.16

5 Geotextile and Geonet properties are prior to lamination.

6 Geotextile data is provided by the supplier.

7 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,

***Nilay Patel***

Nilay Patel
QA Manager

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN 350-2-8**
**Project : Duke Energy**

We, the Geocomposite manufacturer, hereby certify the following for the material delievered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 323410304 | 323410304 - N | 3234.082 | 3234.104 | 1.77 | 3.53 | |
| 2 | 323410305 | 323410305 - N | 3234.082 | 3234.104 | 1.77 | 3.53 | |
| 3 | 323410306 | 323410306 - N | 3234.082 | 3234.104 | 1.77 | 3.53 | |
| 4 | 323410308 | 323410308 - N | 3234.082 | 3234.104 | 1.77 | 3.53 | |
| 5 | 323410310 | 323410310 - N | 3234.099 | 3234.091 | 1.77 | 3.53 | |
| 6 | 323410314 | 323410314 - N | 3234.099 | 3234.091 | 1.77 | 3.53 | |
| 7 | 323410315 | 323410315 - N | 3234.099 | 3234.091 | 1.77 | 3.53 | |
| 8 | 323410316 | 323410316 - N | 3234.088 | 3234.102 | 1.77 | 3.53 | |
| 9 | 323410317 | 323410317 - N | 3234.088 | 3234.102 | 1.77 | 3.53 | |
| 10 | 323410325 | 323410325 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |
| 11 | 323410326 | 323410326 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |
| 12 | 323410327 | 323410327 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |
| 13 | 323410328 | 323410328 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |
| 14 | 323410329 | 323410329 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |
| 15 | 323410330 | 323410330 - N | 3234.105 | 3234.093 | 1.23 | 3.06 | |

APPROVED 5 QA

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product :** **TN 350-2-8**
**Project :** **Duke Energy**

We, the Geonet Manufacturer, hereby ceritify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area ($lb/ft^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity ($m^2/sec$) |
|---|---|---|---|---|---|---|---|
| 323410304 - N | 26976-3 | 0.9548 | 0.415 | 343 | 2.29 | 112 | |
| 323410305 - N | 26976-3 | 0.9548 | 0.415 | 343 | 2.29 | 112 | |
| 323410306 - N | 26976-3 | 0.9548 | 0.415 | 343 | 2.29 | 112 | |
| 323410308 - N | 26976-3 | 0.9548 | 0.415 | 343 | 2.29 | 112 | |
| 323410310 - N | 26976-3 | 0.9548 | 0.421 | 347 | 2.66 | 118 | |
| 323410314 - N | 26976-3 | 0.9548 | 0.421 | 347 | 2.66 | 118 | |
| 323410315 - N | 26976-3 | 0.9548 | 0.421 | 347 | 2.66 | 118 | |
| 323410316 - N | 26976-3 | 0.9548 | 0.421 | 347 | 2.66 | 118 | |
| 323410317 - N | 26976-3 | 0.9548 | 0.421 | 347 | 2.66 | 118 | |
| 323410325 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410326 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410327 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410328 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410329 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410330 - N | 26976-3 | 0.9552 | 0.419 | 350 | 2.60 | 116 | |

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5
QA

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN 350-2-8**
**Project : Duke Energy**

We, the Geocomposite manufacturer, hereby certify the following for the material delievered to the above referenced project :

| Roll | Geocomposite Roll Number | Geonet Roll Number | Geotextile Roll Number | | Ply Adhesion (lb/in) | | Geocomposite Transmissivity ($m^2$/sec) |
|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | Minimum | Average | |
| 1 | 323410331 | 323410331 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 2 | 323410332 | 323410332 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 3 | 323410333 | 323410333 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 4 | 323410334 | 323410334 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 5 | 323410335 | 323410335 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 6 | 323410336 | 323410336 - N | 3234.062 | 3234.052 | 1.23 | 3.06 | |
| 7 | 323410337 | 323410337 - N | 3234.094 | 3234.098 | 1.23 | 3.06 | |
| 8 | 323410338 | 323410338 - N | 3234.094 | 3234.098 | 1.23 | 3.06 | |
| 9 | 323410339 | 323410339 - N | 3234.094 | 3234.098 | 1.23 | 3.06 | |
| 10 | 323410340 | 323410340 - N | 3234.094 | 3234.098 | 1.75 | 3.50 | |
| 11 | 323410342 | 323410342 - N | 3234.094 | 3234.098 | 1.75 | 3.50 | |
| 12 | 323410343 | 323410343 - N | 3234.094 | 3234.098 | 1.75 | 3.50 | |
| 13 | 323410344 | 323410344 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 14 | 323410345 | 323410345 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 15 | 323410346 | 323410346 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 16 | 323410347 | 323410347 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 17 | 323410348 | 323410348 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 18 | 323410349 | 323410349 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 19 | 323410350 | 323410350 - N | 3234.097 | 3234.089 | 1.75 | 3.50 | |
| 20 | 323410351 | 323410351 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 21 | 323410352 | 323410352 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 22 | 323410353 | 323410353 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 23 | 323410354 | 323410354 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 24 | 323410355 | 323410355 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 25 | 323410356 | 323410356 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |
| 26 | 323410357 | 323410357 - N | 3234.084 | 3234.096 | 1.75 | 3.50 | |

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SKAPS Industries

Engineered Synthetic Products, Inc.

**Product :** TN 350-2-8
**Project :** Duke Energy

We, the Geonet Manufacturer, hereby ceritify the following for the material sent to the above referenced project :

| Geonet Roll Number | Resin Lot Number | Geonet Density (gm/cc) | Mass Per Unit Area (lb/ft$^2$) | Thickness (mils) | Carbon Black (%) | Tensile Strength (MD) (lb/in) | Transmissivity (m$^2$/sec) |
|---|---|---|---|---|---|---|---|
| 323410331 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410332 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410333 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410334 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410335 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410336 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410337 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410338 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410339 - N | 26976-3 | 0.9552 | 0.417 | 345 | 2.35 | 114 | |
| 323410340 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410342 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410343 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410344 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410345 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410346 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410347 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410348 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410349 - N | 26976-3 | 0.9552 | 0.413 | 341 | 2.39 | 113 | |
| 323410350 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410351 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410352 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410353 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410354 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410355 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410356 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |
| 323410357 - N | 26976-3 | 0.9552 | 0.422 | 352 | 2.71 | 119 | |

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SKAPS Industries

# POLYETHYLENE RESIN CERTIFICATION

**Customer Name :** Environmental Specialties International
**Project Name :** Duke Energy
**Geocomposite Manufacturer :** SKAPS Industries
**Geocomposite Production Plant :** Commerce, GA
**Geocomposite Brand Name :** TN350-2-8

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

| Resin Supplier | Resin Production Plant | Resin Brand Name | Resin Lot Number | Property | Test Method | Units | Resin Supplier Value | Tested Value* |
|---|---|---|---|---|---|---|---|---|
| New South Polymers, Inc | Formosa, TX | HDPE | 26976-3 | Density | ASTM D 1505 | gm/cc | 0.950 | 0.950 |
| | | | | Melt Flow Index | ASTM D 1238[a] | gm/10 min | 0.17 | 0.17 |

(a) Condition 190/2.16
* Data from SKAPS Quality Control

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

**Engineered Synthetic Products, Inc.**

**Product : TN350-2-8**
**Project : Duke Energy**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

| GEOCOMP ROLL# | FABRIC ROLL# | WEIGHT oz/sq yd | MD TENSILE lbs. | XMD TENSILE lbs. | MD TRAP lbs. | XMD TRAP lbs. | PUNCTURE lbs. | STATIC PUNCTURE STRENGTH lbs. | AOS us sieve | PERM-ITY $sec^{-1}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 323410304 | 3234.082 | 8.37 | 235 | 241 | 100 | 104 | 132 | 504 | 80 | 1.33 |
| | 3234.104 | 8.28 | 232 | 239 | 96 | 107 | 140 | 508 | 80 | 1.39 |
| 323410310 | 3234.099 | 8.14 | 228 | 237 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| | 3234.091 | 8.18 | 230 | 233 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| 323410316 | 3234.088 | 8.12 | 226 | 230 | 100 | 104 | 132 | 504 | 80 | 1.33 |
| | 3234.102 | 8.28 | 232 | 239 | 96 | 107 | 140 | 508 | 80 | 1.39 |
| 323410325 | 3234.105 | 8.16 | 234 | 245 | 96 | 107 | 140 | 508 | 80 | 1.39 |
| | 3234.093 | 8.18 | 230 | 233 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| 323410331 | 3234.062 | 8.24 | 231 | 236 | 98 | 102 | 135 | 506 | 80 | 1.33 |
| | 3234.052 | 8.22 | 234 | 240 | 100 | 111 | 137 | 510 | 80 | 1.33 |
| 323410337 | 3234.094 | 8.18 | 230 | 233 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| | 3234.098 | 8.14 | 228 | 237 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| 323410344 | 3234.097 | 8.14 | 228 | 237 | 105 | 120 | 138 | 502 | 80 | 1.33 |
| | 3234.089 | 8.12 | 226 | 230 | 100 | 104 | 132 | 504 | 80 | 1.33 |
| 323410351 | 3234.084 | 8.37 | 235 | 241 | 100 | 104 | 132 | 504 | 80 | 1.33 |
| | 3234.096 | 8.14 | 228 | 237 | 105 | 120 | 138 | 502 | 80 | 1.33 |

571 Industrial Parkway, Commerce, GA 30529 Phone: 706-336-7000 Fax: 706-336-7007 Email: skaps@skaps.com

# 350-mm LBS Composite Alternate Conformance Test Results

DRAFT

geotechnics
INTEGRITY IN TESTING

# CONFORMANCE TEST RESULTS

CLIENT: S&ME, INC.
CLIENT PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
PROJECT NO.: L10017-08
LAB ID NO.: L10017-08-01
MATERIAL: SKAPS TN 350-2-8
ROLL NO: 323410309

| TEST | ASTM METHOD | UNITS | SPECIMEN NO. 1 | 2 | 3 | 4 | 5 | AVE | STD |
|---|---|---|---|---|---|---|---|---|---|
| **Geonet*** | | | | | | | | | |
| THICKNESS | D 5199 | inches | 0.3501 | 0.3491 | 0.3499 | 0.3586 | 0.3522 | | |
| | | | 0.3497 | 0.3474 | 0.3566 | 0.3508 | 0.3497 | **0.3514** | 0.0035 |
| DENSITY | D 1505 | g/cc | 0.9528 | 0.9506 | 0.9503 | | | **0.9512** | 0.0014 |
| **Geocomposite** | | | | | | | | | |
| PLY ADHESION | D 7005 | | | | | | | | |
| | SIDE "A" | MD-lb/in | 3.0 | 2.4 | 3.6 | 3.3 | 2.9 | **3.03** | 0.469 |
| | SIDE"B" | MD-lb/in | 3.6 | 2.9 | 2.7 | 3.1 | 2.9 | **3.02** | 0.321 |

* GEONET TAKEN FROM GEOCOMPOSITE LOOSE ENDS

CHECKED BY: J.O DATE: 5-14-10

\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-08-01 COMP MARSHALL.xls]Sheet1 L10017-08-01 5/14/2010

# TRANSMISSIVITY TEST RESULTS

**ASTM D 4716-00**

geotechnics
INTEGRITY IN TESTING

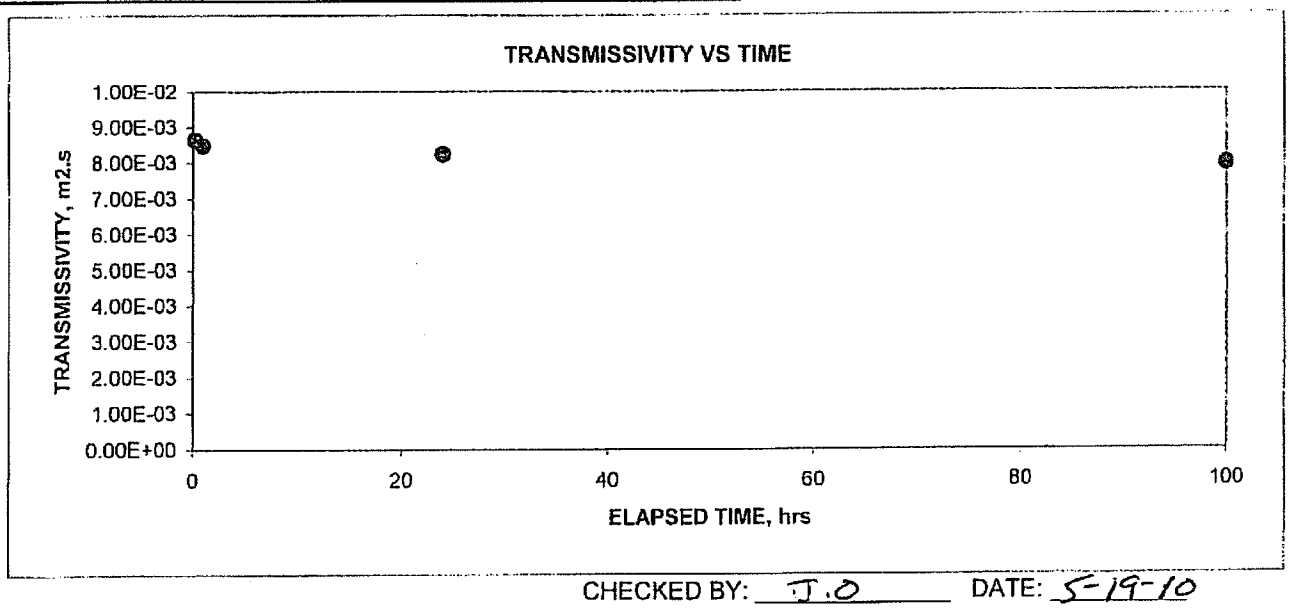
CLIENT: S&ME, INC.
PROJECT: MARSHALL STEAM STATION
INDUSTRIAL LANDFILL NO. 1
MATERIAL: SKAPS TN330-2-8 GEOCOMPOSITE

PROJECT NO.: L10017-08
LAB I.D. NO.: L10017-08-01
ROLL NO.: 323410309
REPLICATE NO.: 1 of 1

TEST SECTION: LINER 60 MIL MICROSPIKE (BOTTOM SIDE)
**SKAPS TN330-2-8 GEOCOMPOSITE - MD**
LINER 60 MIL MICROSPIKE (TOP SIDE)

**7,200 psf NORMAL COMPRESSIVE STRESS**

| ELAPSED TIME (hrs) | MANOMETERS RES. (in) | MANOMETERS WEIR (in) | HYDR. GRAD. | COLLECTION DATA VOLUME (ml) | COLLECTION DATA TIME (sec.) | WATER TEMP °C | AVERAGE FLOW RATE (l/s-m) | AVERAGE FLOW RATE (gpm/ft) | CALCULATED TRANSMISSIVITY (m2/sec) |
|---|---|---|---|---|---|---|---|---|---|
| 0.25 | 0.66 | 0.30 | 0.03 | 1230<br>1230<br>1230 | 15<br>15<br>15 | 20.4 | 2.59E-01 | 1.253 | 8.64E-03 |
| 1 | 0.66 | 0.30 | 0.03 | 1210<br>1210<br>1210 | 15<br>15<br>15 | 20.5 | 2.54E-01 | 1.230 | 8.48E-03 |
| 24 | 0.66 | 0.30 | 0.03 | 1160<br>1160<br>1160 | 15<br>15<br>15 | 20.0 | 2.47E-01 | 1.193 | 8.23E-03 |
| 100 | 0.66 | 0.30 | 0.03 | 1120<br>1120<br>1120 | 15<br>15<br>15 | 20.1 | 2.38E-01 | 1.149 | 7.93E-03 |




CHECKED BY: J.O DATE: 5-19-10

C:\My Documents\EXCEL\Templates\[Trans100hr1Load1Grad.xls]Sheet1
\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\017 - S&ME, INC - MARSHALL STEAM\[L10017-08-01 TRANS MARSHALL.xls]Rep1 L10017-08-01 5/19/2010

# APPENDIX II – GEOSYNTHETICS
# Section 4 – Bills of Lading / Shipment Lists

PLASTIC FUSION FABRICATORS, INC.
THERMOPLASTIC CONSULTING FABRICATION INSTALLATION
3455 STANWOOD BLVD.
HUNTSVILLE, AL 35811
256/852/0378 BUS
256/852/0388 FAX

# PACKING LIST

| Date | PFF Order # | Your Order # | Sales Contact | Shipment # |
|---|---|---|---|---|
| 4/29/2010 | F10066 | MSS11-003 | LEIF MARTIN | 8962 |

**Sold To:** EARNHARDT GRADING INC.
15220 STUMPTOWN RD.
HUNTERSVILLE NC 28078
704-875-6727

**Ship To:** DUKE ENERGY/MARSHALL STEAM STA.
ATTN: EARNHARDT/LF CELL 1 & 2
8320 EAST NC 150
TERRELL NC 28628
WILSON 704-361-7882

| Qty Ordered | Back-Ordered | Qty Shipped | Description |
|---|---|---|---|
| 6 | | 6 | EA. FABRICATED 18" SDR17 HDPE PERFORATED COLLECTION SUMPS. |
| | | | (SUMPS ARE 10' LONG) |
| | | | ***ATTN: 3 EA. HAVE 7.7 DEGREE BENDS & 3 EA. HAVE 19.5 DEGREE |
| | | | BENDS. |
| 6 | | 6 | EA. FABRICATED 18" HDPE FLANGE RINGS AND BLINDS @ 1" THICK |
| | | | AND WITH STAINLESS STEEL HARDWARE. |
| 6 | | 6 | EA. FABRICATED 3" SDR11 HDPE SCREENED VENT PIPES @ 3' LONG. |
| | | | ***ATTN: CALL WILSON WITH ETA AND UPON ARRIVAL AT PLANT TO |
| | | | GET ESCORTED TO UNLOADING SITE. |

**Total Shipping Units** 1
**Total Weight**
**Packed By** Mike PITT

**Shipped Via** TRUCKING WITH CHARACTER
**TRACKING #**

60345900

**PolyPipe®** Trailer #11

Customer Service: 1-800-433-5632

Delivery Ticket#: 80032506
Date: 04/20/2010
Page 1 of 1

Sold To: PLASTIC FUSION FABRICATORS INC
Phone #: 256-852-0378
Deliver To: EARNHARDT GRADING INC
8320 EAST NC 150
TERRELL NC 28682
Payer: PLASTIC FUSION FABRICATORS INC
3455 STANWOOD BLVD
HUNTSVILLE AL 35811

Plant:
Polypipe Erwin
PO Box 199
37650 ERWIN
PH: 423-743-9116
#9700 Job No. 3040666

Order#:1000015123
Job#:P12751
Customer#:3040666
PO#:P12751
Type:3RD

Zone:
Total Load Wt: 17,246.600 LB

Carrier# & Name:
Cont/Pro #:kuston

Bill freight to Payer Account
PLASTIC FUSION FABRICATORS INC
3455 STANWOOD BLVD
HUNTSVILLE AL 35811

Ordered By/Phone#:
LEIF 256-746-1257
256-746-1224 FAX
Shipping Instructions:
F.O.B. ERWIN, TENNESSEE --- SHIP VIA BEST WAY / THIRD PARTY

DELIVER THURSDAY 04-22-10

Jerry Deel

TAG: P.O.# M5511-003

24 HOUR PRECALL REQUIRED FOR DIRECTIONS AND DELIVERY INSTRUCTIONS - WILSON 704-361-7882
SOMEONE WILL MEET DRIVER AT GATE AND DIRECT TO PROPER DELIVERY LOCATION

Contact

*****THANK YOU FOR YOUR ORDER, WE APPRECIATE YOUR BUSINESS*****

BARRY BRITAIN FAX 940-665-8188 / barry.britain@polypipeinc.com / PHONE 888-433-5931

| Load Quantity | UOM | Order Quantity | Product Code | Product Description | Units | UOM |
|---|---|---|---|---|---|---|
| 700.000 | FT | 700.000 | 1306482 | HD,BLK,IPS,18,17,50,W/I<br>POLYPIPE PW HDPE WATER PIPE, AWWA C-906, | 700.000 | FT |

| Subject to Section 7 of conditions of applicable bill of lading. If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement.<br>The carrier shall not make delivery of the shipment without payment of freight and all other lawful charges. | | Customer, by signing below, acknowledges receipt of the goods identified above. |
|---|---|---|
| Shipper Polypipe Inc | Freight Consignor | Customer EARNHARDT GRADING |
| Per Date 4-20-10 | Per Jerry Deel Date | Per Wilson Warlick Date 4-22-10 |

CUSTOMER DELIVERY

**Flying "W" Plastics, Inc.**
P.O. Box 759
487 Vanhorn Rd.
Glenville, WV 26351 USA
Phone: 304-462-5779
Fax: 304-462-7657
Fed ID: 55-071-3785

# Packing Slip No. 31791



*Invoice To:* **Plastic Fusion Fabricators**
3455 Stanwood Blvd
Huntsville, AL 35811
Phone: 256-852-0378
Fax: 256-852-0378

*Ship To:* **EARNHARDT GRADING**
DUKE ENERGY/MARSHALL STEAM STA
8320 EAST NORTH CAROLINA 150
TERRELL, NC 28628
704-601-4290

Reference No.: MSSII-003

| *Ship Date* | *Ship Via* | *Order Date* | *Cust ID* |
|---|---|---|---|
| **4/21/2010** | FWP Company Trucks | **03/22/2010** | 338 |

| *Order Qty* | *Ship/BO Qty* | *Part ID/Description* | *U/M* | *Your Order* | *Our Order* |
|---|---|---|---|---|---|
| **450.00** | **0.00**<br>450.00 | **SP10I1700050**<br>*Rev*<br>10" IPS SDR 17 100 PSI SPEC II 50'<br>PE3408 AWWA PIPE | **FT**<br>*FOB*<br>*Terms* Net 30 Days<br>*Salesperson* 1 | **P12752** | **31791** |
| **3,600.00** | **700.00**<br>2,900.00 | **SP10I1700050PF**<br>*Rev*<br>10" IPS SDR 17 100 PSI SPEC II 50'<br>PE3408 AWWA PIPE PERFORATED | **FT**<br>*FOB*<br>*Terms* Net 30 Days<br>*Salesperson* 1 | **P12752** | **31791** |

SIGNATURE
PRINT

**Flying "W" Plastics, Inc.**
P.O. Box 759
487 Vanhorn Rd.
Glenville, WV 26351 USA
Phone: 304-462-5779
Fax: 304-462-7657
Fed ID: 55-071-3785

# Packing Slip No. 31791-2



*Invoice To:* **Plastic Fusion Fabricators**
3455 Stanwood Blvd
Huntsville, AL 35811
Phone: 256-852-0378
Fax: 256-852-0378

*Ship To:* **EARNHARDT GRADING**
DUKE ENERGY/MARSHALL STEAM STA
8320 EAST NORTH CAROLINA 150
TERRELL, NC 28628
704-601-4290

Reference No.: MSSII-003

| *Ship Date* | *Ship Via* | *Order Date* | *Cust ID* |
|---|---|---|---|
| **4/22/2010** | FWP Company Trucks | **03/22/2010** | 338 |

| *Order Qty* | *Ship/BO Qty* | *Part ID/Description* | *U/M* | *Your Order* | *Our Order* |
|---|---|---|---|---|---|
| **450.00** | **450.00** | **SP10I1700050** | **FT** | **P12752** | **31791** |
| | 0.00 | *Rev* | *FOB* | | |
| | | 10" IPS SDR 17 100 PSI SPEC II 50' | *Terms* Net 30 Days | | |
| | | PE3408 AWWA PIPE | *Salesperson* 1 | | |
| **3,600.00** | **2,900.00** | **SP10I1700050PF** | **FT** | **P12752** | **31791** |
| | 0.00 | *Rev* | *FOB* | | |
| | | 10" IPS SDR 17 100 PSI SPEC II 50' | *Terms* Net 30 Days | | |
| | | PE3408 AWWA PIPE PERFORATED | *Salesperson* 1 | | |

STRAIGHT BILL OF LADING
ORIGINAL - NOT NEGOTIABLE

**BOL# 10-01-1001-002**

Environmental Specialties International, Inc
7943 Pecue Lane Suite A
Baton Rouge, LA 70809

DATE 6/1/2010

CH Robinson / Meteor Express
(NAME OF CARRIER) (SCAC)

| TO: | | FROM: | |
|---|---|---|---|
| CONSIGNEE | Duke Energy Marshall Steam Plant LF #1 | SHIPPER | Environmental Specialties International, Inc. |
| STREET | 6320 NC Highway 150 E | STREET | 7943 Pecue Lane, Suite A |
| DESTINATION | Terrell, NC | ORIGIN | Baton Rouge, La 70809 |
| ZIP CODE | 28682 | Attention: | Fred Clark 225-317-4087 |

Contact: Attn: W. Warlick 704-361-7882 Seal # TAG # BILL # 1-570-17-40118

| NO. SHIPPING UNITS | HM | KIND OF PACKAGING, DESCRIPTION OF ARTICLES | Quantity | WEIGHT (SUBJECT TO CORRECTION) |
|---|---|---|---|---|
| 20 rolls | | Composite (15'x 3' x 1200 lbs) | 20 rolls | 24,000 lbs |
| | | SHIPMENT OF | | |
| | | ALTERNATE GEOCOMPOSITE | | |
| | | Roll # 323410305, 323410306 | | |
| | | 323410307, 323410307 | | |
| | | 323410310, 323410311 | | |
| | | 323410312, 323410313 | | |
| | | 323410314, 323410315 | | |
| | | 323410316, 323410317 | | |
| | | 323410318, 323410319 | | |
| | | 323410325, 323410326 | | |
| | | 323410327, 323410328 | | |
| | | 323410329, 323410330 | | |
| Total | | | Total | Total |
| 20 rolls | | | 20 rolls | 24,000 lbs |

| | | | | |
|---|---|---|---|---|
| FREIGHT C.O.D. TO | COD AMT: | C.O.D. | PREPAID | $ |
| ADDRESS - ESI @ 7943 Pecue Lane, Suite A, Baton Rouge, LA | | FEE: | COLLECT | $ |

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Carrier: CH Robinson

Shipper: ESI
Baton Rouge, LA

Per:

Driver:

Driver's #:

Date: 6/1/2010

* Hazmat table "X" to incorporate Hazmatrum Materials as defined in Title 49 of the Code of Federal Regulations

STRAIGHT BILL OF LADING
ORIGINAL - NOT NEGOTIABLE

**BOL# 10-01-1001-001**

Environmental Specialties International, Inc
7943 Pecue Lane Suite A
Baton Rouge, LA 70809

DATE 6/1/2010

CH Robinson
(NAME OF CARRIER) (SCAC)

| TO: | | FROM: | |
|---|---|---|---|
| CONSIGNEE | Duke Energy Marshall Steam Plant LF #1 | SHIPPER | Environmental Specialties International, Inc. |
| STREET | 8320 NC Highway 150 E | STREET | 7943 Pecue Lane, Suite A |
| DESTINATION | Terrell, NC | ORIGIN | Baton Rouge, La 70809 |
| ZIP CODE | 28682 | Attention: | Fred Clark 225-317-4087 |

Contact: Attn: W. Warlick 704-361-7882 Seal # TAG # TPL #

| NO. SHIPPING UNITS | HM | KIND OF PACKAGING, DESCRIPTION OF ARTICLES | Quantity | WEIGHT (SUBJECT TO CORRECTION) |
|---|---|---|---|---|
| 20 rolls | | Composite (15'x 3' x 1200 lbs) | 20 rolls | 24,000 lbs. |
| | | SHIPMENT OF | | |
| | | ALTERNATE GEOCOMPOSITE | | |
| | | Roll # 323410335, 323410337 | | |
| | | 323410338, 323410339 | | |
| | | 323410340, 323410341 | | |
| | | 323410342, 323410343 | | |
| | | 323410344, 323410304 | | |
| | | 323410321, 323410322 | | |
| | | 323410323, 323410324 | | |
| | | 323410331, 323410332 | | |
| | | 323410333, 323410334 | | |
| | | 323410336, 323410320 | | |
| Total | | | Total | Total |
| 20 rolls | | | 20 rolls | 24,000 lbs |

| REMIT C.O.D. TO: | COD AMT: | C.O.D. | PREPAID | $ |
|---|---|---|---|---|
| ADDRESS - ESI @ 7943 Pecue Lane, Suite A, Baton Rouge, LA | | FEE: | COLLECT | $ |

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Carrier: CH Robinson

Shipper: ESI
Baton Rouge, LA

Driver:

Per:

Driver's #:

Date: 6/1/2010

* Mark with "X" to designate Hazardous Material as defined in Title 49 of the Code of Federal Regulations

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14890

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/25/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210300 | 2240 | 16 | 359210369 | 2240 |
| 2 | 359210301 | 2240 | 17 | 359210371 | 2240 |
| 3 | 359210302 | 2240 | 18 | 359210374 | 2240 |
| 4 | 359210303 | 2240 | 19 | 359210375 | 2240 |
| 5 | 359210315 | 2240 | 20 | 359210376 | 2240 |
| 6 | 359210316 | 2240 | 21 | 359210377 | 2240 |
| 7 | 359210322 | 2240 | 22 | 359210379 | 2240 |
| 8 | 359210323 | 2240 | 23 | 359210380 | 1680 |
| 9 | 359210326 | 2240 | 24 | 359210382 | 2240 |
| 10 | 359210330 | 2240 | 25 | 359210383 | 2240 |
| 11 | 359210331 | 2240 | 26 | 359210384 | 2240 |
| 12 | 359210332 | 2240 | 27 | 359210385 | 2240 |
| 13 | 359210366 | 2240 | | | |
| 14 | 359210367 | 2240 | | | |
| 15 | 359210368 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,920
Total Weight: 35,361

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Loadpro
Date : 5/25/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14891

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/25/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210076 | 1400 | 16 | 359210321 | 2240 |
| 2 | 359210077 | 2240 | 17 | 359210324 | 2100 |
| 3 | 359210078 | 2240 | 18 | 359210325 | 2240 |
| 4 | 359210304 | 2240 | 19 | 359210327 | 2240 |
| 5 | 359210305 | 2240 | 20 | 359210328 | 2240 |
| 6 | 359210306 | 2240 | 21 | 359210329 | 2240 |
| 7 | 359210307 | 2240 | 22 | 359210333 | 2240 |
| 8 | 359210308 | 2240 | 23 | 359210364 | 2240 |
| 9 | 359210309 | 2240 | 24 | 359210365 | 2240 |
| 10 | 359210311 | 2240 | 25 | 359210372 | 2240 |
| 11 | 359210312 | 2240 | 26 | 359210373 | 2240 |
| 12 | 359210313 | 2240 | 27 | 359210381 | 2240 |
| 13 | 359210318 | 2240 | | | |
| 14 | 359210319 | 2240 | | | |
| 15 | 359210320 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,500
Total Weight: 35,300

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : KEUMTU
Driver's Name : JEFF THROCKMORTON
Driver's Sign :
Driver's Cell Phone # : 418-222-8435
Trucking Co. : KEUMTU (CANADA)
Trucking Co. Phone # : SAME
Broker : Cheetah
Date : 5/25/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper. Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14899

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/26/2010

Cust. P.O. # 13179

Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. |
|---|---|---|
| 1 | 359210001 | 2240 |
| 2 | 359210002 | 2520 |
| 3 | 359210003 | 2240 |
| 4 | 359210004 | 2240 |
| 5 | 359210005 | 2240 |
| 6 | 359210006 | 2240 |
| 7 | 359210023 | 2240 |
| 8 | 359210025 | 2240 |
| 9 | 359210026 | 2240 |
| 10 | 359210027 | 2240 |
| 11 | 359210028 | 2240 |
| 12 | 359210030 | 2240 |
| 13 | 359210037 | 2240 |
| 14 | 359210038 | 2240 |
| 15 | 359210039 | 1960 |
| 16 | 359210040 | 2240 |
| 17 | 359210041 | 2240 |
| 18 | 359210047 | 2240 |
| 19 | 359210048 | 2240 |
| 20 | 359210049 | 2240 |
| 21 | 359210050 | 2240 |
| 22 | 359210052 | 2240 |
| 23 | 359210055 | 2240 |
| 24 | 359210057 | 2240 |
| 25 | 359210058 | 2240 |
| 26 | 359210059 | 2240 |
| 27 | 359210060 | 2240 |

SHIPMENT SUMMARY

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 36,881

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign : _____

ATTN RECEIVER : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Mercer
Date : 5/26/2010

CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14904

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/26/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210007 | 2240 | 16 | 359210042 | 2240 |
| 2 | 359210008 | 1890 | 17 | 359210043 | 2240 |
| 3 | 359210009 | 2520 | 18 | 359210044 | 2240 |
| 4 | 359210010 | 2240 | 19 | 359210045 | 2240 |
| 5 | 359210011 | 2240 | 20 | 359210046 | 2240 |
| 6 | 359210019 | 2240 | 21 | 359210051 | 2240 |
| 7 | 359210020 | 2240 | 22 | 359210053 | 2240 |
| 8 | 359210021 | 2170 | 23 | 359210054 | 2240 |
| 9 | 359210022 | 2170 | 24 | 359210056 | 2240 |
| 10 | 359210024 | 2240 | 25 | 359210061 | 2240 |
| 11 | 359210029 | 2240 | 26 | 359210062 | 2240 |
| 12 | 359210031 | 2240 | 27 | 359210063 | 2240 |
| 13 | 359210032 | 2240 | | | |
| 14 | 359210033 | 2240 | | | |
| 15 | 359210034 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,270
Total Weight: 36,777

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

2 Bags of Ties
Short

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Anderson
Date : 5/26/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) If the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) If the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14910

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/26/2010

Cust. P.O. # : 13179

Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210012 | 2240 | 16 | 359210192 | 2240 |
| 2 | 359210013 | 2240 | 17 | 359210193 | 2240 |
| 3 | 359210014 | 2240 | 18 | 359210194 | 2240 |
| 4 | 359210015 | 2240 | 19 | 359210195 | 2240 |
| 5 | 359210016 | 2240 | 20 | 359210196 | 2240 |
| 6 | 359210017 | 2240 | 21 | 359210197 | 2240 |
| 7 | 359210018 | 2240 | 22 | 359210198 | 2240 |
| 8 | 359210035 | 2240 | 23 | 359210199 | 1400 |
| 9 | 359210036 | 2240 | 24 | 359210419 | 2240 |
| 10 | 359210185 | 2240 | 25 | 359210422 | 2240 |
| 11 | 359210187 | 2240 | 26 | 359210423 | 2240 |
| 12 | 359210188 | 2240 | 27 | 359210426 | 2240 |
| 13 | 359210189 | 2240 | | | |
| 14 | 359210190 | 2240 | | | |
| 15 | 359210191 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 59,640
Total Weight: 36,699

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Lonestar
Date : 5/26/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER 5/26/10
SHIPPER ADDRESS: 571 ~~INDUSTRIAL PKWY~~
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries, subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14911

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/27/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210159 | 2240 | 16 | 359210174 | 2240 |
| 2 | 359210160 | 2240 | 17 | 359210175 | 2240 |
| 3 | 359210161 | 2240 | 18 | 359210176 | 2240 |
| 4 | 359210162 | 2240 | 19 | 359210177 | 2240 |
| 5 | 359210163 | 2240 | 20 | 359210178 | 2240 |
| 6 | 359210164 | 2240 | 21 | 359210179 | 2240 |
| 7 | 359210165 | 2240 | 22 | 359210180 | 2240 |
| 8 | 359210166 | 2240 | 23 | 359210181 | 2240 |
| 9 | 359210167 | 2240 | 24 | 359210182 | 2240 |
| 10 | 359210168 | 2240 | 25 | 359210183 | 2240 |
| 11 | 359210169 | 2240 | 26 | 359210184 | 2240 |
| 12 | 359210170 | 2240 | 27 | 359210186 | 2240 |
| 13 | 359210171 | 2240 | | | |
| 14 | 359210172 | 2240 | | | |
| 15 | 359210173 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet : 60,480
Total Weight : 36,935

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday
2) Driver must call 706-336-7000 when unloaded
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice. failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Cheetah
Date : 5/27/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

#1623

Bill of Lading # : 14914

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/27/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210334 | 2240 | 16 | 359210351 | 2240 |
| 2 | 359210337 | 2240 | 17 | 359210352 | 1400 |
| 3 | 359210338 | 2240 | 18 | 359210353 | 2240 |
| 4 | 359210339 | 2240 | 19 | 359210354 | 2240 |
| 5 | 359210340 | 2240 | 20 | 359210355 | 2240 |
| 6 | 359210341 | 2240 | 21 | 359210356 | 2240 |
| 7 | 359210342 | 2240 | 22 | 359210357 | 2240 |
| 8 | 359210343 | 2240 | 23 | 359210358 | 2240 |
| 9 | 359210344 | 2240 | 24 | 359210360 | 2240 |
| 10 | 359210345 | 2240 | 25 | 359210361 | 2240 |
| 11 | 359210346 | 2240 | 26 | 359210362 | 2240 |
| 12 | 359210347 | 2240 | 27 | 359210363 | 2240 |
| 13 | 359210348 | 2240 | | | |
| 14 | 359210349 | 2240 | | | |
| 15 | 359210350 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 59,640
Total Weight: 35,566

Bags of ties : 2 (IN TRUCK SIDE BOX)

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : DAVID HALLEN
Driver's Name :
Driver's Sign :
Driver's Cell Phone # : 803-378-2430
Trucking Co. : SENN
Trucking Co. Phone # : 800-447-0792
Broker : Loadpro
Date : 5/27/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14926

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/27/2010
Cust. P.C. # : 13179
Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210105 | 2240 | 16 | 359210121 | 1890 |
| 2 | 359210106 | 2240 | 17 | 359210122 | 2240 |
| 3 | 359210108 | 2240 | 18 | 359210123 | 2240 |
| 4 | 359210109 | 2240 | 19 | 359210124 | 2240 |
| 5 | 359210110 | 2240 | 20 | 359210125 | 2240 |
| 6 | 359210111 | 2240 | 21 | 359210126 | 2240 |
| 7 | 359210112 | 2240 | 22 | 359210127 | 2240 |
| 8 | 359210113 | 2240 | 23 | 359210128 | 2240 |
| 9 | 359210114 | 2240 | 24 | 359210129 | 2240 |
| 10 | 359210115 | 2240 | 25 | 359210131 | 2240 |
| 11 | 359210116 | 2240 | 26 | 359210132 | 2240 |
| 12 | 359210117 | 2240 | 27 | 359210133 | 2240 |
| 13 | 359210118 | 2240 | | | |
| 14 | 359210119 | 2240 | | | |
| 15 | 359210120 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,130
Total Weight: 36,558

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign :

**ATTN RECEIVER : If ties are not collected from driver, *SKAPS* will not assume responsibility**

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Lonestar
Date : 5/27/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS. 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occuring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14927

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/28/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210130 | 2240 | 16 | 359210148 | 2240 |
| 2 | 359210134 | 2240 | 17 | 359210149 | 2240 |
| 3 | 359210135 | 2240 | 18 | 359210150 | 2240 |
| 4 | 359210136 | 2240 | 19 | 359210151 | 2240 |
| 5 | 359210137 | 2240 | 20 | 359210152 | 2240 |
| 6 | 359210138 | 2240 | 21 | 359210153 | 2240 |
| 7 | 359210139 | 2240 | 22 | 359210154 | 2240 |
| 8 | 359210140 | 2240 | 23 | 359210155 | 2240 |
| 9 | 359210141 | 2240 | 24 | 359210156 | 2240 |
| 10 | 359210142 | 2240 | 25 | 359210157 | 2240 |
| 11 | 359210143 | 2240 | 26 | 359210158 | 2240 |
| 12 | 359210144 | 2240 | 27 | 359210200 | 2240 |
| 13 | 359210145 | 2240 | | | |
| 14 | 359210146 | 2240 | | | |
| 15 | 359210147 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 36,755

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign . [signature]

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name : [illegible]
Driver's Sign [illegible]
Driver's Cell Phone # : 704 902-[illegible]
Trucking Co. [illegible]
Trucking Co. Phone # : 704-[illegible]-6706
Broker : Mercer
Date : 5/28/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER [signature] 5-28-10
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either. (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14928

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/27/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210079 | 2240 | 16 | 359210094 | 2240 |
| 2 | 359210080 | 2240 | 17 | 359210095 | 2240 |
| 3 | 359210081 | 2240 | 18 | 359210096 | 2240 |
| 4 | 359210082 | 2100 | 19 | 359210097 | 2240 |
| 5 | 359210083 | 2240 | 20 | 359210098 | 2240 |
| 6 | 359210084 | 2240 | 21 | 359210099 | 2240 |
| 7 | 359210085 | 2240 | 22 | 359210100 | 2240 |
| 8 | 359210086 | 2240 | 23 | 359210101 | 2240 |
| 9 | 359210087 | 2240 | 24 | 359210102 | 2240 |
| 10 | 359210088 | 2240 | 25 | 359210103 | 2240 |
| 11 | 359210089 | 2240 | 26 | 359210104 | 2240 |
| 12 | 359210090 | 2240 | 27 | 359210107 | 2240 |
| 13 | 359210091 | 2240 | | | |
| 14 | 359210092 | 2240 | | | |
| 15 | 359210093 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,340
Total Weight: 36,884

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : _____

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Lonestar
Date : 5/27/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14933

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/28/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210275 | 2240 | 16 | 359210290 | 2240 |
| 2 | 359210276 | 2240 | 17 | 359210291 | 2240 |
| 3 | 359210277 | 2240 | 18 | 359210292 | 2240 |
| 4 | 359210278 | 2240 | 19 | 359210293 | 2240 |
| 5 | 359210279 | 2240 | 20 | 359210294 | 2240 |
| 6 | 359210280 | 2240 | 21 | 359210295 | 2240 |
| 7 | 359210281 | 2240 | 22 | 359210296 | 2240 |
| 8 | 359210282 | 2240 | 23 | 359210297 | 2240 |
| 9 | 359210283 | 2240 | 24 | 359210298 | 2240 |
| 10 | 359210284 | 2240 | 25 | 359210299 | 2240 |
| 11 | 359210285 | 2240 | 26 | 359210335 | 2240 |
| 12 | 359210286 | 2240 | 27 | 359210336 | 2240 |
| 13 | 359210287 | 2240 | | | |
| 14 | 359210288 | 2380 | | | |
| 15 | 359210289 | 2380 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,760
Total Weight: 35,819

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Lonestar
Date : 5/28/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14935

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/28/2010
Cust. P.O. # : 13179
Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210258 | 2240 | 16 | 359210274 | 2240 |
| 2 | 359210259 | 2240 | 17 | 359210414 | 2240 |
| 3 | 359210260 | 2240 | 18 | 359210415 | 2240 |
| 4 | 359210262 | 2240 | 19 | 359210416 | 2240 |
| 5 | 359210263 | 2240 | 20 | 359210417 | 2240 |
| 6 | 359210264 | 2240 | 21 | 359210418 | 2240 |
| 7 | 359210265 | 2240 | 22 | 359210420 | 2240 |
| 8 | 359210266 | 2240 | 23 | 359210421 | 2240 |
| 9 | 359210267 | 2240 | 24 | 359210424 | 2240 |
| 10 | 359210268 | 2240 | 25 | 359210425 | 2240 |
| 11 | 359210269 | 2240 | 26 | 359210427 | 2240 |
| 12 | 359210270 | 2240 | 27 | 359210428 | 2240 |
| 13 | 359210271 | 2240 | | | |
| 14 | 359210272 | 2240 | | | |
| 15 | 359210273 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 35,156

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Lonestar
Date : 5/28/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER 5-28-10
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14937

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 5/28/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210230 | 2240 | 16 | 359210247 | 2240 |
| 2 | 359210233 | 2240 | 17 | 359210248 | 2240 |
| 3 | 359210234 | 2240 | 18 | 359210249 | 2240 |
| 4 | 359210235 | 2240 | 19 | 359210250 | 2240 |
| 5 | 359210236 | 2240 | 20 | 359210251 | 2240 |
| 6 | 359210237 | 2240 | 21 | 359210252 | 2240 |
| 7 | 359210238 | 2240 | 22 | 359210253 | 2240 |
| 8 | 359210239 | 2240 | 23 | 359210254 | 2240 |
| 9 | 359210240 | 2240 | 24 | 359210255 | 2240 |
| 10 | 359210241 | 2240 | 25 | 359210256 | 2240 |
| 11 | 359210242 | 2240 | 26 | 359210257 | 2170 |
| 12 | 359210243 | 2240 | 27 | 359210261 | 2240 |
| 13 | 359210244 | 2240 | | | |
| 14 | 359210245 | 2240 | | | |
| 15 | 359210246 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,410
Total Weight: 35,324

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : _____

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Loadpro
Date : 5/28/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper. Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14938

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/1/2010
Cust. P.O. # : 13179
Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210387 | 2240 | 16 | 359210402 | 2240 |
| 2 | 359210388 | 2240 | 17 | 359210403 | 2240 |
| 3 | 359210389 | 2240 | 18 | 359210404 | 2240 |
| 4 | 359210390 | 2380 | 19 | 359210405 | 2240 |
| 5 | 359210391 | 2240 | 20 | 359210406 | 2240 |
| 6 | 359210392 | 2240 | 21 | 359210407 | 2240 |
| 7 | 359210393 | 2240 | 22 | 359210408 | 2240 |
| 8 | 359210394 | 2240 | 23 | 359210409 | 2240 |
| 9 | 359210395 | 2240 | 24 | 359210410 | 2240 |
| 10 | 359210396 | 2240 | 25 | 359210411 | 2240 |
| 11 | 359210397 | 2240 | 26 | 359210412 | 2240 |
| 12 | 359210398 | 2240 | 27 | 359210413 | 2240 |
| 13 | 359210399 | 2240 | | | |
| 14 | 359210400 | 2240 | | | |
| 15 | 359210401 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,620
Total Weight: 34,230

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign : [illegible]

ATTN RECEIVER : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : [illegible]
Driver's Name : [illegible]
Driver's Sign : [illegible]
Driver's Cell Phone # : 803-209-1876
Trucking Co. : [illegible]
Trucking Co. Phone # :
Broker : Lonestar
Date : 6/1/2010

CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14940

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/1/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210570 | 2240 | 16 | 359210589 | 2240 |
| 2 | 359210571 | 2240 | 17 | 359210590 | 2240 |
| 3 | 359210572 | 2240 | 18 | 359210591 | 2800 |
| 4 | 359210573 | 2240 | 19 | 359210592 | 2240 |
| 5 | 359210574 | 2240 | 20 | 359210593 | 2240 |
| 6 | 359210575 | 2240 | 21 | 359210594 | 2240 |
| 7 | 359210578 | 2240 | 22 | 359210595 | 2240 |
| 8 | 359210579 | 2240 | 23 | 359210596 | 2240 |
| 9 | 359210580 | 2240 | 24 | 359210606 | 1820 |
| 10 | 359210581 | 2240 | 25 | 359210627 | 2240 |
| 11 | 359210582A | 1400 | 26 | 359210629 | 2240 |
| 12 | 359210584 | 1820 | 27 | 359210630 | 2240 |
| 13 | 359210585 | 2100 | | | |
| 14 | 359210587 | 2240 | | | |
| 15 | 359210588 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,220
Total Weight: 38,281

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Anderson Tr.
Date : 6/1/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14941

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/1/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210204 | 2240 | 16 | 359210220 | 2240 |
| 2 | 359210205 | 2240 | 17 | 359210221 | 2240 |
| 3 | 359210206 | 2240 | 18 | 359210222 | 2240 |
| 4 | 359210207 | 2240 | 19 | 359210223 | 2240 |
| 5 | 359210208 | 2240 | 20 | 359210224 | 2240 |
| 6 | 359210209 | 2240 | 21 | 359210225 | 2240 |
| 7 | 359210210 | 2240 | 22 | 359210226 | 2240 |
| 8 | 359210211 | 2240 | 23 | 359210227 | 2240 |
| 9 | 359210212 | 2240 | 24 | 359210228 | 2240 |
| 10 | 359210213 | 2100 | 25 | 359210229 | 2240 |
| 11 | 359210214 | 2240 | 26 | 359210231 | 2240 |
| 12 | 359210215 | 2240 | 27 | 359210232 | 2240 |
| 13 | 359210217 | 2240 | | | |
| 14 | 359210218 | 2240 | | | |
| 15 | 359210219 | 2030 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,130
Total Weight: 33,981

Bags of ties : 2

**Driver sign below if you have received above mentioned Items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Cheetah
Date : 6/1/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) If the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # 14942

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip: Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date: 6/1/2010
Cust. P.O. #: 13179
Job #: 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210064 | 2240 | 16 | 359210216 | 2240 |
| 2 | 359210065 | 2240 | 17 | 359210442 | 2240 |
| 3 | 359210066 | 2240 | 18 | 359210452 | 2240 |
| 4 | 359210067 | 2240 | 19 | 359210576 | 2240 |
| 5 | 359210068 | 2240 | 20 | 359210577 | 2240 |
| 6 | 359210069 | 2240 | 21 | 359210583A | 1400 |
| 7 | 359210070 | 2240 | 22 | 359210586 | 2240 |
| 8 | 359210071 | 2240 | 23 | 359210603 | 2240 |
| 9 | 359210072 | 2240 | 24 | 359210604 | 1400 |
| 10 | 359210073 | 2240 | 25 | 359210605 | 2240 |
| 11 | 359210074 | 2240 | 26 | 359210613 | 2240 |
| 12 | 359210075 | 2240 | 27 | 359210628 | 2240 |
| 13 | 359210201 | 2100 | | | |
| 14 | 359210202 | 2240 | | | |
| 15 | 359210203 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code:** TN 330-2-8

Total Rolls: 27
Total Sq. Feet: 58,660
Total Weight: 36,507

Bags of ties: 2

**Driver sign below if you have received above mentioned items:**

Driver's Sign: CHARLES

**ATTN RECEIVER:** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container #: _____
Seal #: _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by:
Driver's Name: CHARLES
Driver's Sign: CHALE
Driver's Cell Phone #: 1-864-992-7160
Trucking Co.: CROMER
Trucking Co. Phone #: 1-864-445-4640
Broker: Lonestar
Date: 6/1/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail info@skaps.com

Bill of Lading # : 14946

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/2/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210465 | 2240 | 16 | 359210496 | 2100 |
| 2 | 359210466 | 2100 | 17 | 359210497 | 2240 |
| 3 | 359210467 | 2240 | 18 | 359210498 | 2170 |
| 4 | 359210468 | 2240 | 19 | 359210499 | 2240 |
| 5 | 359210476 | 2240 | 20 | 359210500 | 2240 |
| 6 | 359210478 | 2240 | 21 | 359210501 | 2240 |
| 7 | 359210480 | 2240 | 22 | 359210503 | 2240 |
| 8 | 359210481 | 2240 | 23 | 359210508 | 2240 |
| 9 | 359210485 | 2240 | 24 | 359210509 | 2240 |
| 10 | 359210486 | 2240 | 25 | 359210510 | 2240 |
| 11 | 359210487 | 2240 | 26 | 359210511 | 2240 |
| 12 | 359210491 | 2240 | 27 | 359210512 | 2240 |
| 13 | 359210493 | 2240 | | | |
| 14 | 359210494 | 2240 | | | |
| 15 | 359210495 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,130
Total Weight: 39,432

Bags of ties : 2

**Driver sign below if you have received above mentioned Items :**

Driver's Sign : _____

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Cheetah
Date : 6/2/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14947

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/2/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210455 | 2240 | 16 | 359210482 | 2240 |
| 2 | 359210457 | 2030 | 17 | 359210483 | 2240 |
| 3 | 359210461 | 2240 | 18 | 359210484 | 2240 |
| 4 | 359210462 | 2240 | 19 | 359210488 | 2240 |
| 5 | 359210463 | 2240 | 20 | 359210489 | 2240 |
| 6 | 359210464 | 2240 | 21 | 359210490 | 2240 |
| 7 | 359210469 | 2240 | 22 | 359210492 | 2240 |
| 8 | 359210470 | 2240 | 23 | 359210502 | 2240 |
| 9 | 359210471 | 2240 | 24 | 359210504 | 2240 |
| 10 | 359210472 | 2240 | 25 | 359210505 | 2240 |
| 11 | 359210473 | 2240 | 26 | 359210506 | 2240 |
| 12 | 359210474 | 1400 | 27 | 359210507 | 2240 |
| 13 | 359210475 | 1750 | | | |
| 14 | 359210477 | 2240 | | | |
| 15 | 359210479 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 58,940
Total Weight: 39,292

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : _____

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Cheetah
Date : 6/2/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

## STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14949

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/2/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210527 | 2240 | 16 | 359210556 | 2240 |
| 2 | 359210533 | 2240 | 17 | 359210557 | 2240 |
| 3 | 359210542 | 2240 | 18 | 359210558 | 2240 |
| 4 | 359210543 | 2240 | 19 | 359210559 | 2240 |
| 5 | 359210544 | 2240 | 20 | 359210562 | 2240 |
| 6 | 359210545 | 2240 | 21 | 359210563 | 2450 |
| 7 | 359210546 | 2240 | 22 | 359210564 | 2240 |
| 8 | 359210547 | 2240 | 23 | 359210565 | 2240 |
| 9 | 359210548 | 2240 | 24 | 359210566 | 2240 |
| 10 | 359210549 | 2240 | 25 | 359210567 | 2240 |
| 11 | 359210550 | 2240 | 26 | 359210568 | 2240 |
| 12 | 359210551 | 2240 | 27 | 359210569 | 1680 |
| 13 | 359210553 | 2240 | | | |
| 14 | 359210554 | 2240 | | | |
| 15 | 359210555 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,130
Total Weight: 39,500

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. : Green
Trucking Co. Phone # :
Broker : Lonestar
Date : 6/2/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14954

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/2/2010
Cust. P.O. # : 13179
Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210513 | 2240 | 16 | 359210532 | 2240 |
| 2 | 359210514 | 2240 | 17 | 359210534 | 2240 |
| 3 | 359210515 | 2240 | 18 | 359210535 | 2310 |
| 4 | 359210519 | 2240 | 19 | 359210536 | 2310 |
| 5 | 359210520 | 2240 | 20 | 359210537 | 2240 |
| 6 | 359210521 | 2240 | 21 | 359210538 | 2240 |
| 7 | 359210522 | 2240 | 22 | 359210539 | 2240 |
| 8 | 359210523 | 2240 | 23 | 359210540 | 2240 |
| 9 | 359210524 | 2240 | 24 | 359210541 | 1820 |
| 10 | 359210525 | 2240 | 25 | 359210552 | 2240 |
| 11 | 359210526 | 2240 | 26 | 359210560 | 2240 |
| 12 | 359210528 | 2240 | 27 | 359210561 | 1540 |
| 13 | 359210529 | 2240 | | | |
| 14 | 359210530 | 2240 | | | |
| 15 | 359210531 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 59,500
Total Weight 39,468

Bags of ties : 2

Driver sign below if you have received above-mentioned items :

Driver's Sign

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by
Driver's Name
Driver's Sign
Driver's Cell Phone #
Trucking Co.
Trucking Co. Phone #
Broker : Lonestar
Date : 6/2/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS. 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14961

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/3/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210429 | 2240 | 16 | 359210460 | 2240 |
| 2 | 359210430 | 2240 | 17 | 359210516 | 2240 |
| 3 | 359210432 | 1960 | 18 | 359210517 | 2240 |
| 4 | 359210433 | 2240 | 19 | 359210518 | 2240 |
| 5 | 359210435 | 2240 | 20 | 359210609 | 2240 |
| 6 | 359210444 | 2240 | 21 | 359210610 | 2240 |
| 7 | 359210446 | 2240 | 22 | 359210611 | 2240 |
| 8 | 359210447 | 2240 | 23 | 359210612 | 2240 |
| 9 | 359210448 | 2240 | 24 | 359210622 | 2240 |
| 10 | 359210451 | 2240 | 25 | 359210623 | 2240 |
| 11 | 359210453 | 2240 | 26 | 359210624 | 2030 |
| 12 | 359210454 | 2240 | 27 | 359210626 | 2240 |
| 13 | 359210456 | 2240 | | | |
| 14 | 359210458 | 2240 | | | |
| 15 | 359210459 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,990
Total Weight: 39,119

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : [signature]

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : Arnie
Driver's Name : [signature]
Driver's Sign : 910-734-1204
Driver's Cell Phone # : DBL
Trucking Co. : 910-734-1204
Trucking Co. Phone # :
Broker : Anderson Tr.
Date : 6/3/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14966

Ship Date : 6/3/2010

Cust. P.O. # : 13179

Job # : 3592

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210314A | 1400 | 16 | 359210601 | 2240 |
| 2 | 359210386 | 2240 | 17 | 359210602 | 2240 |
| 3 | 359210431 | 1960 | 18 | 359210607 | 2240 |
| 4 | 359210434 | 2240 | 19 | 359210608 | 2240 |
| 5 | 359210439 | 2240 | 20 | 359210614 | 2240 |
| 6 | 359210440 | 2030 | 21 | 359210615 | 2240 |
| 7 | 359210441 | 2240 | 22 | 359210616 | 2240 |
| 8 | 359210443 | 2240 | 23 | 359210617 | 2240 |
| 9 | 359210445 | 2240 | 24 | 359210618 | 2240 |
| 10 | 359210449 | 2240 | 25 | 359210619 | 2240 |
| 11 | 359210450 | 2240 | 26 | 359210620 | 2240 |
| 12 | 359210597 | 2240 | 27 | 359210621 | 2240 |
| 13 | 359210598 | 2240 | | | |
| 14 | 359210599 | 2240 | | | |
| 15 | 359210600 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code :** TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 59,150
Total Weight: 38,394

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Anderson Tr.
Date : 6/3/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage containers, or any other consequences occuring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14969

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/3/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code: TN 330-2-8**

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210631 | 2240 | 16 | 359210646 | 2240 |
| 2 | 359210632 | 2240 | 17 | 359210647 | 2240 |
| 3 | 359210633 | 2240 | 18 | 359210648 | 1960 |
| 4 | 359210634 | 2240 | 19 | 359210649 | 2450 |
| 5 | 359210635 | 2240 | 20 | 359210650 | 2100 |
| 6 | 359210636 | 2240 | 21 | 359210651 | 2240 |
| 7 | 359210637 | 2240 | 22 | 359210652 | 2240 |
| 8 | 359210638 | 2240 | 23 | 359210653 | 2240 |
| 9 | 359210639 | 2240 | 24 | 359210654 | 2240 |
| 10 | 359210640 | 2240 | 25 | 359210655 | 2240 |
| 11 | 359210641 | 2240 | 26 | 359210656 | 1820 |
| 12 | 359210642 | 2240 | 27 | 359210657 | 2240 |
| 13 | 359210643 | 2240 | | | |
| 14 | 359210644 | 2240 | | | |
| 15 | 359210645 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,850
Total Weight: 38,914

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : Toby T. Campbell

**ATTN RECEIVER :** If ties are not collected from driver, SKAPS will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign : Toby T. Campbell
Driver's Cell Phone # : Toby T. Campbell
Trucking Co. : TOBY TRUCKING
Trucking Co. Phone # : [illegible]
Broker : Cheetah 71 6706
Date : 6/3/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 14970

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/3/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210310 | 2240 | 16 | 359210664 | 2240 |
| 2 | 359210317 | 2240 | 17 | 359210665 | 2240 |
| 3 | 359210359 | 2240 | 18 | 359210666 | 2240 |
| 4 | 359210370 | 2240 | 19 | 359210667 | 2240 |
| 5 | 359210378 | 2240 | 20 | 359210668 | 2240 |
| 6 | 359210436 | 2240 | 21 | 359210669 | 2240 |
| 7 | 359210437 | 2240 | 22 | 359210670 | 2240 |
| 8 | 359210438 | 2240 | 23 | 359210671 | 2240 |
| 9 | 359210625 | 2240 | 24 | 359210672 | 1400 |
| 10 | 359210658 | 2240 | 25 | 359210673 | 2240 |
| 11 | 359210659 | 2240 | 26 | 359210674 | 2240 |
| 12 | 359210660 | 2240 | 27 | 359210675 | 2240 |
| 13 | 359210661 | 2240 | | | |
| 14 | 359210662 | 2240 | | | |
| 15 | 359210663 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,640
Total Weight: 38,840

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : Frazier L. Clark

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : F. GREAT AMERICAN LINES
Driver's Name : ~~FRAZIER L. CLARK~~
Driver's Sign : Frazier L. Clark
Driver's Cell Phone # : 919-452-3185
Trucking Co. : ~~GREAT AMERICAN LINES~~
Trucking Co. Phone # : ~~860-755-1455~~
Broker : Landstar
Date : 6/3/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

## STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15019

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/9/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210676 | 2265 | 16 | 359210697 | 2240 |
| 2 | 359210677 | 2265 | 17 | 359210698 | 2240 |
| 3 | 359210682 | 2240 | 18 | 359210701 | 2240 |
| 4 | 359210683 | 2240 | 19 | 359210705 | 2240 |
| 5 | 359210684 | 2240 | 20 | 359210715 | 2240 |
| 6 | 359210685 | 2240 | 21 | 359210717 | 2240 |
| 7 | 359210686 | 2240 | 22 | 359210718 | 2240 |
| 8 | 359210687 | 2240 | 23 | 359210719 | 2240 |
| 9 | 359210688 | 2240 | 24 | 359210811 | 1820 |
| 10 | 359210690 | 2240 | 25 | 359210812 | 1540 |
| 11 | 359210691 | 2240 | 26 | 359210813 | 2240 |
| 12 | 359210692 | 2240 | 27 | 359210814 | 2240 |
| 13 | 359210694 | 2240 | | | |
| 14 | 359210695 | 2240 | | | |
| 15 | 359210696 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 59,410
Total Weight: 38,852

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

Dennis Pickell

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Landstar
Date : 6/9/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15021

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/10/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

**Product Code:** TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210707 | 2240 | 16 | 359210733 | 2240 |
| 2 | 359210708 | 2240 | 17 | 359210734 | 2240 |
| 3 | 359210709 | 2240 | 18 | 359210735 | 2240 |
| 4 | 359210710 | 2240 | 19 | 359210736 | 2240 |
| 5 | 359210713 | 2240 | 20 | 359210737 | 2240 |
| 6 | 359210720 | 2240 | 21 | 359210738 | 2240 |
| 7 | 359210721 | 2240 | 22 | 359210770 | 2240 |
| 8 | 359210722 | 2240 | 23 | 359210772 | 2240 |
| 9 | 359210723 | 2240 | 24 | 359210775 | 2240 |
| 10 | 359210724 | 2240 | 25 | 359210776 | 2240 |
| 11 | 359210727 | 2240 | 26 | 359210777 | 2240 |
| 12 | 359210728 | 2240 | 27 | 359210778 | 2240 |
| 13 | 359210729 | 2240 | | | |
| 14 | 359210731 | 2240 | | | |
| 15 | 359210732 | 2240 | | | |

**SHIPMENT SUMMARY**

**Product Code : TN 330-2-8**

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 39,551

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign :

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Cheetah
Date : 6/10/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15026

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/10/2010
Cust. P.O. # : 13179
Job # : 3592

DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210711 | 2240 | 16 | 359210762 | 2240 |
| 2 | 359210712 | 2240 | 17 | 359210763 | 2240 |
| 3 | 359210714 | 2240 | 18 | 359210765 | 2240 |
| 4 | 359210725 | 2240 | 19 | 359210766 | 2240 |
| 5 | 359210726 | 2240 | 20 | 359210767 | 2240 |
| 6 | 359210730 | 2240 | 21 | 359210768 | 2240 |
| 7 | 359210739 | 2240 | 22 | 359210769 | 2240 |
| 8 | 359210740 | 2240 | 23 | 359210771 | 2240 |
| 9 | 359210746 | 2240 | 24 | 359210773 | 2240 |
| 10 | 359210748 | 2240 | 25 | 359210774 | 2240 |
| 11 | 359210751 | 2240 | 26 | 359210779 | 2240 |
| 12 | 359210754 | 2240 | 27 | 359210780 | 2240 |
| 13 | 359210757 | 2240 | | | |
| 14 | 359210758 | 2240 | | | |
| 15 | 359210761 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 39,608

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign : X

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name :
Driver's Sign :
Driver's Cell Phone # :
Trucking Co. :
Trucking Co. Phone # :
Broker : Lonestar
Date : 6/10/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15031

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/11/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210678 | 2240 | 16 | 359210798 | 2240 |
| 2 | 359210679 | 2240 | 17 | 359210799 | 2240 |
| 3 | 359210680 | 2240 | 18 | 359210800 | 2240 |
| 4 | 359210781 | 2240 | 19 | 359210801 | 2240 |
| 5 | 359210782 | 2240 | 20 | 359210805 | 2240 |
| 6 | 359210783 | 2240 | 21 | 359210806 | 2240 |
| 7 | 359210784 | 2240 | 22 | 359210807 | 2240 |
| 8 | 359210786 | 2380 | 23 | 359210808 | 2240 |
| 9 | 359210787 | 2240 | 24 | 359210815 | 2240 |
| 10 | 359210788 | 2240 | 25 | 359210821 | 2240 |
| 11 | 359210789 | 2240 | 26 | 359210822 | 2240 |
| 12 | 359210793 | 2660 | 27 | 359210826 | 2240 |
| 13 | 359210794 | 2240 | | | |
| 14 | 359210795 | 2240 | | | |
| 15 | 359210797 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 61,040
Total Weight: 37,776

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : Robert Simmons

**ATTN RECEIVER :** If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by :
Driver's Name : EDGE
Driver's Sign : Robert T Simmons
Driver's Cell Phone # : Robert Simmons
Trucking Co : 803 - 371-6166
Trucking Co. Phone # : EDGE
Broker : Lonestar
Date : 6/11/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15033

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/10/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210742 | 2240 | 16 | 359210802 | 2240 |
| 2 | 359210743 | 2240 | 17 | 359210803 | 2240 |
| 3 | 359210744 | 2240 | 18 | 359210804 | 2240 |
| 4 | 359210745 | 2240 | 19 | 359210809 | 2240 |
| 5 | 359210747 | 2240 | 20 | 359210810 | 2240 |
| 6 | 359210749 | 2240 | 21 | 359210816 | 2240 |
| 7 | 359210750 | 2240 | 22 | 359210817 | 2240 |
| 8 | 359210752 | 2240 | 23 | 359210818 | 2240 |
| 9 | 359210753 | 2240 | 24 | 359210819 | 2240 |
| 10 | 359210755 | 2240 | 25 | 359210820 | 2240 |
| 11 | 359210756 | 2240 | 26 | 359210827 | 2240 |
| 12 | 359210759 | 2240 | 27 | 359210829 | 2240 |
| 13 | 359210760 | 2240 | | | |
| 14 | 359210764 | 2240 | | | |
| 15 | 359210785 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 27
Total Sq. Feet: 60,480
Total Weight: 38,528

Bags of ties : 2

Driver sign below if you have received above mentioned items :

Driver's Sign :

**ATTN RECEIVER** : If ties are not collected from driver, *SKAPS* will not assume responsibility

Container # :
Seal # :

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by
Driver's Name
Driver's Sign
Driver's Cell Phone # : " " "
Trucking Co. :
Trucking Co. Phone # :
Broker : Cheetah
Date : 6/10/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

STRAIGHT BILL OF LADING ORIGINAL-NOT NEGOTIABLE

# SKAPS Industries

571 Industrial Parkway
Commerce, GA 30529
Ph: 706-336-7000 Fax: 706-336-7007
www.skaps.com e-mail: info@skaps.com

Bill of Lading # : 15069

Job Name: ESI - Duke Energy Marshall Steam Station
Address: 8320 NC Highway 150 E
City, State, Zip : Terrell, NC 28682
Contact: Wilson Warlick
Phone: 704-361-7882

Ship Date : 6/15/2010
Cust. P.O. # : 13179
Job # : 3592

**DRIVER MUST CALL 24 HOURS PRIOR TO DELIVERY**

Product Code: TN 330-2-8

| No | Roll# | Sq. Ft. | No | Roll# | Sq. Ft. |
|---|---|---|---|---|---|
| 1 | 359210681 | 2240 | 16 | 359210823 | 2240 |
| 2 | 359210689 | 2240 | 17 | 359210824 | 2240 |
| 3 | 359210693A | 1400 | 18 | 359210825 | 2240 |
| 4 | 359210693B | 700 | 19 | 359210828 | 2240 |
| 5 | 359210699B | 700 | 20 | 359210830 | 2240 |
| 6 | 359210700 | 2240 | 21 | 359210831 | 2240 |
| 7 | 359210702 | 2240 | 22 | 359210832 | 2240 |
| 8 | 359210703 | 1960 | 23 | 359210833 | 2240 |
| 9 | 359210704 | 2240 | | | |
| 10 | 359210706 | 2240 | | | |
| 11 | 359210716 | 2240 | | | |
| 12 | 359210790 | 2240 | | | |
| 13 | 359210791 | 2240 | | | |
| 14 | 359210792 | 2240 | | | |
| 15 | 359210796 | 2240 | | | |

**SHIPMENT SUMMARY**

Product Code : TN 330-2-8

Total Rolls : 23
Total Sq. Feet: 47,320
Total Weight: 29,488

Bags of ties : 2

**Driver sign below if you have received above mentioned items :**

Driver's Sign : _____

**ATTN RECEIVER : If ties are not collected from driver, *SKAPS* will not assume responsibility**

Container # : _____
Seal # : _____

**Driver Requirements:**

1) For Monday delivery driver must call on Friday.
2) Driver must call 706-336-7000 when unloaded.
3) Driver must call and advise of any delay in transit.
4) A copy of this bill-of-lading must accompany freight invoice, failure to do this will result in delayed payments.

Deliver by : _____
Driver's Name : _____
Driver's Sign : _____
Driver's Cell Phone # : _____
Trucking Co. : _____
Trucking Co. Phone # : _____
Broker : Cheetah
Date : 6/15/2010

**CARRIER MUST COLLECT THE FREIGHT FROM THE BROKER ONLY**

SIGN HERE FOR SHIPPER _____
SHIPPER ADDRESS: 571 INDUSTRIAL PKWY.
COMMERCE, GA 30529

Received at Commerce, GA from SKAPS Industries the property described above, in apparent good order except as noted (contents and condition of packages unknown), marked, consigned, and destined as indicated above, which said Carrier (the word "Carrier" being understood throughout this Shipping Order as meaning the person or corporation in possession of the property) agrees to carry to the place of delivery at said destination. It is mutually agreed as to each Carrier of all or any of said property, over all or any portion of said route to destination and as to each party at any time interested in all or any of said property, that every service performed hereunder shall be subject to either: (a) if the shipper noted herein is SKAPS Industries as indicated by the designation of the "Shipper" to be SKAPS Industries, then the Shipper and Carrier are subject to the terms and conditions contained in the Contract for Truck Transportation existing between the parties or (b) if the Shipper noted herein is not SKAPS Industries then SKAPS Industries is acting solely as the agent for the denoted Shipper, and thus every aspect of the service to be performed hereunder between the Shipper and the Carrier shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official Southern, Western, and Illinois Freight Classifications in effect on the date hereof, if this is a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. When acting in the capacity of an agent for a Shipper in placing the material in transit on behalf of a Shipper, SKAPS Industries accepts no liability for loss of cargo, damage to containers, or any other consequences occurring during transportation. Carrier having agreed that the transportation arrangement was initiated by the Shipper and not by SKAPS Industries. Subject to the above terms and conditions as to which party is the Shipper, Shipper hereby certifies that he is familiar with the terms and conditions that govern the transportation of this shipment, and the said terms and conditions are hereby agreed and accepted for himself and his assigns.

**Shippers No : 026017010** Previous Page

Straight Bill of Lading - Original Loader: RPANK Time In: 5/17/10-13:42:14 Time Out: 5/17/10-16:59:05

**Carrier**: ROSEDALE
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/18/2010
**Ship Date** : 05/17/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 89382 Trailer #: 682745/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45430.0000 |

Gross: 0.0000 Tare: 0.0000 **Total**: 45430

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Jeff Flora

**Placards Required?** Yes / No **Supplied?** Yes / No

638668/F003646

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017010
ORDER DATE: 3/12/2010
SHIP DATE:. 5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001748 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001763 | 150.0 | 15.0 | 2250.0 | 2648.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001767 | 150.0 | 15.0 | 2250.0 | 2614.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001771 | 150.0 | 15.0 | 2250.0 | 2630.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001797 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001852 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001857 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001872 | 150.0 | 15.0 | 2250.0 | 2718.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001878 | 150.0 | 15.0 | 2250.0 | 2702.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001889 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001899 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001906 | 150.0 | 15.0 | 2250.0 | 2658.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001942 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001945 | 150.0 | 15.0 | 2250.0 | 2644.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001946 | 150.0 | 15.0 | 2250.0 | 2654.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001952 | 150.0 | 15.0 | 2250.0 | 2702.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001965 | 150.0 | 15.0 | 2250.0 | 2722.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 38250.0 | |
| | | | | | | | | ======== | |

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ORDER TOTALS..... 45430.0

TOTAL ITEMS..... 17

**Shippers No : 026017009** Previous Page

Straight Bill of Lading - Original Loader: RPANK Time In: 5/17/10 13:31:47 Time Out: 5/17/10-14:44:51

**Carrier:** ROSEDALE
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/18/2010
**Ship Date** : 05/17/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 473915 Trailer #: 720739/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45277.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45277

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017009
ORDER DATE:  3/12/2010
SHIP DATE:.  5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001764 | 150.0 | 15.0 | 2250.0 | 2610.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001769 | 150.0 | 15.0 | 2250.0 | 2616.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001772 | 150.0 | 15.0 | 2250.0 | 2620.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001849 | 150.0 | 15.0 | 2250.0 | 2683.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001873 | 150.0 | 15.0 | 2250.0 | 2720.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001895 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001919 | 150.0 | 15.0 | 2250.0 | 2654.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001929 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001934 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001936 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001943 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001948 | 150.0 | 15.0 | 2250.0 | 2652.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001949 | 150.0 | 15.0 | 2250.0 | 2684.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001950 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001951 | 150.0 | 15.0 | 2250.0 | 2672.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001956 | 150.0 | 15.0 | 2250.0 | 2646.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001968 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

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ORDER TOTALS..... 45277.0

TOTAL  ITEMS..... 17

**Shippers No : 026017011** Previous Page

Straight Bill of Lading - Original Loader: WWYAT Time In: 5/17/10-14:44:49 Time Out: 5/17/10-17:35:19

**Carrier:** ROSEDALE
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/18/2010
**Ship Date** : 05/17/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 86299 Trailer #: 720782/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45822.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45822

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Chris Stanley

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017011
ORDER DATE:  3/12/2010
SHIP DATE:.  5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001746 | 150.0 | 15.0 | 2250.0 | 2966.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001760 | 150.0 | 15.0 | 2250.0 | 2652.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001762 | 150.0 | 15.0 | 2250.0 | 2654.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001765 | 150.0 | 15.0 | 2250.0 | 2624.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001773 | 150.0 | 15.0 | 2250.0 | 2626.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001777 | 150.0 | 15.0 | 2250.0 | 2650.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001785 | 150.0 | 15.0 | 2250.0 | 2612.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001790 | 150.0 | 15.0 | 2250.0 | 2780.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001793 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001795 | 150.0 | 15.0 | 2250.0 | 2672.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001822 | 150.0 | 15.0 | 2250.0 | 2646.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001870 | 150.0 | 15.0 | 2250.0 | 2708.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001875 | 150.0 | 15.0 | 2250.0 | 2702.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001901 | 150.0 | 15.0 | 2250.0 | 2686.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001911 | 150.0 | 15.0 | 2250.0 | 2648.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001933 | 150.0 | 15.0 | 2250.0 | 2634.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001972 | 150.0 | 15.0 | 2250.0 | 2898.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 38250.0 | |
| | | | | | | | | ======== | |

ORDER TOTALS..... 45822.0

TOTAL  ITEMS..... 17

CETCO®

**Shippers No : 026017013** Previous Page

Straight Bill of Lading - Original Loader: WWYAT Time In: 5/18/10-11:17:12 Time Out: 5/18/10-11:57:54

**Carrier**: volume
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/18/2010
**Ship Date** : 05/17/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 5058 Trailer #: 5043/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45438.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45438

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the property described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

D Sang 770-387-7700

**Per** **Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017013
ORDER DATE:  3/12/2010
SHIP DATE:.  5/18/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001804 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001806 | 150.0 | 15.0 | 2250.0 | 2678.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001807 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001808 | 150.0 | 15.0 | 2250.0 | 2672.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001809 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001810 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001811 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001826 | 150.0 | 15.0 | 2250.0 | 2640.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001830 | 150.0 | 15.0 | 2250.0 | 2648.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001836 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001839 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001840 | 150.0 | 15.0 | 2250.0 | 2676.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001848 | 150.0 | 15.0 | 2250.0 | 2678.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001853 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001874 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001905 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001913 | 150.0 | 15.0 | 2250.0 | 2650.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... 45438.0

TOTAL  ITEMS..... 17

**Shippers No : 026017012** | Previous Page

Straight Bill of Lading - Original  Loader: RPANK  Time In: 5/17/10-13:45:27  Time Out: 5/17/10-14:28:06

**Carrier:** ROSEDALE GROUP
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/18/2010
**Ship Date** : 05/17/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 5468 Trailer #: 720726/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45264.0000 |

Gross: 0.0000  Tare: 0.0000  **Total:** 45264

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per John Dines

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017012
ORDER DATE:  3/12/2010
SHIP DATE:.  5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001749 | 150.0 | 15.0 | 2250.0 | 2708.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001766 | 150.0 | 15.0 | 2250.0 | 2620.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001768 | 150.0 | 15.0 | 2250.0 | 2592.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001770 | 150.0 | 15.0 | 2250.0 | 2622.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001861 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001883 | 150.0 | 15.0 | 2250.0 | 2720.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001915 | 150.0 | 15.0 | 2250.0 | 2652.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001924 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001944 | 150.0 | 15.0 | 2250.0 | 2638.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001953 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001954 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001957 | 150.0 | 15.0 | 2250.0 | 2670.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001958 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001959 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001961 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001963 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001964 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 38250.0 | |
| | | | | | | | | ======== | |

ORDER TOTALS..... 45264.0

TOTAL  ITEMS..... 17

CETCO

**Shippers No : 026017007** Previous Page

Straight Bill of Lading - Original Loader: WWYAT Time In: 5/14/10-10:22:27 Time Out: 5/14/10-11:53:42

**Carrier:** rosedale trans
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 87317 Trailer #: 717665/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45236.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45236

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017007
ORDER DATE:  3/12/2010
SHIP DATE:.  5/14/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001886 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001891 | 150.0 | 15.0 | 2250.0 | 2676.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001897 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001902 | 150.0 | 15.0 | 2250.0 | 2470.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001912 | 150.0 | 15.0 | 2250.0 | 2646.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001918 | 150.0 | 15.0 | 2250.0 | 2652.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001920 | 150.0 | 15.0 | 2250.0 | 2648.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001922 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001927 | 150.0 | 15.0 | 2250.0 | 2670.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001928 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001932 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001935 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001937 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001947 | 150.0 | 15.0 | 2250.0 | 2648.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001955 | 150.0 | 15.0 | 2250.0 | 2670.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001967 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001971 | 150.0 | 15.0 | 2250.0 | 2792.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... 45236.0

TOTAL  ITEMS..... 17

**Shippers No : 026017002** Previous Page

Straight Bill of Lading - Original Loader: DRAKE Time In: 5/14/10-08:42:08 Time Out: 5/14/10-09:06:50

**Carrier:** schilli/wabash
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 4636 Trailer #: 48308/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45226.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45226

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017002
ORDER DATE: 3/12/2010
SHIP DATE:. 5/14/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001887 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001890 | 150.0 | 15.0 | 2250.0 | 2686.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001904 | 150.0 | 15.0 | 2250.0 | 2644.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001907 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001908 | 150.0 | 15.0 | 2250.0 | 2644.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001909 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001910 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001914 | 150.0 | 15.0 | 2250.0 | 2644.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001917 | 150.0 | 15.0 | 2250.0 | 2650.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001923 | 150.0 | 15.0 | 2250.0 | 2654.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001925 | 150.0 | 15.0 | 2250.0 | 2658.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001926 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001931 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001941 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001960 | 150.0 | 15.0 | 2250.0 | 2650.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001962 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001970 | 150.0 | 15.0 | 2250.0 | 2664.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... 45226.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017003** Previous Page

Straight Bill of Lading - Original Loader: RFANC Time In: 5/17/10-17:42:37 Time Out: 5/17/10-19:21:55

**Carrier:** boyd
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 7234 Trailer #: 50076/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45384.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45384

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Wilhe Brown

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017003
ORDER DATE:  3/12/2010
SHIP DATE:.  5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001752 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001755 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001756 | 150.0 | 15.0 | 2250.0 | 2684.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001775 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001779 | 150.0 | 15.0 | 2250.0 | 2634.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001780 | 150.0 | 15.0 | 2250.0 | 2608.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001783 | 150.0 | 15.0 | 2250.0 | 2616.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001789 | 150.0 | 15.0 | 2250.0 | 2634.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001791 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001794 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001796 | 150.0 | 15.0 | 2250.0 | 2672.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001800 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001817 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001821 | 150.0 | 15.0 | 2250.0 | 2658.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001841 | 150.0 | 15.0 | 2250.0 | 2676.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001842 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001871 | 150.0 | 15.0 | 2250.0 | 2716.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 38250.0 | |
| | | | | | | | | ======== | |

ORDER TOTALS..... 45384.0

TOTAL  ITEMS..... 17

**Shippers No : 026017008** Previous Page

Straight Bill of Lading - Original Loader: WWYAT Time In: 5/14/10 13:23:49 Time Out: 5/14/10-14:33:14

**Carrier**: rosedale
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 86282 Trailer #: 948101/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45860.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45860

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Dale Wilson

**Per** **Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017008
ORDER DATE: 3/12/2010
SHIP DATE:. 5/14/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001753 | 150.0 | 15.0 | 2250.0 | 2698.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001854 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001855 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001856 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001858 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001859 | 150.0 | 15.0 | 2250.0 | 2692.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001860 | 150.0 | 15.0 | 2250.0 | 2680.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001862 | 150.0 | 15.0 | 2250.0 | 2686.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001864 | 150.0 | 15.0 | 2250.0 | 2716.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001876 | 150.0 | 15.0 | 2250.0 | 2710.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001877 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001879 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001884 | 150.0 | 15.0 | 2250.0 | 2714.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001885 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001894 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001898 | 150.0 | 15.0 | 2250.0 | 2680.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001966 | 150.0 | 15.0 | 2250.0 | 2724.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |

========

========
45860.0

ORDER TOTALS.....

TOTAL ITEMS..... 17

**Shippers No : 026017006** Previous Page

Straight Bill of Lading - Original Loader: DPARR Time In: 5/14/10-13:41:00 Time Out: 5/14/10-14:56:35

**Carrier**: ROSEDALE
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 6403 Trailer #: 720774/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45513.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45513

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017006
ORDER DATE:  3/12/2010
SHIP DATE:.  5/14/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001750 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001751 | 150.0 | 15.0 | 2250.0 | 2678.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001778 | 150.0 | 15.0 | 2250.0 | 2640.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001782 | 150.0 | 15.0 | 2250.0 | 2614.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001787 | 150.0 | 15.0 | 2250.0 | 2618.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001827 | 150.0 | 15.0 | 2250.0 | 2644.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001828 | 150.0 | 15.0 | 2250.0 | 2656.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001837 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001838 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001844 | 150.0 | 15.0 | 2250.0 | 2702.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001847 | 150.0 | 15.0 | 2250.0 | 2684.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001865 | 150.0 | 15.0 | 2250.0 | 2692.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001866 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001867 | 150.0 | 15.0 | 2250.0 | 2701.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001880 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001881 | 150.0 | 15.0 | 2250.0 | 2722.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001893 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |
| | | | | | | | | ======== |
| ORDER TOTALS..... | | | | | | | | 45513.0 |
| TOTAL ITEMS..... | | | 17 | | | | | |

CETCO

**Shippers No : 026017005** | Previous Page

Straight Bill of Lading - Original  Loader: RPARK  Time In: 5/17/10-15:21:09  Time Out: 5/17/10-18:19:14

**Carrier**: boyd
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 7090 Trailer #: 50520/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45293.0000 |

Gross: 0.0000  Tare: 0.0000  **Total:** 45293

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Calloway Bar

**Per**  **Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017005
ORDER DATE:  3/12/2010
SHIP DATE:.  5/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001754 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001757 | 150.0 | 15.0 | 2250.0 | 2687.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001759 | 150.0 | 15.0 | 2250.0 | 2614.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001781 | 150.0 | 15.0 | 2250.0 | 2612.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001784 | 150.0 | 15.0 | 2250.0 | 2616.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001786 | 150.0 | 15.0 | 2250.0 | 2614.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001792 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001798 | 150.0 | 15.0 | 2250.0 | 2670.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001799 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001801 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001802 | 150.0 | 15.0 | 2250.0 | 2660.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001803 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001805 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001813 | 150.0 | 15.0 | 2250.0 | 2680.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001816 | 150.0 | 15.0 | 2250.0 | 2684.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001832 | 150.0 | 15.0 | 2250.0 | 2670.0 |
| CV-BENTOMAT ST | | SFT | SF | 201018CV | 00001863 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 38250.0 | |
| | | | | | | | | ======== | |

ORDER TOTALS..... 45293.0

TOTAL  ITEMS..... 17

**Shippers No : 026017004** Previous Page

Straight Bill of Lading - Original Loader: DPARR Time In: 5/14/10-09:44:39 Time Out: 5/14/10-10:20:28

**Carrier:** boyd bros
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date :** 05/17/2010
**Ship Date :** 05/14/2010 **Via:** NATI
FOB ORIGIN

**Sold To :** 1823 **Ship To :** 128
Consigned PO: 13180
Truck #: 7243 Trailer #: 50466/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 45626.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 45626

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per** K. L. B.

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017004
ORDER DATE:  3/12/2010
SHIP DATE:.  5/14/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001747 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001758 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001834 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001843 | 150.0 | 15.0 | 2250.0 | 2654.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001845 | 150.0 | 15.0 | 2250.0 | 2684.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001850 | 150.0 | 15.0 | 2250.0 | 2674.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001851 | 150.0 | 15.0 | 2250.0 | 2658.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001868 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001869 | 150.0 | 15.0 | 2250.0 | 2706.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001882 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001888 | 150.0 | 15.0 | 2250.0 | 2686.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001900 | 150.0 | 15.0 | 2250.0 | 2692.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001916 | 150.0 | 15.0 | 2250.0 | 2652.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001921 | 150.0 | 15.0 | 2250.0 | 2650.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001930 | 150.0 | 15.0 | 2250.0 | 2666.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001938 | 150.0 | 15.0 | 2250.0 | 2662.0 |
| CV-BENTOMAT ST | | SFT | SF 201018CV | 00001969 | 150.0 | 15.0 | 2250.0 | 2668.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |
| | | | | | | | | ======== |
| | | | | | | | | 45626.0 |

ORDER TOTALS.....

TOTAL  ITEMS.....  17

**Shippers No : 026017001** Previous Page

Straight Bill of Lading - Original Loaden: WWTAT Time In: 5/14/10-15:06:49 Time Out: 5/14/10-17:01:59

**Carrier:** edge
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 05/17/2010
**Ship Date** : 05/14/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 21 Trailer #: 102/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day *****cannot start delivery until Monday 5/17

| Quantity | HM | Product Size / Description | Weight |
|---|---|---|---|
| 27000.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>12 rolls<br>palletized | 32146.0000 |
| 42.0000 EACH | | COMMODITY GRANULAR-50<br>(10902/024)<br>CLAY-BENTONITE-GROUND<br>CLASS 50 ITEM 48170 / 3295232<br>3295232<br><br>12 rolls<br>palletized | 2100.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 34246

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

If the charges are to be prepaid, write or stamp here, "Prepaid."

**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

**CETCO**

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Luis Lerma
**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

CETCO®

**Shippers No : 026017024** | **Previous Page**

**Straight Bill of Lading - Original** Loader: DPARR Time In: 6/21/10-12:01:21 Time Out: **6/21/10-14:33:41**

**Carrier**: jA RAY
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/17/2010
**Ship Date** : 06/16/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 6772 Trailer #: 70/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46398.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 46398

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017024
ORDER DATE: 3/12/2010
SHIP DATE:. 6/21/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004212 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004237 | 150.0 | 15.0 | 2250.0 | 2786.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004243 | 150.0 | 15.0 | 2250.0 | 2756.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004253 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004258 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004261 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004262 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004263 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004265 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004270 | 150.0 | 15.0 | 2250.0 | 2746.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004271 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004274 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004277 | 150.0 | 15.0 | 2250.0 | 2698.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004279 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004280 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004295 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004296 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... 46398.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017025** | **Previous Page**

**Straight Bill of Lading - Original**

Loader: WWYAT Time In: 6/21/10-13:43:54 Time Out: **6/21/10-16:11:05**

**Carrier:** DAKOTA VALLEY TRUCKING
**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/17/2010
**Ship Date** : 06/16/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 82 Trailer #: 19/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 36000.0000 SF | 36000.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 43901.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 43901

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

**CETCO**

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017025
ORDER DATE: 3/12/2010
SHIP DATE:. 6/21/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004129 | 150.0 | 15.0 | 2250.0 | 2782.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004130 | 150.0 | 15.0 | 2250.0 | 2786.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004144 | 150.0 | 15.0 | 2250.0 | 2710.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004156 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004170 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004204 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004213 | 150.0 | 15.0 | 2250.0 | 2749.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004215 | 150.0 | 15.0 | 2250.0 | 2762.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004216 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004217 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004220 | 150.0 | 15.0 | 2250.0 | 2756.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004234 | 150.0 | 15.0 | 2250.0 | 2768.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004238 | 150.0 | 15.0 | 2250.0 | 2788.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004266 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004278 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004283 | 150.0 | 15.0 | 2250.0 | 2698.0 |
| | | | | | | | ======== | |
| | | | | | | | 36000.0 | |

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ORDER TOTALS..... ========
43901.0

TOTAL ITEMS..... 16

**Shippers No : 026017023** | **Previous Page**

**Straight Bill of Lading - Original** Loader: RPANK Time In: 6/18/10-09:23:46 Time Out: **6/18/10-11:04:22**

**Carrier:** HARGETT & SONS
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/17/2010
**Ship Date** : 06/16/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 4 Trailer #: 4A/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46558.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 46558

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the property described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per** Bill Curtis

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBES AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017023
ORDER DATE: 3/12/2010
SHIP DATE:. 6/18/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004090 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004095 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004132 | 150.0 | 15.0 | 2250.0 | 2746.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004135 | 150.0 | 15.0 | 2250.0 | 2762.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004153 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004158 | 150.0 | 15.0 | 2250.0 | 2734.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004161 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004190 | 150.0 | 15.0 | 2250.0 | 2724.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004210 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004218 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004221 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004222 | 150.0 | 15.0 | 2250.0 | 2766.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004254 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004264 | 150.0 | 15.0 | 2250.0 | 2750.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004272 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004286 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004290 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |

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ORDER TOTALS..... ========
46558.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017022** | **Previous Page**

**Straight Bill of Lading - Original** Loader: RPANK Time In: 6/18/10-09:34:28 Time Out: **6/18/10-12:04:00**

**Carrier:** LANDSTAR
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/17/2010
**Ship Date** : 06/16/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 2278 Trailer #: 237/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46472.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 46472

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

**CETCO**

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017022
ORDER DATE: 3/12/2010
SHIP DATE:. 6/18/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004081 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004133 | 150.0 | 15.0 | 2250.0 | 2762.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004145 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004154 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004182 | 150.0 | 15.0 | 2250.0 | 2698.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004199 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004200 | 150.0 | 15.0 | 2250.0 | 2710.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004201 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004206 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004207 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004228 | 150.0 | 15.0 | 2250.0 | 2774.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004231 | 150.0 | 15.0 | 2250.0 | 2764.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004245 | 150.0 | 15.0 | 2250.0 | 2758.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004246 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004247 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004248 | 150.0 | 15.0 | 2250.0 | 2738.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004288 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

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ORDER TOTALS..... 46472.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017017** | **Previous Page**

**Straight Bill of Lading - Original** Loader: DPARR Time In: 6/17/10-09:41:17 Time Out: **6/17/10-11:08:25**

**Carrier:** MERCER
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/16/2010
**Ship Date** : 06/15/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 10578 Trailer #: 10578A/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46476.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 46476

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

CETCO

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the property described above in apparent good order, except as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017017
ORDER DATE: 3/12/2010
SHIP DATE:. 6/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004076 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004085 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004093 | 150.0 | 15.0 | 2250.0 | 2758.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004094 | 150.0 | 15.0 | 2250.0 | 2742.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004096 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004141 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004162 | 150.0 | 15.0 | 2250.0 | 2728.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004165 | 150.0 | 15.0 | 2250.0 | 2708.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004168 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004188 | 150.0 | 15.0 | 2250.0 | 2716.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004189 | 150.0 | 15.0 | 2250.0 | 2738.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004195 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004205 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004214 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004227 | 150.0 | 15.0 | 2250.0 | 2746.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004260 | 150.0 | 15.0 | 2250.0 | 2768.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004276 | 150.0 | 15.0 | 2250.0 | 2738.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... 46476.0

TOTAL ITEMS..... 17

CETCO®

**Shippers No : 026017019** | **Previous Page**

**Straight Bill of Lading - Original** Loader: DPARR Time In: 6/17/10-08:11:46 Time Out: **6/17/10-09:36:18**

**Carrier:** R.C.KELLY
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/16/2010
**Ship Date** : 06/15/2010 **Via:** NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 007 Trailer #: 003/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 40500.0000 SF | 40500.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 49165.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 49165

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per** **Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017019
ORDER DATE: 3/12/2010
SHIP DATE:. 6/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004146 | 150.0 | 15.0 | 2250.0 | 2750.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004147 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004152 | 150.0 | 15.0 | 2250.0 | 2738.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004157 | 150.0 | 15.0 | 2250.0 | 2726.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004159 | 150.0 | 15.0 | 2250.0 | 2726.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004166 | 150.0 | 15.0 | 2250.0 | 2704.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004171 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004172 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004173 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004174 | 150.0 | 15.0 | 2250.0 | 2695.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004192 | 150.0 | 15.0 | 2250.0 | 2710.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004193 | 150.0 | 15.0 | 2250.0 | 2716.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004198 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004239 | 150.0 | 15.0 | 2250.0 | 2776.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004241 | 150.0 | 15.0 | 2250.0 | 2778.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004242 | 150.0 | 15.0 | 2250.0 | 2776.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004244 | 150.0 | 15.0 | 2250.0 | 2772.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004250 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| | | | | | | | ======== | |
| | | | | | | | 40500.0 | |

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ORDER TOTALS..... 49165.0

TOTAL ITEMS..... 18

CETCO

**Shippers No : 026017021** | **Previous Page**

**Straight Bill of Lading - Original** Loader: WWYAT Time In: 6/17/10-13:25:06 Time Out: **6/17/10-15:37:01**

**Carrier:** palmetto
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/17/2010
**Ship Date** : 06/16/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 2284 Trailer #: 230/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46160.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 46160

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Frank A Adams

**Per** **Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017021
ORDER DATE: 3/12/2010
SHIP DATE:. 6/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004143 | 150.0 | 15.0 | 2250.0 | 2720.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004155 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004163 | 150.0 | 15.0 | 2250.0 | 2706.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004164 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004219 | 150.0 | 15.0 | 2250.0 | 2742.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004225 | 150.0 | 15.0 | 2250.0 | 2756.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004232 | 150.0 | 15.0 | 2250.0 | 2764.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004249 | 150.0 | 15.0 | 2250.0 | 2770.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004281 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004282 | 150.0 | 15.0 | 2250.0 | 2710.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004285 | 150.0 | 15.0 | 2250.0 | 2702.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004287 | 150.0 | 15.0 | 2250.0 | 2692.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004289 | 150.0 | 15.0 | 2250.0 | 2688.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004291 | 150.0 | 15.0 | 2250.0 | 2700.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004292 | 150.0 | 15.0 | 2250.0 | 2682.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004293 | 150.0 | 15.0 | 2250.0 | 2692.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004294 | 150.0 | 15.0 | 2250.0 | 2696.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |
| | | | | | | | ======== | |

ORDER TOTALS..... ========
46160.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017020** | Previous Page

**Straight Bill of Lading - Original** Loader: RPANK Time In: 6/17/10-15:37:37 Time Out: **6/17/10-17:04:10**

**Carrier:** sst

**Consigned To** :
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/16/2010
**Ship Date** : 06/15/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 711 Trailer #: 711A/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46812.0000 |

Gross: 0.0000 Tare: 0.0000 **Total**: 46812

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017020
ORDER DATE: 3/12/2010
SHIP DATE:. 6/17/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004071 | 150.0 | 15.0 | 2250.0 | 2906.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004077 | 150.0 | 15.0 | 2250.0 | 2722.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004084 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004089 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004091 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004092 | 150.0 | 15.0 | 2250.0 | 2740.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004115 | 150.0 | 15.0 | 2250.0 | 2772.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004160 | 150.0 | 15.0 | 2250.0 | 2798.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004169 | 150.0 | 15.0 | 2250.0 | 2698.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004180 | 150.0 | 15.0 | 2250.0 | 2690.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004197 | 150.0 | 15.0 | 2250.0 | 2724.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004203 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004211 | 150.0 | 15.0 | 2250.0 | 2766.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004229 | 150.0 | 15.0 | 2250.0 | 2780.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004230 | 150.0 | 15.0 | 2250.0 | 2768.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004252 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | | SFT | SF 201024CV | 00004269 | 150.0 | 15.0 | 2250.0 | 2744.0 |
| | | | | | | | ======== | |
| | | | | | | | 38250.0 | |

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ORDER TOTALS..... 46812.0

TOTAL ITEMS..... 17

CETCO

**Shippers No : 026017015** Previous Page

Straight Bill of Lading - Original Loader: RPANK Time In: 6/16/10-14:09:22 Time Out: 6/16/10-16:03:55

**Carrier:** mercer
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/16/2010
**Ship Date** : 06/15/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 11620 Trailer #: 11620A/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 40500.0000 SF | 40500.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>18 rolls | 49136.0000 |

Gross: 0.0000 Tare: 0.0000 **Total:** 49136

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

**CETCO**

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per**

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES  IL  60192

ORDER NO:.. 026017015
ORDER DATE:  3/12/2010
SHIP DATE:.  6/16/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE  LA  70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN:  WILSON WARLICK
TERRELL  NC  28682

PO: 13180

| PRODUCT | SIZE | U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004112 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004134 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004136 | 150.0 | 15.0 | 2250.0 | 2756.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004137 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004138 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004139 | 150.0 | 15.0 | 2250.0 | 2726.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004140 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004175 | 150.0 | 15.0 | 2250.0 | 2712.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004177 | 150.0 | 15.0 | 2250.0 | 2694.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004178 | 150.0 | 15.0 | 2250.0 | 2704.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004179 | 150.0 | 15.0 | 2250.0 | 2714.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004183 | 150.0 | 15.0 | 2250.0 | 2706.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004184 | 150.0 | 15.0 | 2250.0 | 2718.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004185 | 150.0 | 15.0 | 2250.0 | 2708.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004186 | 150.0 | 15.0 | 2250.0 | 2720.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004187 | 150.0 | 15.0 | 2250.0 | 2714.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004236 | 150.0 | 15.0 | 2250.0 | 2790.0 |
| CV-BENTOMAT ST | | SFT | SF | 201024CV | 00004240 | 150.0 | 15.0 | 2250.0 | 2766.0 |
| | | | | | | | | ======== | |
| | | | | | | | | 40500.0 | |
| | | | | | | | | ======== | |

ORDER TOTALS..... 49136.0

TOTAL  ITEMS..... 18

CETCO®

**Shippers No : 026017018** | Previous Page

Straight Bill of Lading - Original  Loader: DPARR  Time In: 6/16/10-12:37:46  Time Out: 6/16/10-13:49:26

**Carrier:** bailey trucking
**Consigned To :**
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
TERRELL NC 28682
Phone:

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
**Deliver Date** : 06/16/2010
**Ship Date** : 06/15/2010 **Via**: NATI
FOB ORIGIN

**Sold To** : 1823 **Ship To** : 128
Consigned PO: 13180
Truck #: 912 Trailer #: 9632/

**Shipping Plant:** CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container/Pro #:

**Global Comments:** ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
**Customer Comments:**
**Order Comments:** CALL WILSON WARLICK 704.361.7882 24hrs. prior to delivery MON-FRI 7AM-5PM 8 max per day

| Order Qty | Shipped Qty | HM | Product Size / Description | Weight |
|---|---|---|---|---|
| 38250.0000 SF | 38250.0000 SF | | BENTOMAT ST<br><br>CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING:<br>CLASS 65 / ITEM 49265 SUB 10<br><br>17 rolls | 46680.0000 |

Gross: 0.0000  Tare: 0.0000  **Total:** 46680

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

**CETCO**

If the charges are to be prepaid, write or stamp here, "Prepaid."
**Prepaid**
Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

**Per** Wilson Bel

**Placards Required?** Yes / No **Supplied?** Yes / No

# P A C K I N G  L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 026017018
ORDER DATE: 3/12/2010
SHIP DATE:. 6/16/2010

SOLD TO: 1823
ENVIRONMENTAL SPECIALTIES
INTERNATIONAL, INC.
7943 PECUE LANE

BATON ROUGE LA 70809

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 128
DUKE ENERGY
MARSHALL STEAM PLANT
8320 NC HIGHWAY 150E
ATTN: WILSON WARLICK
TERRELL NC 28682

PO: 13180

| PRODUCT | SIZE U/M | LOT # | ROLL# | LNGTH | WIDTH | SHIP QTY | WEIGHT |
|---|---|---|---|---|---|---|---|
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004078 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004082 | 150.0 | 15.0 | 2250.0 | 2732.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004083 | 150.0 | 15.0 | 2250.0 | 2730.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004086 | 150.0 | 15.0 | 2250.0 | 2760.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004100 | 150.0 | 15.0 | 2250.0 | 2766.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004106 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004107 | 150.0 | 15.0 | 2250.0 | 2742.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004118 | 150.0 | 15.0 | 2250.0 | 2768.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004119 | 150.0 | 15.0 | 2250.0 | 2748.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004120 | 150.0 | 15.0 | 2250.0 | 2760.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004121 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004122 | 150.0 | 15.0 | 2250.0 | 2752.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004123 | 150.0 | 15.0 | 2250.0 | 2754.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004124 | 150.0 | 15.0 | 2250.0 | 2736.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004125 | 150.0 | 15.0 | 2250.0 | 2738.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004127 | 150.0 | 15.0 | 2250.0 | 2746.0 |
| CV-BENTOMAT ST | SFT SF | 201024CV | 00004151 | 150.0 | 15.0 | 2250.0 | 2728.0 |
| | | | | | | ======== | |
| | | | | | | 38250.0 | |
| | | | | | | ======== | |

ORDER TOTALS..... ========
46680.0

TOTAL ITEMS..... 17

## 'RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| ME OF CARRIER | CARRIER'S NO. | DATE | BIL NO. |
|---|---|---|---|
| TRUCK | | 4/16/2010 | 025318 |

:EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading, property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei erstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver ther carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any t property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da ot, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. ipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio hereby agreed to by the shipper and accepted for himself and his assigns.

:OM: -IIPPER ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE: DUKE ENERGY
MARSHALL STEAM PLANT
STREET: 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION: WILSON WARLICK 704-361-7882
ZIP

:IVERING RRIER: TDT | ROUTE | VEHICLE NUMBER

| NO. PACKAGES | * HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ 45,600 LBS | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211548-10 | 11,615 |
| L-HD-MSDS-60-23 | 211550-10 | 11,615 |
| L-HD-MSDS-60-23 | 211551-10 | 11,615 |
| L-HD-MSDS-60-23 | 211558-10 | 11,615 |
| L-HD-MSDS-60-23 | 211666-10 | 11,615 |
| L-HD-MSDS-60-23 | 211675-10 | 11,615 |
| L-HD-MSDS-60-23 | 211683-10 | 11,615 |
| L-HD-MSDS-60-23 | 211701-10 | 11,615 |
| L-HD-MSDS-60-23 | 212104-10 | 11,615 |
| L-HD-MSDS-60-23 | 212105-10 | 11,615 |
| L-HD-MSDS-60-23 | 212106-10 | 11,615 |
| L-HD-MSDS-60-23 | 212107-10 | 11,615 |

Total Weight: ~~45,996 LB~~ 45,600 LBS
Total Units: 12 ROLLS
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

:IFT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☑ Prepaid
☐ Collect $

he shipment moves between two ports by a carrier by er, the law requires that the bill of lading shall state ether it is "carrier's or shipper's weight".

ipper's imprint in lieu of stamp; not a part of bill of lading roved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect. ☑ Check box if charges are Collec

t is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Page 1 of 1

Shipper, Per

Agent, Per

nanent post office address of shipper

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

en transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident.

agru america, inc.

# SHIPPING RELEASE FORM

Date: 4-16-10

BOL #:

Document #:

Customer:

Destination: Terell, NC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARKS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 211548-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 211550-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 211551-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 211558-10 | Y | N | Y | N | Y | N | Y | N | No Weld Rod |
| 5 | 211666-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 211675-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 211701-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 211683-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 212104-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 212105-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 212106-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | 212107-10 | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS – INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ? yes no

SHIPREL FRM REV.01

Inspector:

Loader: RM

**RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE**

| ME OF CARRIER | CARRIER'S NO. | DATE | BIL NO. |
|---|---|---|---|
| TRUCK | | 4/16/2010 | 025313 |

EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading.
roperty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
eratood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
her carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da
ol, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
per hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
ereby agreed to by the shipper and accepted for himself and his assigns.

OM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru America

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

IVERING RRIER T.D.T. ROUTE VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ 45450 lbs. | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211435-10 | 11,615 |
| L-HD-MSDS-60-23 | 211436-10 | 11,615 |
| L-HD-MSDS-60-23 | 211437-10 | 11,615 |
| L-HD-MSDS-60-23 | 211438-10 | 11,615 |
| L-HD-MSDS-60-23 | 211439-10 | 11,615 |
| L-HD-MSDS-60-23 | 211440-10 | 11,615 |
| L-HD-MSDS-60-23 | 211441-10 | 11,615 |
| L-HD-MSDS-60-23 | 211442-10 | 11,615 |
| L-HD-MSDS-60-23 | 211443-10 | 11,615 |
| L-HD-MSDS-60-23 | 211444-10 | 11,615 |
| L-HD-MSDS-60-23 | 211445-10 | 11,615 |
| L-HD-MSDS-60-23 | 211446-10 | 11,615 |

Total Weight: ~~45,996 LB~~ 45450 lbs
Total Units: 12 Rolls @ 45450 lbs
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

IT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600
agru America

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

e shipment moves between two ports by a carrier by
, the law requires that the bill of lading shall state
her it is "carrier's or shipper's weight".

pper's impriint in lieu of stamp; not a part of bill of lading
roved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect. ☐ Check box if charges are Collec

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Page 1 of 1 Shipper, Per Agent, Per

anent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.
n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
munication Standard (HM 126C). Provide emergency response phone number in case of incident or accident.

agru America, Inc.

# SHIPPING RELEASE FORM

Date : 4-15-10

BOL # :

Document # : 13568

Customer : Duke/Marshall

Destination : Terrell N.C.

| | ROLL # | EXTERNAL VISUAL OK? | STRAPS OK? | CORE OK? | WELD ROD OK? | COMMENTS (TO ALL NO REMARK) |
|---|---|---|---|---|---|---|
| 1 | 211435-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 2 | 211436-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 3 | 211437-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 4 | 211438-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 5 | 211439-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 6 | 211440-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 7 | 211441-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 8 | 211442-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 9 | 211443-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 10 | 211444-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 11 | 211445-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 12 | 211446-10 | ✓ N | ✓ N | ✓ N | Y N | |
| 13 | | Y N | Y N | Y N | Y N | |
| 14 | | Y N | Y N | Y N | Y N | |
| 15 | | Y N | Y N | Y N | Y N | |
| 16 | | Y N | Y N | Y N | Y N | |
| 17 | | Y N | Y N | Y N | Y N | |
| 18 | | Y N | Y N | Y N | Y N | |
| 19 | | Y N | Y N | Y N | Y N | |
| 20 | | Y N | Y N | Y N | Y N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPREL FRM
REV 01

Inspector -

Digital photo taken of shipment ?

yes no

Loader - L. Mosfink

**IIS MEMORANDUM** is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 4/16/2010 | 025312 |

CEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading.
property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier be derstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver other carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any f property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the d act, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
pper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditi hereby agreed to by the shipper and accepted for himself and his assigns.

ROM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882
ZIP

LIVERING RRIER PTL | ROUTE | VEHICLE NUMBER

| NO. PACKAGES | * HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONL |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ 45 525 lbs. | | | |
| | | Item Key / Roll Number / Quantity | | | | |
| | | L-HD-MSDS-60-23 211700-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211702-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211703-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211704-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211795-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211796-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211797-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211798-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 211799-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 212101-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 212102-10 1,615 | | | | |
| | | L-HD-MSDS-60-23 212103-10 1,615 | | | | |
| | | Total Weight: ~~45,996 LB~~ 45 525 lbs. | | | | |
| | | Total Units: 12 Rolls | | | | |
| | | Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10 | | | | |
| | | Location: GTOWN P.O. No.: 13173 | | | | |

VIT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

he shipment moves between two ports by a carrier by er, the law requires that the bill of lading shall state ther it is "carrier's or shipper's weight".

hipper's imprint in lieu of stamp; not a part of bill of lading roved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.

☐ Check box if charges are Colle

I is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per

Agent, Per



nanent post office address of shipper

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

en transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response nmunication Standard (HM-126C). Provide emergency response phone number in case of incident or accident.

agru america, inc.

# SHIPPING RELEASE FORM

Date : 7-16-10

BOL # :

Document # :

Customer :

Destination :

| | ROLL # | EXTERNAL VISUAL OK ? | STRAPS OK ? | CORE OK ? | WELD ROD OK ? | COMMENTS (TO ALL NO REMARKS) |
|---|---|---|---|---|---|---|
| 1 | 211795-10 | Y N | Y N | Y N | Y N | |
| 2 | 211796-10 | Y N | Y N | Y N | Y N | No weld Rod |
| 3 | 211797-10 | Y N | Y N | Y N | Y N | |
| 4 | 211798-10 | Y N | Y N | Y N | Y N | |
| 5 | 211799-10 | Y N | Y N | Y N | Y N | |
| 6 | 211700-10 | Y N | Y N | Y N | Y N | |
| 7 | 211702-10 | Y N | Y N | Y N | Y N | |
| 8 | 211703-10 | Y N | Y N | Y N | Y N | |
| 9 | 211704-10 | Y N | Y N | Y N | Y N | |
| 10 | 212101-10 | Y N | Y N | Y N | Y N | |
| 11 | 212102-10 | Y N | Y N | Y N | Y N | |
| 12 | 212103-10 | Y N | Y N | Y N | Y N | |
| 13 | | Y N | Y N | Y N | Y N | |
| 14 | | Y N | Y N | Y N | Y N | |
| 15 | | Y N | Y N | Y N | Y N | |
| 16 | | Y N | Y N | Y N | Y N | |
| 17 | | Y N | Y N | Y N | Y N | |
| 18 | | Y N | Y N | Y N | Y N | |
| 19 | | Y N | Y N | Y N | Y N | |
| 20 | | Y N | Y N | Y N | Y N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ?

yes no

SHPREL FRM
REV 01

Inspector :

Loader : R. H

TRAIG. .LL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

B/L NO. 025309

| ME OF CARRIER | CARRIER'S NO. | DATE |
|---|---|---|
| TRUCK | | 4/16/2010 |

CEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading, property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei ersiood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver other carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any d property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da ent, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. pper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio hereby agreed to by the shipper and accepted for himself and his assigns.

ROM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

LIVERING RRIER: XTL

ROUTE

VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ | | | |
| 132 | | WELD ROD MFG BLACK HDPE 5MM | 45105 132 | | | |
| | | Item Key / Roll Number | Quantity 45237 lbs. | | | |
| | | L-HD-MSDS-60-23 211682-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211684-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211785-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211786-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211787-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211788-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211789-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211790-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211791-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211792-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211793-10 | 11,615 | | | |
| | | L-HD-MSDS-60-23 211794-10 | 11,615 | | | |
| | | 45237 lbs. | | | | |
| | | Total Weight: ~~46,128~~ LB | | | | |
| | | Total Units: 12 Rolls & 6 Spools | | | | |
| | | Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10 | | | | |
| | | Location: GTOWN P.O. No.: 13173 | | | | |
| | | 12 Rolls @ 45105 lbs. } 45237 lbs. | | | | |
| | | 6 Spools @ 132 lbs. | | | | |

MIT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

the shipment moves between two ports by a carrier by ter, the law requires that the bill of lading shall state ther it is "carrier's or shipper's weight".

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Colle

e is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per

Agent, Per

Page 1 of 1

manent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

en transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response Telecommunication Standard (HM-126C). Provide emergency response phone number in case of incident or accident.

1

agru america, inc.

# SHIPPING RELEASE FORM

Date : 4-15-10

BOL # :

Document # : 13568

Customer : Duke/Kinsell

Destination : Lenoir N.C

| | Roll # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS ALL TO ALL NO REMARK |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 211682-10 | Y | N | Y | N | Y | N | Y | N | 6 weld rods |
| 2 | 211684-10 | Y | N | Y | N | Y | N | Y | N | LOT#7100252 |
| 3 | 211785-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 211786-10 | Y | N | Y | N | Y | N | Y | N | 6x22 = |
| 5 | 211787-10 | Y | N | Y | N | Y | N | Y | N | 132 lbs |
| 6 | 211788-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 211789-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 211790-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 211791-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 211792-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 211793-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | 211794-10 | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPREL FRM
REV 01

Digital photo taken of shipment ?
yes no

Inspector :

Loader : J. Mayfield

## TRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | 616 | 4/16/2010 | 025308 |

EIVED, subject to the classifications and tariffs in effect on the date of issue of this Bill of Lading.
property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier be
derstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
other carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the d
ed, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
pper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
hereby agreed to by the shipper and accepted for himself and his assigns.

ROM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882
ZIP

LIVERING RRIER: TDT
ROUTE
VEHICLE NUMBER

| NO. PACKAGES | * HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | 45,996 | | | |
| 198 | | WELD ROD MFG BLACK HDPE 5MM | 198 | | | |
| | | | 45,825 | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211669-10 | 11,615 |
| L-HD-MSDS-60-23 | 211670-10 | 11,615 |
| L-HD-MSDS-60-23 | 211671-10 | 11,615 |
| L-HD-MSDS-60-23 | 211672-10 | 11,615 |
| L-HD-MSDS-60-23 | 211673-10 | 11,615 |
| L-HD-MSDS-60-23 | 211674-10 | 11,615 |
| L-HD-MSDS-60-23 | 211676-10 | 11,615 |
| L-HD-MSDS-60-23 | 211677-10 | 11,615 |
| L-HD-MSDS-60-23 | 211678-10 | 11,615 |
| L-HD-MSDS-60-23 | 211679-10 | 11,615 |
| L-HD-MSDS-60-23 | 211680-10 | 11,615 |
| L-HD-MSDS-60-23 | 211681-10 | 11,615 |

Total Weight: ~~46,194~~ 45,825 LB
Total Units: 12 Rolls / 95 pallets
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

MIT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

he shipment moves between two ports by a carrier by
r, the law requires that the bill of lading shall state
ther it is "carrier's or shipper's weight".

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Collec

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per
Agent, Per



nanent post office address of shipper

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
munication Standard (HM-126C). Provide emergency response phone number in case of incident or accident.

agru America, inc.

# SHIPPING RELEASE FORM

Date : 4-15-10

BOL # :

Document # : 13568

Customer : Duke/Marshall

Destination : Lowell, NC

| | Roll # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (PTO ALL NO REMARKS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 211669-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 2 | 211670-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | 9 weld rods |
| 3 | 211671-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | LOT # 8A1302 |
| 4 | 211672-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 5 | 211673-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 6 | 211674-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 7 | 211676-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 8 | 211677-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 9 | 211678-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 10 | 211679-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 11 | 211680-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 12 | 211681-10 | ✓ | N | ✓ | N | ✓ | N | ✓ | N | |
| 13 | | Y | N | Y | N | Y | N | ✓ | N | |
| 14 | | Y | N | Y | N | Y | N | ✓ | N | |
| 15 | | Y | N | Y | N | Y | N | ✓ | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPPING FRM
REV 01

Digital photo taken of shipment ?
yes no

Inspector :

Loader : J Marshall

**TRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE**

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 4/16/2010 | 025304 |

CEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading.
property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bel
erstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
ther carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
l property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the d
ed, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
pper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
hereby agreed to by the shipper and accepted for himself and his assigns.

IOM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

LIVERING ARRIER: H T&

ROUTE

VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | 45,195 ~~45,996~~ | | | |
| 330 | | WELD ROD MFG BLACK HDPE 5MM | 330 | | | |
| | | | 45525 lbs. | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211555-10 | 11,615 |
| L-HD-MSDS-60-23 | 211556-10 | 11,615 |
| L-HD-MSDS-60-23 | 211557-10 | 11,615 |
| L-HD-MSDS-60-23 | 211559-10 | 11,615 |
| L-HD-MSDS-60-23 | 211560-10 | 11,615 |
| L-HD-MSDS-60-23 | 211561-10 | 11,615 |
| L-HD-MSDS-60-23 | 211562-10 | 11,615 |
| L-HD-MSDS-60-23 | 211563-10 | 11,615 |
| L-HD-MSDS-60-23 | 211564-10 | 11,615 |
| L-HD-MSDS-60-23 | 211665-10 | 11,615 |
| L-HD-MSDS-60-23 | 211667-10 | 11,615 |
| L-HD-MSDS-60-23 | 211668-10 | 11,615 |

Total Weight: ~~46,326 LB~~ 45,525 lbs.
Total Units: 12 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

12 Rolls @ 45195 lbs.
15 spools @ 330 lbs.
} 45,525 lbs

IT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

e shipment moves between two ports by a carrier by
r, the law requires that the bill of lading shall state
her it is "carrier's or shipper's weight".

pper's Imprint in lieu of stamp; not a part of bill of lading
roved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are
required to state specifically in writing the agreed or declared
value of the property.
The agreed or declared value of the property is hereby
specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be
delivered to the consignee without recourse on the
consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without
payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect. ☐ Check box if charges are Colle

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per

Agent, Per

Page 1 of 1

nent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
nunication Standard (HM 126C). Provide emergency response phone number in case of incident or accident.

1

agru america, inc.

# SHIPPING RELEASE FORM

Date: 4-15-10

BOL #:

Document #: 13568

Customer: Duke Woodville

Destination: Terrell, NC

| | Roll # | External Visual OK? | Straps OK? | Core OK? | Weld Rod OK? | Comments (Note all No Remarks) |
|---|---|---|---|---|---|---|
| 1 | 211555-10 | Y N | Y N | Y N | Y N | |
| 2 | 211556-10 | Y N | Y N | Y N | Y N | 15 wide rolls |
| 3 | 211557-10 | Y N | Y N | Y N | Y N | Lot# 8711302 |
| 4 | 211559-10 | Y N | Y N | Y N | Y N | 15 X 22 = 330 lbs |
| 5 | 211560-10 | Y N | Y N | Y N | Y N | |
| 6 | 211561-10 | Y N | Y N | Y N | Y N | |
| 7 | 211562-10 | Y N | Y N | Y N | Y N | |
| 8 | 211563-10 | Y N | Y N | Y N | Y N | |
| 9 | 211564-10 | Y N | Y N | Y N | Y N | |
| 10 | 211665-10 | Y N | Y N | Y N | Y N | |
| 11 | 211667-10 | Y N | Y N | Y N | Y N | |
| 12 | 211668-10 | Y N | Y N | Y N | Y N | |
| 13 | | Y N | Y N | Y N | Y N | |
| 14 | | Y N | Y N | Y N | Y N | |
| 15 | | Y N | Y N | Y N | Y N | |
| 16 | | Y N | Y N | Y N | Y N | |
| 17 | | Y N | Y N | Y N | Y N | |
| 18 | | Y N | Y N | Y N | Y N | |
| 19 | | Y N | Y N | Y N | Y N | |
| 20 | | Y N | Y N | Y N | Y N | |

12 Rolls @ 45195

15 spools of weld Rods @ 330 lbs

Total - 45,525 lbs.

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPREL FRM
REV 01

Digital photo taken of shipment ?
yes no

Inspector:

Loader: J. Mayfield

## RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 4/19/2010 | 025326 |

EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading,
property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
lerstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
ther carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
l property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da
ate, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
pper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
hereby agreed to by the shipper and accepted for himself and his assigns.

OM:
HIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

LIVERING RRIER Stone Construction | ROUTE | VEHICLE NUMBER

| NO. PACKAGES | * HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ 44920 lbs. | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211320-10 | 11,615 |
| L-HD-MSDS-60-23 | 211324-10 | 11,615 |
| L-HD-MSDS-60-23 | 211326-10 | 11,615 |
| L-HD-MSDS-60-23 | 211327-10 | 11,615 |
| L-HD-MSDS-60-23 | 211328-10 | 11,615 |
| L-HD-MSDS-60-23 | 211431-10 | 11,615 |
| L-HD-MSDS-60-23 | 211432-10 | 11,615 |
| L-HD-MSDS-60-23 | 211433-10 | 11,615 |
| L-HD-MSDS-60-23 | 211434-10 | 11,615 |
| L-HD-MSDS-60-23 | 211547-10 | 11,615 |
| L-HD-MSDS-60-23 | 211553-10 | 11,615 |
| L-HD-MSDS-60-23 | 211554-10 | 11,615 |

44920 lbs.

Total Weight: ~~45,996 LB~~
Total Units: 12 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

MIT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
Prepaid
Collect $

he shipment moves between two ports by a carrier by
r, the law requires that the bill of lading shall state
ther it is "carrier's or shipper's weight".

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ Per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
Signature of Consignor

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
Check box if charges are Collec

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per
Agent, Per

Page 1 of 1

nanent post office address of shipper

* MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
mmunication Standard (HM 126C). Provide emergency response phone number in case of incident or accident

1

agru americo.inc

# SHIPPING RELEASE FORM

Date: 4/19/10

BOL #:

Document #: 13568

Customer:

Destination: 1 NC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARKS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 211320-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 211324-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 211326-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 211327-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 211328-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 211431-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 211432-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 211433-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 211434-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 211547-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 211553-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | 211554-10 | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 lool spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if necessary*) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHPREL.FRM
REV 01

Digital photo taken of shipment ?
yes no

Inspector: [illegible]

Loader: [illegible]

RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 4/19/2010 | 025325 |

EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading.
roperty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
erstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
her carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da
of, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
per hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
ereby agreed to by the shipper and accepted for himself and his assigns.

OM:
IPPER
RIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE: DUKE ENERGY
STREET: MARSHALL STEAM PLANT
8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION: WILSON WARLICK 704-361-7882
ZIP

IVERING
RIER: Stone Construction

ROUTE

VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ 45,180 LBS | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211212-10 | 11,615 |
| L-HD-MSDS-60-23 | 211213-10 | 11,615 |
| L-HD-MSDS-60-23 | 211214-10 | 11,615 |
| L-HD-MSDS-60-23 | 211315-10 | 11,615 |
| L-HD-MSDS-60-23 | 211316-10 | 11,615 |
| L-HD-MSDS-60-23 | 211317-10 | 11,615 |
| L-HD-MSDS-60-23 | 211318-10 | 11,615 |
| L-HD-MSDS-60-23 | 211319-10 | 11,615 |
| L-HD-MSDS-60-23 | 211321-10 | 11,615 |
| L-HD-MSDS-60-23 | 211322-10 | 11,615 |
| L-HD-MSDS-60-23 | 211323-10 | 11,615 |
| L-HD-MSDS-60-23 | 211549-10 | 11,615 |

Total Weight: ~~45,996 LB~~ 45,180 LBS
Total Units: 12 ROLLS
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

IT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☑ Prepaid
☐ Collect $

a shipment moves between two ports by a carrier by
, the law requires that the bill of lading shall state
er it is "carrier's or shipper's weight".

pper's imprint in lieu of stamp; not a part of bill of lading
ved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Collec

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Shipper, Per
Agent, Per

Page 1 of 1

tment post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
mmunication Standard (HM 126C). Provide emergency response phone number in case of incident or accident.

# IGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

B/L NO. 025916

OF CARRIER TRUCK | CARRIER'S NO. | DATE 6/18/2010

), subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading,
irty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
od throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
arrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
erty, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the di
this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
ereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditio
y agreed to by the shipper and accepted for himself and his assigns.

I:
PER
GIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru america

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

RING
ER Stone Construction

ROUTE

VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 7,765 | | HD DBL MICRO 60MIL 23FT | 42,163 | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 218590-10 | 11,615 |
| L-HD-MSDS-60-23 | 218591-10 | 11,615 |
| L-HD-MSDS-60-23 | 218592-10 | 11,615 |
| L-HD-MSDS-60-23 | 218593-10 | 11,615 |
| L-HD-MSDS-60-23 | 218694-10 | 11,615 |
| L-HD-MSDS-60-23 | 218722-10 | 11,615 |
| L-HD-MSDS-60-23 | 218723-10 | 11,615 |
| L-HD-MSDS-60-23 | 219103-10 | 11,615 |
| L-HD-MSDS-60-23 | 219104-10 | 11,615 |
| L-HD-MSDS-60-23 | 219105-10 | 11,615 |
| L-HD-MSDS-60-23 | 219107-10 | 11,615 |

Total Weight: 42,163 LB
Total Units: 13 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

T C.O.D. TO:

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru america

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

shipment moves between two ports by a carrier by the law requires that the bill of lading shall state it is "carrier's or shipper's weight".

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Coll

er's imprint in lieu of stamp; not a part of bill of lading ed by the Interstate Commerce Commission.

to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportat

Shipper, Per

Agent, Per

Page 1 of 1

ment post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response

agru america, inc

SHIPPING RELEASE FOR

Date: 6/18/10

BOL #:

Document #: 13568

Customer:

Destination: INC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARK) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 218590-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218591-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218592-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 218593-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 218694-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 218722-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 218723-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 219103-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 219104-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 219105-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 219107-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ?

yes no

SHIPREL FRM
REV 01

Inspector: JCF

Loader: KF

# AIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| : C: CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 6/18/2010 | 025918 |

'ED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading,
perty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier b
:ood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliv
: carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or ar
ɔperty, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the
il this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
r hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and condit
eby agreed to by the shipper and accepted for himself and his assigns.

M:
'PER
IGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882 ZIP

ERING IER Stone Construction

ROUTE

VEHICLE NUMBER

| NO. CKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONL |
|---|---|---|---|---|---|---|
| 27,765 | | HD DBL MICRO 60MIL 23FT | 42,163 | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 211552-10 | 11,615 |
| L-HD-MSDS-60-23 | 218603-10 | 11,615 |
| L-HD-MSDS-60-23 | 218612-10 | 11,615 |
| L-HD-MSDS-60-23 | 218695-10 | 11,615 |
| L-HD-MSDS-60-23 | 218729-10 | 11,615 |
| L-HD-MSDS-60-23 | 219106-10 | 11,615 |
| L-HD-MSDS-60-23 | 219108-10 | 11,615 |
| L-HD-MSDS-60-23 | 219109-10 | 11,615 |
| L-HD-MSDS-60-23 | 219110-10 | 11,615 |
| L-HD-MSDS-60-23 | 219114-10 | 11,615 |
| L-HD-MSDS-60-23 | 219223-10 | 11,615 |

Total Weight: 42,163 LB
Total Units: 11 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

T C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☒ Prepaid
☐ Collect $

shipment moves between two ports by a carrier by the law requires that the bill of lading shall state r it is "carrier's or shipper's weight".

ɔer's imprint in lieu of stamp; not a part of bill of lading ed by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Colle

: to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transport

Shipper, Per

Agent, Per



ɔment post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response unication Standard (HM-126C). Provide emergency response phone number in case of incident or accident.

agru america, inc

# SHIPPING RELEASE FORI

Date: 6/18/10

BOL #:

Document #: 13568

Customer:

Destination: INC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARK |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 211552-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218695-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218603-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 218612-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 218727-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 219106-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 219108-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 219109-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 219110-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 219114-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 219223-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if neccessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ?

yes no

SHIPREL FRM
REV 01

Inspector: KF

Loader: KF

# AIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

OF CARRIER TRUCK | CARRIER'S NO. | DATE 6/18/2010 | B/L NO. 025917

ED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading.
operty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier b
ood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliv
carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or ar
operty, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the
if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and condit
aby agreed to by the shipper and accepted for himself and his assigns.

VI:
PER
GIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru America

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE DUKE ENERGY
MARSHALL STEAM PLANT
STREET 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION WILSON WARLICK 704-361-7882
ZIP

ERING ER Stone Construction | ROUTE | VEHICLE NUMBER

| NO. CKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONL |
|---|---|---|---|---|---|---|
| 27,765 | | HD DBL MICRO 60MIL 23FT | 42,163 | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 218589-10 | 11,615 |
| L-HD-MSDS-60-23 | 218601-10 | 11,615 |
| L-HD-MSDS-60-23 | 218607-10 | 11,615 |
| L-HD-MSDS-60-23 | 218696-10 | 11,615 |
| L-HD-MSDS-60-23 | 218697-10 | 11,615 |
| L-HD-MSDS-60-23 | 218698-10 | 11,615 |
| L-HD-MSDS-60-23 | 218699-10 | 11,615 |
| L-HD-MSDS-60-23 | 218721-10 | 11,615 |
| L-HD-MSDS-60-23 | 219102-10 | 11,615 |
| L-HD-MSDS-60-23 | 219222-10 | 11,615 |
| L-HD-MSDS-60-23 | 219224-10 | 11,615 |

Total Weight: 42,163 LB
Total Units: 11 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
[X] Prepaid
[ ] Collect $

hipment moves between two ports by a carrier by
e law requires that the bill of lading shall state
n is "carrier's or shipper's weight".

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
[ ] Check box if charges are Colle

's imprint in lieu of stamp; not a part of bill of lading
by the Interstate Commerce Commission.

o certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportatio

Page 1 of 1 Shipper, Per Agent, Per

ent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

nsporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response
sification Standard (UMA 1250). Provide emergency response phone number where shown above.

1

agru america, inc

# SHIPPING RELEASE FORM

Date : 06-18-10

BOL # :

Document # : 13568

Customer :

Destination : Jenell NC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARK) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 218589-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218696-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218697-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 218698-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 218699-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 218601-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 218607-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 218721-10 | Y | N | Y | N | Y | N | Y | N | |
| 9 | 219102-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 219222-10 | Y | N | Y | N | Y | N | Y | N | |
| 11 | 219224-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if neccessary*) : *Secure Load; Lot # on BOL; Check type*

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPREL FRM
REV 01

Digital photo taken of shipment ?

yes no

Inspector : J.T.D

Loader : J.T.D

# RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| NE OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 6/17/2010 | 025900 |

IVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading,
roperty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
rstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to delivor
ier carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
roperty, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the
f, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
ar hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and cond
eraby agreed to by the shipper and accepted for himself and his assigns.

DM:
IPPER
RIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru america

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE: DUKE ENERGY
MARSHALL STEAM PLANT
STREET: 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION: WILSON WARLICK 704-361-7882
ZIP

IVERING RIER: Stone Construction
ROUTE
VEHICLE NUMBER

| NO. ACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONL |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ | | | |
| 242 | | WELD ROD MFG BLACK HDPE 5MM | 242 | | | |
| | | | 46080 LBS | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 218602-10 | 11,615 |
| L-HD-MSDS-60-23 | 218604-10 | 11,615 |
| L-HD-MSDS-60-23 | 218605-10 | 11,615 |
| L-HD-MSDS-60-23 | 218606-10 | 11,615 |
| L-HD-MSDS-60-23 | 218608-10 | 11,615 |
| L-HD-MSDS-60-23 | 218609-10 | 11,615 |
| L-HD-MSDS-60-23 | 218610-10 | 11,615 |
| L-HD-MSDS-60-23 | 218611-10 | 11,615 |
| L-HD-MSDS-60-23 | 218714-10 | 11,615 |
| L-HD-MSDS-60-23 | 218731-10 | 11,615 |
| L-HD-MSDS-60-23 | 219111-10 | 11,615 |
| L-HD-MSDS-60-23 | 219116-10 | 11,615 |

Total Weight: ~~46,238 LB~~ 46080 LBS
Total Units: 12 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

HT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☑ Prepaid
☐ Collect $

e shipment moves between two ports by a carrier by r, the law requires that the bill of lading shall state ner it is "carrier's or shipper's weight".

pper's imprint in lieu of stamp; not a part of bill of lading ved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Coll

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transporta

Page 1 of 1
Shipper, Per
Agent, Per

anent post office address of shipper
+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.
n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response

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agru america, inc

# SHIPPING RELEASE FORI

Date : 06-16-10

BOL # :

Document # : 13568

Customer :

Destination : Terrell NC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARK |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 218602-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218604-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218605-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 218606-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 218608-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 218609-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 218610-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 218611-10 | Y | N | Y | N | Y | N | Y | N | 5mm HD |
| 9 | 218714-10 | Y | N | Y | N | Y | N | Y | N | |
| 10 | 218731-10 | Y | N | Y | N | Y | N | Y | N | 8290800 (8 spools) |
| 11 | 219111-10 | Y | N | Y | N | Y | N | Y | N | 791450 (3) |
| 12 | 219116-10 | Y | N | Y | N | Y | N | Y | N | 11 spools |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ?

yes no

SHIPREL FRM
REV 01

Inspector : J.T.D

Loader : J.T.D

**S MEMORANDUM** is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

B/L NO. 025904

E OF CARRIER: TRUCK | CARRIER'S NO. | DATE: 6/17/2010

'ED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading,
perty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier bei
tood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver
r carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any
operty, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the da
if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
r hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditi
eby agreed to by the shipper and accepted for himself and his assigns.

M: PPER IGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru america

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE: DUKE ENERGY
MARSHALL STEAM PLANT
STREET: 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION: WILSON WARLICK 704-361-7882
ZIP

VERING IER: Stone | ROUTE | VEHICLE NUMBER

| NO. CKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONLY) |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ | | | |
| 245 | | WELD ROD MFG BLACK HDPE 5MM | 245 | | | |
| | | | 45,960 LBS | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 216600-10 | 11,615 |
| L-HD-MSDS-60-23 | 218713-10 | 11,615 |
| L-HD-MSDS-60-23 | 218718-10 | 11,615 |
| L-HD-MSDS-60-23 | 218719-10 | 11,615 |
| L-HD-MSDS-60-23 | 218720-10 | 11,615 |
| L-HD-MSDS-60-23 | 218724-10 | 11,615 |
| L-HD-MSDS-60-23 | 218725-10 | 11,615 |
| L-HD-MSDS-60-23 | 218726-10 | 11,615 |
| L-HD-MSDS-60-23 | 218727-10 | 11,615 |
| L-HD-MSDS-60-23 | 218728-10 | 11,615 |
| L-HD-MSDS-60-23 | 218730-10 | 11,615 |
| L-HD-MSDS-60-23 | 218732-10 | 11,615 |

Total Weight: ~~46,241 LB~~ 46,202 LBS
Total Units: 12 ROLLS
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

IT C.O.D. TO:

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

agru america

C.O.D. Amt $

C.O.D. FEE
☑ Prepaid
☐ Collect $

e shipment moves between two ports by a carrier by , the law requires that the bill of lading shall state er it is "carrier's or shipper's weight".

pper's imprint in lieu of stamp; not a part of bill of lading wed by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect. ☐ Check box if charges are Colle

is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transporta

Page 1 of 1

Shipper, Per

Agent, Per

anent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Response

agru america, inc

# SHIPPING RELEASE FORM

Date : 6-16-10

BOL # :

Document # : 13568

Customer :

Destination : NC

| | ROLL # | EXTERNAL VISUAL OK ? | | STRAPS OK ? | | CORE OK ? | | WELD ROD OK ? | | COMMENTS ? (TO ALL NO REMARK) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 218600-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218718-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218719-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 218720-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 218724-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 218725-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 218726-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 218727-10 | Y | N | Y | N | Y | N | Y | N | 5mm HD |
| 9 | 218728-10 | Y | N | Y | N | Y | N | Y | N | 7100409 |
| 10 | 218730-10 | Y | N | Y | N | Y | N | Y | N | 11 spools |
| 11 | 218731-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | 218732-10 | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (*if neccessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

SHIPREL FRM
REV 01

Digital photo taken of shipment ?
yes no

Inspector : J. T. D

Loader : J. T. D

# RAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - NOT NEGOTIABLE

| ME OF CARRIER | CARRIER'S NO. | DATE | B/L NO. |
|---|---|---|---|
| TRUCK | | 6/17/2010 | 025905 |

EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of issue of this Bill of Lading, roperty described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below which said carrier (the word carrier be rstood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliv her carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or an property, that every service to be performed hereunder, shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the f, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. per hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and condi ereby agreed to by the shipper and accepted for himself and his assigns.

OM:
IIPPER
ORIGIN)

AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

EMERGENCY RESPONSE PHONE NO.

TO:
CONSIGNEE: DUKE ENERGY
MARSHALL STEAM PLANT
STREET: 8320 NC HIGHWAY E
TERRELL, NC 28682
DESTINATION: WILSON WARLICK 704-361-7882
ZIP

IVERING IRIER: Stone Construction
ROUTE
VEHICLE NUMBER

| NO. PACKAGES | + HM | KIND OF PACKAGE, DESCRIPTION OF ARTICLES SPECIAL MARKS AND EXCEPTIONS | *WEIGHT (SUBJECT TO CORR.) | CLASS OR RATE | ✓ | CHARGES (FOR CARRIER USE ONL |
|---|---|---|---|---|---|---|
| 139,380 | | HD DBL MICRO 60MIL 23FT | ~~45,996~~ | | | |
| 239 | | WELD ROD MFG BLACK HDPE 5MM | 239 | | | |
| | | | 45,960 LB | | | |

| Item Key | Roll Number | Quantity |
|---|---|---|
| L-HD-MSDS-60-23 | 218715-10 | 11,615 |
| L-HD-MSDS-60-23 | 218716-10 | 11,615 |
| L-HD-MSDS-60-23 | 218717-10 | 11,615 |
| L-HD-MSDS-60-23 | 219101-10 | 11,615 |
| L-HD-MSDS-60-23 | 219112-10 | 11,615 |
| L-HD-MSDS-60-23 | 219113-10 | 11,615 |
| L-HD-MSDS-60-23 | 219115-10 | 11,615 |
| L-HD-MSDS-60-23 | 219117-10 | 11,615 |
| L-HD-MSDS-60-23 | 219118-10 | 11,615 |
| L-HD-MSDS-60-23 | 219119-10 | 11,615 |
| L-HD-MSDS-60-23 | 219120-10 | 11,615 |
| L-HD-MSDS-60-23 | 219221-10 | 11,615 |

46,199 LBS
Total Weight: ~~46,235 LB~~
Total Units: 12 Rolls
Order No.: 13568 Order Date: 03/09/10 Request Date: 03/09/10
Location: GTOWN P.O. No.: 13173

IT C.O.D. TO:
AGRU/AMERICA, INC.
500 GARRISON ROAD
GEORGETOWN, SOUTH CAROLINA 29440
(843) 546-0600

C.O.D. Amt $

C.O.D. FEE
☑ Prepaid
☐ Collect $

e shipment moves between two ports by a carrier by r, the law requires that the bill of lading shall state ner it is "carrier's or shipper's weight".

pper's imprint in lieu of stamp; not a part of bill of lading oved by the Interstate Commerce Commission.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ per

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

TOTAL CHARGES $

Freight charges are PREPAID unless marked collect.
☐ Check box if charges are Coll

iz to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transport

Shipper, Per
Agent, Per

Page 1 of 1

anent post office address of shipper

+ MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF FEDERAL REGULATIONS.

n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in U.S. DOT Emergency Response unication Standard (NM 1760). Provide emergency response phone number in case of incident or accident.

agru america, inc

# SHIPPING RELEASE FORM

Date : 06-16-10

BOL # :

Document # : 13568

Customer :

Destination : NC

| | ROLL # | EXTERNAL VISUAL OK? | | STRAPS OK? | | CORE OK? | | WELD ROD OK? | | COMMENTS (TO ALL NO REMARKS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 218715-10 | Y | N | Y | N | Y | N | Y | N | |
| 2 | 218717-10 | Y | N | Y | N | Y | N | Y | N | |
| 3 | 218716-10 | Y | N | Y | N | Y | N | Y | N | |
| 4 | 219101-10 | Y | N | Y | N | Y | N | Y | N | |
| 5 | 219112-10 | Y | N | Y | N | Y | N | Y | N | |
| 6 | 219113-10 | Y | N | Y | N | Y | N | Y | N | |
| 7 | 219115-10 | Y | N | Y | N | Y | N | Y | N | |
| 8 | 219117-10 | Y | N | Y | N | Y | N | Y | N | 5mm HD |
| 9 | 219118-10 | Y | N | Y | N | Y | N | Y | N | 7100409 |
| 10 | 219119-10 | Y | N | Y | N | Y | N | Y | N | 11 Spools |
| 11 | 219120-10 | Y | N | Y | N | Y | N | Y | N | |
| 12 | 219221-10 | Y | N | Y | N | Y | N | Y | N | |
| 13 | | Y | N | Y | N | Y | N | Y | N | |
| 14 | | Y | N | Y | N | Y | N | Y | N | |
| 15 | | Y | N | Y | N | Y | N | Y | N | |
| 16 | | Y | N | Y | N | Y | N | Y | N | |
| 17 | | Y | N | Y | N | Y | N | Y | N | |
| 18 | | Y | N | Y | N | Y | N | Y | N | |
| 19 | | Y | N | Y | N | Y | N | Y | N | |
| 20 | | Y | N | Y | N | Y | N | Y | N | |

External Visual Check : Clean Roll; Damage (Holes, Tears); Telescoping; Liner Defects (Voids, Bug Marks, etc.); Legible markings on roll

Strap Check : 6 foot spacing; Check for wear, cuts

Core Check : Check for cracks, defects

Weld Rod Check (if necessary) : Secure Load; Lot # on BOL; Check type

Comments : Note comments for ANY & ALL "No" entries on form

CHECK OFF ON ALL FIELDS - INSPECTOR VERIFIES ALL COMMENTS

Digital photo taken of shipment ?

yes no

SHIPREL FRM
REV 01

Inspector : J.T.D

Loader : J.T.D

# APPENDIX II – GEOSYNTHETICS
# Section 5 – Cell 1 Secondary HDPE Geomembrane CQA Forms

**Subgrade Certification Forms**
**Geomembrane Deployment Report**
**Geomembrane Trial Seam Log**
**Geomembrane Seam Log**
**Destructive Laboratory Test Results**
**Geomembrane Defect Log**
**Geomembrane Repair Testing Log**

# Cell 1 Secondary HDPE Geomembrane Subgrade Certification Forms

S&ME

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER: ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

PROJECT NAME: Duke Energy Marshall Cell 2 PROJECT NO: 10 - 01 - 1001

LOCATION: Terrell,NC.

AREA ACCEPTED: PANEL- 01 THRU PANEL- 28

PANEL NUMBERS: PANEL - 01 THRU PANEL- 28

GRADE ACCEPTANCE: INSPECTOR: JIMMY ADDIS

GENERAL CONTRACTOR: EARNHARDT GRADING, INC.

OWNER: DUKE ENERGY CORP

AUTHORIZED REPRESENTATIVE: Darrell B. Wolfe

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 14-Jun and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 14-Jun |

**OWNER REPRESENTATIVE:**

| Signature | Title | DATE |
|---|---|---|
| Jimmy H. Addis | CQA | 6/14/10 |

7943 FECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2700 ~ FAX 225-291-2788

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Cell ~~2~~ 1 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC. DSW 7/2/10

**AREA ACCEPTED:** PANEL- 29 THRU. PANEL- 39

**PANEL NUMBERS:** PANEL - 29 THRU. PANEL- 39

**GRADE ACCEPTANCE: INSPECTOR:** JIMMY ADDIS

**GENERAL CONTRACTOR:** EARNHARDT GRADING, INC.

**OWNER:** Duke Energy Corp

**AUTHORIZED REPRESENTATIVE:** Darell S. Wolfe

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 17-Jun and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 17-Jun |

**OWNER REPRESENTATIVE:**

| Signature | Title | DATE |
|---|---|---|
| Jimmy H. Addis | CQA | 6/17/10 |

7943 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2700 ~ FAX 225-291-2788

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Cell ~~2~~ 1 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC. DBW 7/21/10

**AREA ACCEPTED:** PANEL- 40 THRU. PANEL- 71

**PANEL NUMBERS:** PANEL - 40 THRU. PANEL- 71

**GRADE ACCEPTANCE: INSPECTOR:** JIMMY ADDIS

**GENERAL CONTRACTOR:** EARNHARDT GRADING, INC.

**OWNER:** Duke Energy Corp

**AUTHORIZED REPRESENTATIVE:** Darrell B. Wolfe

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 18-Jun and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 18-Jun |

**OWNER REPRESENTATIVE:**

| Signature | Title | DATE |
|---|---|---|
| Jimmy H. Addis | CQA | 6/18/10 |

7943 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2700 ~ FAX 225-291-2788

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Cell 2 | **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC. DBW 7/12/10

**AREA ACCEPTED:** PANEL- 72 THRU. PANEL- 100

**PANEL NUMBERS:** PANEL - 72 THRU. PANEL- 100

**GRADE ACCEPTANCE: INSPECTOR:** JIMMY ADDIS

**GENERAL CONTRACTOR:** EARNHARDT GRADING, INC.

**OWNER:** DUKE ENERGY CORP

**AUTHORIZED REPRESENTATIVE:** Daniel B. Wolfe

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 19-Jun and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 19-Jun |

**OWNER REPRESENTATIVE:**

| Signature | Title | DATE |
|---|---|---|
| Jimmy H. Addis | CQA | 6/19/10 |

7943 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2700 ~ FAX 225-291-2788

# Cell 1 Secondary HDPE Geomembrane Deployment Report

S&ME

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/14,6/17,6/18/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | ----- | ----- | | |
| S1 | 211684 | 501 | 22 | 11,022 | 0 | TB | 6/14/10 |
| S2 | 211786 | 500 | 22 | 11,000 | 0 | TB | 6/14/10 |
| S3 | 211791 | 500 | 22 | 11,000 | 0 | TB | 6/14/10 |
| S4 | 211790 | 501 | 22 | 11,022 | 0 | TB | 6/14/10 |
| S5 | 211555 | 500 | 22 | 11,000 | 0 | TB | 6/14/10 |
| S6 | 211668 | 502 | 22 | 11,044 | 0 | TB | 6/14/10 |
| S7 | 211327 | 76 | 22 | 1,672 | 0 | TB | 6/14/10 |
| S8 | 211327 | 75 | 22 | 1,650 | 0 | TB | 6/14/10 |
| S9 | 211327 | 74 | 22 | 1,628 | 0 | TB | 6/14/10 |
| S10 | 211327 | 75 | 22 | 1,650 | 0 | TB | 6/14/10 |
| S11 | 211327 | 74 | 22 | 1,628 | 0 | TB | 6/14/10 |
| S12 | 211327 | 73 | 22 | 1,606 | 0 | TB | 6/14/10 |
| S13 | 211557 | 73 | 22 | 1,606 | 0 | TB | 6/14/10 |
| S14 | 211557 | 72 | 22 | 1,584 | 0 | TB | 6/14/10 |
| S15 | 211557 | 71 | 22 | 1,562 | 0 | TB | 6/14/10 |
| S16 | 211557 | 71 | 22 | 1,562 | 0 | TB | 6/14/10 |
| S17 | 211557 | 71 | 22 | 1,562 | 0 | TB | 6/14/10 |
| S18 | 211557 | 70 | 22 | 1,540 | 0 | TB | 6/14/10 |
| S19 | 211324 | 70 | 22 | 1,540 | 0 | TB | 6/14/10 |
| S20 | 211324 | 71 | 22 | 1,562 | 0 | TB | 6/14/10 |
| S21 | 111324 | 69 | 22 | 1,518 | 0 | TB | 6/14/10 |
| S22 | 211324 | 70 | 22 | 1,540 | 0 | TB | 6/14/10 |
| S23 | 211324 | 69 | 22 | 1,518 | 0 | TB | 6/14/10 |
| S24 | 211324 | 70 | 22 | 1,540 | 0 | TB | 6/14/10 |
| S25 | 211665 | 70 | 22 | 1,540 | 0 | TB | 6/14/10 |
| S26 | 211665 | 67 | 22 | 1,474 | 0 | TB | 6/14/10 |
| S27 | 211665 | 67 | 22 | 1,474 | 0 | TB | 6/14/10 |
| S28 | 211665 | 67 | 22 | 1,474 | 0 | TB | 6/14/10 |
| S29 | 211785 | 502 | 22 | 11,044 | 0 | TB | 6/17/10 |
| | | | **Sheet Total** | 111,562 | 0 | | |
| | | | **Total to Date** | 111,562 | 0 | | |

**CQA Personnel:** Travis Bowman

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/14,6/17,6/18/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 111,562 | 0 | | |
| S30 | 211432 | 499 | 22 | 10,978 | 0 | TB | 6/17/10 |
| S31 | 211214 | 498 | 22 | 10,956 | 0 | TB | 6/17/10 |
| S32 | 211433 | 502 | 22 | 11,044 | 0 | TB | 6/17/10 |
| S33 | 211553 | 500 | 22 | 11,000 | 0 | TB | 6/17/10 |
| S34 | 211431 | 499 | 22 | 10,978 | 0 | TB | 6/17/10 |
| S35 | 211434 | 501 | 22 | 11,022 | 0 | TB | 6/17/10 |
| S36 | 211671 | 496 | 22 | 10,912 | 0 | TB | 6/17/10 |
| S37 | 211678 | 497 | 22 | 10,934 | 0 | TB | 6/17/10 |
| S38 | 211213 | 498 | 22 | 10,956 | 0 | TB | 6/17/10 |
| S39 | 211321 | 501 | 8 | 4,008 | 0 | TB | 6/17/10 |
| S40 | 211321 | 331 | 8 | 2,483 | 0 | TB | 6/18/10 |
| S41 | 211673 | 326 | 22 | 7,172 | 0 | TB | 6/18/10 |
| S42 | 211319 | 328 | 22 | 7,216 | 0 | TB | 6/18/10 |
| S43 | 211564 | 328 | 22 | 7,216 | 0 | TB | 6/18/10 |
| S44 | 211560 | 327 | 22 | 7,194 | 0 | TB | 6/18/10 |
| S45 | 211561 | 330 | 22 | 7,260 | 0 | TB | 6/18/10 |
| S46 | 211558 | 332 | 22 | 7,304 | 0 | TB | 6/18/10 |
| S47 | 211559 | 333 | 22 | 7,326 | 0 | TB | 6/18/10 |
| S48 | 211680 | 334 | 22 | 7,348 | 0 | TB | 6/18/10 |
| S49 | 211556 | 331 | 22 | 7,282 | 0 | TB | 6/18/10 |
| S50 | 211677 | 333 | 22 | 7,326 | 0 | TB | 6/18/10 |
| S51 | 211679 | 329 | 22 | 7,238 | 0 | TB | 6/18/10 |
| S52 | 211669 | 328 | 22 | 7,216 | 0 | TB | 6/18/10 |
| S53 | 211326 | 329 | 22 | 7,238 | 0 | TB | 6/18/10 |
| S54 | 211547 | 328 | 22 | 7,216 | 0 | TB | 6/18/10 |
| S55 | 211788 | 327 | 22 | 7,194 | 0 | TB | 6/18/10 |
| S56 | 211788 | 173 | 22 | 3,806 | 0 | TB | 6/18/10 |
| S57 | 211547 | 154 | 22 | 3,388 | 0 | TB | 6/18/10 |
| S58 | 211564 | 65 | 22 | 1,430 | 0 | TB | 6/18/10 |
| | | | **Sheet Total** | 222,641 | 0 | | |
| | | | **Total to Date** | 334,203 | 0 | | |

**CQA Personnel:** Travis Bowman

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/14,6/17,6/18/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 334,203 | 0 | | |
| S59 | 211564 | 64 | 22 | 1,408 | 0 | TB | 6/18/10 |
| S60 | 211326 | 64 | 22 | 1,408 | 0 | TB | 6/18/10 |
| S61 | 211326 | 66 | 22 | 1,452 | 0 | TB | 6/18/10 |
| S62 | 211669 | 64 | 22 | 1,408 | 0 | TB | 6/18/10 |
| S63 | 211669 | 64 | 22 | 1,408 | 0 | TB | 6/18/10 |
| S64 | 211679 | 62 | 22 | 1,364 | 0 | TB | 6/18/10 |
| S65 | 211679 | 62 | 22 | 1,364 | 0 | TB | 6/18/10 |
| S66 | 211556 | 63 | 22 | 1,386 | 0 | TB | 6/18/10 |
| S67 | 211556 | 62 | 22 | 1,364 | 0 | TB | 6/18/10 |
| S68 | 211680 | 63 | 22 | 1,386 | 0 | TB | 6/18/10 |
| S69 | 211 | 65 | 22 | 1,430 | 0 | TB | 6/18/10 |
| S70 | 211673 | 61 | 22 | 1,342 | 0 | TB | 6/18/10 |
| S71 | 211673 | 61 | 22 | 1,342 | 0 | TB | 6/18/10 |
| S72 | 211548 | 230 | 22 | 5,060 | 0 | TB | 6/18/10 |
| S73 | 211548 | 237 | 22 | 5,214 | 0 | TB | 6/18/10 |
| S74 | 211666 | 234 | 22 | 5,148 | 0 | TB | 6/18/10 |
| S75 | 211666 | 239 | 22 | 5,258 | 0 | TB | 6/18/10 |
| S76 | 211701 | 244 | 22 | 5,368 | 0 | TB | 6/18/10 |
| S77 | 211701 | 248 | 22 | 5,456 | 0 | TB | 6/18/10 |
| S78 | 211683 | 259 | 22 | 5,698 | 0 | TB | 6/18/10 |
| S79 | 211683 | 227 | 22 | 4,994 | 0 | TB | 6/18/10 |
| S80 | 211679 | 41 | 22 | 902 | 0 | TB | 6/18/10 |
| S81 | 211321 | 144 | 22 | 3,168 | 0 | TB | 6/18/10 |
| S82 | 211104 | 188 | 22 | 4,136 | 0 | TB | 6/18/10 |
| S83 | 212104 | 169 | 22 | 3,718 | 0 | TB | 6/18/10 |
| S84 | 211319 | 113 | 22 | 2,486 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S85 | 212104 | 84 | 22 | 1,848 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S86 | 211558 | 37 | 22 | 814 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S87 | 211558 | 12 | 10 | 120 | 0 | TB | 6/18/10 Measured center cut on 45 |
| | | | **Sheet Total** | 77,450 | 0 | | |
| | | | **Total to Date** | 411,653 | 0 | | |

**CQA Personnel:** Travis Bowman

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/14,6/17,6/18/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 411,653 | 0 | | |
| S88 | 211558 | 24 | 20 | 480 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S89 | 211558 | 69 | 22 | 1,518 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S90 | 211677 | 110 | 22 | 2,420 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S91 | 211550 | 198 | 22 | 4,356 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S92 | 211550 | 213 | 22 | 4,686 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S93 | 211674 | 230 | 22 | 5,060 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S94 | 211674 | 188 | 22 | 4,136 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S95 | 211328 | 179 | 22 | 3,938 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S96 | 211328 | 140 | 22 | 3,080 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S97 | 211328 | 129 | 22 | 2,838 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S98 | 211560 | 69 | 22 | 1,518 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S99 | 211560 | 51 | 22 | 1,122 | 0 | TB | 6/18/10 Measured center cut on 45 |
| S100 | 211674 | 24 | 22 | 528 | 0 | TB | 6/18/10 Measured center cut on 45 |
| | | | **Sheet Total** | 35,680 | 0 | | |
| | | | **Total to Date** | 447,333 | 0 | | |

**CQA Personnel:** Travis Bowman

# Cell 1 Secondary HDPE Geomembrane Trial Seam Log

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| S1 | 1230 | WT | 3211 | 90 | 30 | 750 | 119 | 98 | 125 | 115 | 114 | 116 | 130 | 132 | 138 | P | F | SS | JA | 06/14/2010 |
| S2 | 1228 | DC | 3210 | 90 | 30 | 750 | 125 | 120 | 119 | 120 | 121 | 119 | 133 | 141 | 137 | P | F | SS | JA | 06/14/2010 |
| S3 | 1427 | LN | 1220 | 92 | 7 | 860 | 110 | 101 | 113 | 141 | 120 | 123 | 140 | 143 | 144 | P | F | SS | JA | 06/14/2010 |
| S4 | 1430 | BV | 1219 | 92 | 7 | 860 | 116 | 111 | 100 | 98 | 103 | 107 | 149 | 141 | 139 | P | F | SS | KB | 06/16/2010 |
| S5 | 1555 | DC | 3210 | 94 | 13 | 750 | 106 | 111 | 114 | 109 | 100 | 107 | 135 | 138 | 136 | P | F | ST | KB | 06/16/2010 |
| S6 | 740 | JT | 5171 | 70 | 475 | 550 | 130 | 0 | 122 | 0 | 123 | 0 | 137 | 142 | 133 | P | Ex | TT | KB | 06/16/2010 |
| S7 | 738 | MM | 829 | 70 | 500 | 550 | 137 | 0 | 137 | 0 | 120 | 0 | 134 | 143 | 140 | P | Ex | TT | KB | 06/16/2010 |
| S8 | 745 | MV | 5155 | 72 | 500 | 550 | 130 | 0 | 131 | 0 | 146 | 0 | 140 | 139 | 140 | P | Ex | ST | KB | 06/16/2010 |
| S9 | 1230 | WT | 3211 | 90 | 30 | 860 | 110 | 109 | 116 | 111 | 106 | 116 | 140 | 137 | 133 | P | F | SS | JA | 06/17/2010 |
| S10 | 1222 | DC | 3210 | 90 | 30 | 860 | 106 | 111 | 109 | 107 | 123 | 127 | 141 | 144 | 147 | P | F | SS | JA | 06/17/2010 |
| S11 | 1505 | JT | 5171 | 94 | 450 | 550 | 130 | 0 | 123 | 0 | 127 | 0 | 147 | 149 | 137 | P | Ex | TT | JA | 06/18/2010 |
| S12 | 1240 | SL | 1221 | 90 | 7 | 860 | 110 | 117 | 121 | 115 | 112 | 121 | 138 | 129 | 133 | P | F | SS | JA | 06/18/2010 |
| S13 | 1250 | WT | 3211 | 90 | 30 | 860 | 102 | 119 | 102 | 114 | 127 | 107 | 136 | 137 | 146 | P | F | SS | JA | 06/18/2010 |
| S14 | 1250 | DC | 3210 | 90 | 30 | 860 | 113 | 120 | 126 | 119 | 112 | 118 | 134 | 137 | 139 | P | F | SS | JA | 06/18/2010 |
| S15 | 1247 | BV | 1219 | 90 | 7 | 860 | 110 | 106 | 114 | 118 | 114 | 122 | 136 | 134 | 130 | P | F | SS | JA | 06/18/2010 |

Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| S16 | 1430 | BV | 1219 | 91 | 5 | 860 | 97 | 120 | 100 | 109 | 118 | 112 | 129 | 136 | 132 | P | F | TT | JA | 06/18/2010 |
| S17 | 1630 | WT | 3211 | 92 | 13 | 860 | 101 | 106 | 107 | 111 | 114 | 118 | 131 | 127 | 137 | P | F | ST | JA | 06/18/2010 |
| S18 | 720 | JT | 5171 | 78 | 450 | 550 | 123 | 0 | 120 | 0 | 126 | 0 | 151 | 154 | 149 | P | Ex | TT | KB | 06/19/2010 |
| S19 | 1020 | DC | 3210 | 82 | 30 | 860 | 115 | 117 | 110 | 107 | 112 | 115 | 150 | 153 | 154 | P | F | SS | KB | 06/19/2010 |
| S20 | 1022 | WT | 3211 | 82 | 30 | 860 | 110 | 119 | 117 | 113 | 121 | 109 | 140 | 144 | 149 | P | F | SS | KB | 06/19/2010 |
| S21 | 1030 | BV | 1219 | 82 | 7 | 860 | 115 | 111 | 106 | 114 | 119 | 112 | 144 | 152 | 147 | P | F | SS | KB | 06/19/2010 |
| S22 | 1235 | BV | 1219 | 90 | 5 | 860 | 118 | 114 | 121 | 110 | 112 | 110 | 136 | 141 | 137 | P | F | TT | KB | 06/19/2010 |
| S23 | 1236 | DC | 3210 | 90 | 30 | 860 | 114 | 110 | 106 | 109 | 112 | 118 | 141 | 146 | 137 | P | F | SS | KB | 06/19/2010 |
| S24 | 1240 | WT | 3211 | 90 | 30 | 860 | 110 | 112 | 116 | 114 | 122 | 118 | 146 | 151 | 148 | P | F | SS | KB | 06/19/2010 |
| S25 | 1245 | JT | 5171 | 90 | 450 | 550 | 111 | 0 | 126 | 0 | 114 | 0 | 151 | 146 | 154 | P | Ex | TT | KB | 06/19/2010 |
| S26 | 1450 | WT | 3211 | 92 | 17 | 860 | 114 | 120 | 121 | 116 | 118 | 121 | 138 | 147 | 151 | P | F | ST | KB | 06/19/2010 |
| S27 | 1456 | DC | 3210 | 92 | 17 | 860 | 110 | 112 | 106 | 122 | 110 | 125 | 140 | 141 | 138 | P | F | ST | KB | 06/19/2010 |
| S28 | 725 | MV | 5155 | 79 | 450 | 550 | 135 | 0 | 141 | 0 | 127 | 0 | 155 | 157 | 167 | P | Ex | TT | KB | 06/21/2010 |
| S29 | 730 | JT | 5171 | 79 | 450 | 550 | 130 | 0 | 145 | 0 | 151 | 0 | 166 | 171 | 161 | P | Ex | TT | KB | 06/21/2010 |
| | | | | | | | | | | | | | | | | | | | | |

Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** James Addis / Kyle Baucom

# Cell 1 Secondary HDPE Geomembrane Seam Log

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06/14/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 16

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 / S2 | EEOS / WAT | 1240 | DC | 3210 | 500 | 1 | A | 1320 / 1325 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S2 / S3 | EEOS / WAT | 1250 | WT | 3211 | 500 | 2 | A | 1258 / 1303 | 30 / 30 | RC | JA | P | 06-14-2010 | Z2 1:25/1:30 30/30 |
| S3 / S4 | EEOS / WAT | 1308 | DC | 3210 | 500 | 3 | A | 1338 / 1343 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S4 / S5 | EEOS / WAT | 1325 | WT | 3211 | 499 | 4 | A | 1350 / 1355 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S5 / S6 | EEOS / WAT | 1336 | DC | 3210 | 497 | 5 | A | 1404 / 1409 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S7 / S8 | NAT / SEOS | 1358 | WT | 3211 | 75 | | A | 1410 / 1415 | 30 / 30 | RC | JA | P | 06-14-2010 | Z2 2:41/2:46 30/29 |
| S8 / S9 | NAT / SEOS | 1410 | DC | 3210 | 74 | | A | 1426 / 1431 | 30 / 20 | RC | JA | P | 06-14-2010 | |
| S9 / S10 | NAT / SEOS | 1413 | DC | 3210 | 74 | | A | 1419 / 1424 | 30 / 20 | RC | JA | P | 06-14-2010 | |
| S10 / S11 | NAT / SEOS | 1427 | DC | 3210 | 74 | | A | 1434 / 1439 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S11 / S12 | NAT / SEOS | 1432 | DC | 3210 | 73 | | A | 1440 / 1445 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S12 / S13 | NAT / SEOS | 1439 | DC | 3210 | 73 | | A | 1448 / 1453 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S13 / S14 | NAT / SEOS | 1428 | BV | 1219 | 72 | 6 | A | 1445 / 1450 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S14 / S15 | NAT / SEOS | 1450 | DC | 3210 | 72 | | A | 1458 / 1303 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S15 / S16 | NAT / SEOS | 1444 | LN | 1220 | 71 | | A | 1500 / 1505 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S16 / S17 | NAT / SEOS | 1458 | BV | 1219 | 70 | | A | 1502 / 1507 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| | | | | **Sheet Total** | 3,224 | | | | | | | | | |
| | | | | **Total to Date** | 3,224 | | | | | | | | | |

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/14/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 16

**Project Total Carry Over** 3,224

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S17 / S18 | NAT / SEOS | 1458 | DC | 3210 | 70 | | A | 1506 / 1511 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S18 / S19 | NAT / SEOS | 1500 | LN | 1220 | 69 | | A | 1512 / 1517 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S19 / S20 | NAT / SEOS | 1506 | BV | 1219 | 70 | | A | 1516 / 1521 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S20 / S21 | NAT / SEOS | 1512 | DC | 3210 | 69 | 7 | A | 1519 / 1524 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S21 / S22 | NAT / SEOS | 1514 | LN | 1220 | 69 | | A | 1525 / 1530 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S22 / S23 | NAT / SEOS | 1518 | BV | 1219 | 67 | | A | 1528 / 1533 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S23 / S24 | NAT / SEOS | 1523 | DC | 3210 | 68 | | A | 1531 / 1536 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S24 / S25 | NAT / SEOS | 1531 | LN | 1220 | 68 | | A | 1544 / 1549 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S25 / S26 | NAT / SEOS | 1534 | BV | 1219 | 67 | | A | 1545 / 1550 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S26 / S27 | NAT / SEOS | 1537 | DC | 3210 | 67 | | A | 1547 / 1552 | 30 / 30 | RC | JA | P | 06-14-2010 | |
| S27 / S28 | NAT / SEOS | 1550 | BV | 1219 | 66 | | A | 1558 / 1603 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S28 | EEOS / S27 | 1601 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S27 | S27 / S26 | 1603 | DC | 3210 | 22 | 8 | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S26 | S26 / S25 | 1605 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S25 | S25 / S24 | 1607 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |

**Sheet Total** 838
**Total to Date** 4,062

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/14/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 16

**Project Total Carry Over** 4,062

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S6 / S24 | S24 / S23 | 1609 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S23 | S23 / S22 | 1611 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S22 | S22 / S21 | 1613 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S21 | S21 / S20 | 1615 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S20 | S20 / S19 | 1617 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S19 | S19 / S18 | 1619 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S18 | S18 / S17 | 1621 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S17 | S17 / S16 | 1623 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S16 | S16 / S15 | 1625 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S15 | S15 / S14 | 1627 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S14 | S14 / S13 | 1629 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S13 | S13 / S12 | 1631 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S12 | S12 / S11 | 1633 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S11 | S11 / S10 | 1635 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S10 | S10 / S9 | 1637 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |

**Sheet Total** 330
**Total to Date** 4,392

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/14/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 16

**Project Total Carry Over** 4,392

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S6 / S9 | S9 / S8 | 1639 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S8 | S8 / S7 | 1641 | DC | 3210 | 22 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |
| S6 / S7 | S7 / WEOS | 1643 | DC | 3210 | 21 | | A | 1645 / 1650 | 30 / 29 | RC | JA | P | 06-14-2010 | |

**Sheet Total** 65
**Total to Date** 4,457

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/17/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 16

**Project Total Carry Over** 4,457

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 / S29 | EEOS / WAT | 1258 | WT | 3211 | 495 | 9 | A | 1300 / 1305 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S29 / S30 | WAT / EEOS | 1234 | DC | 3210 | 493 | 10 | A | 1310 / 1315 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S30 / S31 | WAT / EEOS | 1305 | WT | 3211 | 493 | 11 | A | 1324 / 1329 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S31 / S32 | WAT / EEOS | 1306 | DC | 3210 | 492 | 12 | A | 1327 / 1332 | 30 / 29 | RC | JA | P | 06-17-2010 | |
| S32 / S33 | WAT / EEOS | 1335 | WT | 3211 | 492 | 13 | A | 1350 / 1355 | 30 / 29 | RC | JA | P | 06-17-2010 | |
| S33 / S34 | WAT / EEOS | 1330 | DC | 3210 | 494 | 14 | A | 1356 / 1402 | 30 / 30 | RC | KB | P | 06-17-2010 | |
| S34 / S35 | WAT / EEOS | 1358 | WT | 3211 | 494 | 15 | A | 1418 / 1423 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S35 / S36 | WAT / EEOS | 1358 | DC | 3210 | 495 | 16 | A | 1424 / 1429 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S36 / S37 | WAT / EEOS | 1427 | WT | 3211 | 493 | 17 | A | 1456 / 1501 | 30 / 30 | RC | JA | P | 06-17-2010 | |
| S37 / S38 | WAT / EEOS | 1432 | DC | 3210 | 494 | 18 | A | 1505 / 1510 | 30 / 30 | RC | JA | P | 06-17-2010 | Z2 3:10/3:15 30/30 |
| S38 / S39 | WAT / EEOS | 1504 | DC | 3210 | 493 | 19 | A | 1530 / 1535 | 30 / 30 | RC | JA | P | 06-17-2010 | |
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**Sheet Total** 5,428
**Total to Date** 9,885

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 16

**Project Total Carry Over** 9,885

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S40 / S41 | WEOS / EEOS | 1322 | SL | 1221 | 323 | 20 | A | 1350 / 1355 | 30 / 30 | RC | JA | P | 06-18-2010 | Z2 14:00/14:05 30/30 |
| S41 / S42 | WEOS / EEOS | 1310 | DC | 3210 | 324 | 21 | A | 1330 / 1335 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S42 / S43 | WEOS / EEOS | 1320 | WT | 3211 | 324 | | A | 1335 / 1340 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S43 / S44 | WEOS / EEOS | 1330 | DC | 3210 | 324 | 22 | A | 1347 / 1352 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S44 / S45 | WEOS / EEOS | 1339 | WT | 3211 | 326 | 23 | A | 1358 / 1403 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S45 / S46 | WEOS / EEOS | 1347 | DC | 3210 | 327 | | A | 1414 / 1419 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S46 / S47 | WEOS / EEOS | 1359 | WT | 3211 | 327 | 24 | A | 1410 / 1415 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S47 / S48 | WEOS / EEOS | 1404 | DC | 3210 | 327 | | A | 1422 / 1427 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S48 / S49 | WEOS / EEOS | 1408 | SL | 1221 | 327 | 25 | A | 1437 / 1442 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S49 / S50 | WEOS / EEOS | 1419 | WT | 3211 | 327 | 26 | A | 1435 / 1440 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S50 / S51 | EEOS / WEOS | 1426 | DC | 3210 | 324 | | A | 1445 / 1450 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S51 / S52 | EEOS / WEOS | 1437 | WT | 3211 | 324 | 27 | A | 1451 / 1456 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S52 / S53 | EEOS / WEOS | 1445 | SL | 1221 | 325 | 28 | A | 1525 / 1530 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S53 / S54 | EEOS / WEOS | 1452 | DC | 3210 | 323 | | A | 1531 / 1536 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S54 / S55 | EEOS / WEOS | 1458 | WT | 3211 | 323 | 29 | A | 1535 / 1540 | 30 / 30 | RC | JA | P | 06-18-2010 | |

**Sheet Total** 4,875
**Total to Date** 14,760

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 16

**Project Total Carry Over** 14,763

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S56 / S57 | NEOS / SEOS | 1519 | WT | 3211 | 22 | | A | 1543 / 1548 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S55 / S57 | EEOS / S56 | 1518 | DC | 3210 | 153 | | A | 1542 / 1547 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S55 / S56 | S56 / WEOS | 1524 | DC | 3210 | 172 | 30 | A | 1545 / 1550 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S28 / S58 | NAT / SEOS | 1518 | SL | 1221 | 63 | | A | 1609 / 1614 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S58 / S59 | NAT / SEOS | 1531 | WT | 3211 | 63 | | A | 1614 / 1619 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S59 / S60 | NAT / SEOS | 1535 | SL | 1221 | 61 | | A | 1616 / 1621 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S60 / S61 | NAT / SEOS | 1537 | DC | 3210 | 61 | | A | 1619 / 1624 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S61 / S62 | NAT / SEOS | 1541 | WT | 3211 | 61 | | A | 1621 / 1626 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S62 / S63 | NAT / SEOS | 1535 | DC | 3210 | 61 | | A | 1623 / 1628 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S63 / S64 | NAT / SEOS | 1605 | WT | 3211 | 61 | 31 | A | 1628 / 1633 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S64 / S65 | NAT / SEOS | 1606 | DC | 3210 | 60 | | A | 1630 / 1635 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S65 / S66 | NAT / SEOS | 1614 | WT | 3211 | 60 | | A | 1634 / 1639 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S66 / S67 | NAT / SEOS | 1614 | DC | 3210 | 60 | | A | 1637 / 1642 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S67 / S68 | NAT / SEOS | 1621 | WT | 3211 | 60 | | A | 1650 / 1655 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S68 / S69 | NAT / SEOS | 1623 | DC | 3210 | 61 | | A | 1648 / 1653 | 30 / 30 | RC | JA | P | 06-18-2010 | |

**Sheet Total** 1,079
**Total to Date** 15,842

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 8 of 16

**Project Total Carry Over** 15,842

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S69 / S70 | NAT / SEOS | 1629 | WT | 3211 | 59 | | A | 1642 / 1647 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S70 / S71 | NAT / SEOS | 1630 | DC | 3210 | 59 | | A | 1640 / 1545 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S29 / S50 | NEOS / S49 | 1446 | BV | 1219 | 22 | | A | 1452 / 1457 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S29 / S49 | S49 / S30 | 1449 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-97 |
| S30 / S49 | S30 / S48 | 1449 | BV | 1219 | 20 | 32 | A | 1454 / 1459 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S30 / S48 | S48 / S31 | 1452 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-74 |
| S31 / S48 | S31 / S47 | 1452 | BV | 1219 | 20 | | A | 1456 / 1501 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S31 / S47 | S47 / S32 | 1454 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-98 |
| S32 / S47 | S32 / S46 | 1454 | BV | 1219 | 20 | | A | 1505 / 1510 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S32 / S46 | S46 / S33 | 1457 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-100 |
| S33 / S46 | S33 / S45 | 1457 | BV | 1219 | 20 | | A | 1510 / 1515 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S33 / S45 | S45 / S34 | 1459 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-101 |
| S34 / S45 | S34 / S44 | 1459 | BV | 1219 | 20 | | A | 1504 / 1509 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S34 / S44 | S44 / S35 | 1502 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-102 |
| S35 / S44 | S35 / S43 | 1502 | BV | 1219 | 20 | | A | 1511 / 1516 | 30 / 30 | RC | JA | P | 06-18-2010 | |

**Sheet Total** 272
**Total to Date** 16,114

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 9 of 16

**Project Total Carry Over** 16,114

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S35 / S43 | S43 / S36 | 1505 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-103 |
| S36 / S43 | S36 / S42 | 1505 | BV | 1219 | 20 | | A | 1513 / 1518 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S36 / S42 | S42 / S37 | 1507 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-107 |
| S37 / S42 | S37 / S41 | 1507 | BV | 1219 | 20 | | A | 1515 / 1520 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S37 / S41 | S41 / S38 | 1510 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-108 |
| S38 / S41 | S38 / S40 | 1510 | BV | 1219 | 20 | | A | 1522 / 1527 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S38 / S40 | S40 / S29 | 1513 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-109 |
| S39 / S40 | S39 / SEOS | 1513 | BV | 1219 | 6 | | A | 1525 / 1530 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S70 | EEOS / S69 | 1640 | WT | 3211 | 21 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S69 | S69 / S68 | 1641 | WT | 3211 | 22 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S68 | S68 / S67 | 1642 | WT | 3211 | 22 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S67 | S67 / S66 | 1643 | WT | 3211 | 22 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S66 | S66 / S65 | 1644 | WT | 3211 | 22 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S57 / S65 | S65 / S56 | 1645 | WT | 3211 | 10 | | A | 1652 / 1657 | 30 / 30 | RC | JA | P | 06-18-2010 | |
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**Sheet Total** 193
**Total to Date** 16,307

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 10 of 16

**Project Total Carry Over** 16,307

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S6 / S56 | NEOS / S55 | 1541 | BV | 1219 | 20 | | A | 1606 / 1611 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S6 / S55 | S55 / S5 | 1544 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-91 |
| S5 / S55 | S5 / S54 | 1544 | BV | 1219 | 20 | | A | 1605 / 1610 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S5 / S54 | S54 / S4 | 1547 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-92 |
| S4 / S54 | S4 / S53 | 1547 | BV | 1219 | 20 | | A | 1556 / 1601 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S4 / S53 | S53 / S3 | 1550 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-93 |
| S3 / S53 | S3 / S52 | 0 | BV | 1219 | 20 | | A | 1555 / 1600 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S3 / S52 | S52 / S2 | 1553 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-94 |
| S2 / S52 | S2 / S51 | 1553 | BV | 1219 | 20 | | A | 1558 / 1603 | 30 / 30 | RC | JA | P | 06-18-2010 | |
| S2 / S51 | S51 / S1 | 1556 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | JA | P | 06-18-2010 | SR-95 |
| S1 / S51 | S1 / SEOS | 1556 | BV | 1219 | 20 | | A | 1539 / 1604 | 30 / 30 | RC | JA | P | 06-18-2010 | |
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**Sheet Total** 130
**Total to Date** 16,437

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-18-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 11 of 16

**Project Total Carry Over** 16,437

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S56 / S65 | S56 / S64 | 1646 | WT | 3211 | 12 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S64 | S64 / S63 | 1647 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S63 | S63 / S62 | 1648 | WT | 3211 | 22 | 33 | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S62 | S62 / S61 | 1649 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S61 | S61 / S60 | 1650 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S60 | S60 / S59 | 1651 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S59 | S59 / S58 | 1652 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
| S56 / S58 | S58 / WEOS | 1653 | WT | 3211 | 22 | | A | 1700 / 1705 | 30 / 29 | RC | JA | P | 06-18-2010 | |
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**Sheet Total** 166
**Total to Date** 16,603

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-19-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 12 of 16

**Project Total Carry Over** 16,603

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S81 / S72 | WEOS / EEOS | 1117 | BV | 1219 | 141 | | A | 1100 / 1105 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S72 / S73 | WEOS / EAT | 1056 | DC | 3210 | 229 | | A | 1110 / 1115 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S73 / S74 | WEOS / EAT | 1107 | WT | 3211 | 229 | 34 | A | 1114 / 1119 | 30 / 29 | RC | WH | P | 06-19-2010 | SR-110 |
| S74 / S75 | WEOS / EAT | 1111 | DC | 3210 | 235 | | A | 1130 / 1135 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S75 / S76 | WEOS / EAT | 1122 | WT | 3211 | 240 | 35 | A | 1133 / 1138 | 30 / 30 | RC | WH | P | 06-19-2010 | SR-111 |
| S76 / S77 | WEOS / EAT | 1126 | DC | 3210 | 244 | | A | 1140 / 1145 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S77 / S78 | WEOS / EAT | 1137 | WT | 3211 | 244 | 36 | A | 1233 / 1238 | 30 / 29 | RC | WH | P | 06-19-2010 | SR-112 |
| S79 / S80 | NEOS / SEOS | 1141 | BV | 1219 | 22 | | A | 1240 / 1245 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S78 / S80 | WEOS / S79 | 1140 | DC | 3210 | 33 | | A | 1235 / 1240 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S78 / S79 | S79 / EAT | 1148 | DC | 3210 | 224 | | A | 1250 / 1255 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S83 / S84 | WEOS / EAT | 1257 | DC | 3210 | 146 | 37 | A | 1308 / 1313 | 30 / 30 | RC | WH | P | 06-19-2010 | SR-113 |
| S85 / S86 | WEOS / EAT | 1308 | DC | 3210 | 58 | | A | 1314 / 1319 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S82 / S83 | WEOS / EAT | 1245 | WT | 3211 | 164 | | A | 1300 / 1305 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S86 / S87 | WEOS / EAT | 1300 | WT | 3211 | 14 | | A | 1320 / 1325 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S79 / S90 | WEOS / EAT | 1316 | DC | 3210 | 135 | | A | 1332 / 1337 | 30 / 30 | RC | WH | P | 06-19-2010 | |

**Sheet Total** 2,358
**Total to Date** 18,961

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-19-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 13 of 16

**Project Total Carry Over** 18,961

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S84 / S85 | WEOS / EAT | 1305 | WT | 3211 | 102 | 38 | A | 1325 / 1330 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S88 / S89 | WEOS / EAT | 1327 | DC | 3210 | 43 | | A | 1330 / 1335 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S82 / S91 | WEOS / EAT | 1340 | WT | 3211 | 182 | | A | 1430 / 1435 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S91 / S92 | WEOS / EAT | 1341 | DC | 3210 | 200 | | A | 1434 / 1439 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S92 / S93 | EAT / WEOS | 1400 | WT | 3211 | 218 | 39 | A | 1436 / 1441 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S89 / S90 | WEOS / EAT | 1315 | WT | 3211 | 82 | | A | 1328 / 1333 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S93 / S94 | EAT / WEOS | 1353 | DC | 3210 | 207 | | A | 1446 / 1451 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S94 / S95 | EAT / WEOS | 1407 | DC | 3210 | 180 | 40 | A | 1450 / 1455 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S95 / S96 | EAT / WEOS | 1420 | WT | 3211 | 155 | | A | 1452 / 1457 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S96 / S97 | EAT / WEOS | 1420 | DC | 3210 | 129 | | A | 1535 / 1540 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S71 / S98 | SEOS / NAT | 1440 | DC | 3210 | 57 | 41 | A | 1519 / 1524 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S57 / S98 | NEOS / SEOS | 1454 | DC | 3210 | 22 | | A | 1524 / 1529 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S98 / S99 | SEOS / NAT | 1431 | WT | 3211 | 57 | | A | 1501 / 1506 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S99 / S100 | SEOS / NAT | 1438 | WT | 3211 | 30 | | A | 1452 / 1457 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S97 / S100 | NAT / S99 | 1458 | DC | 3210 | 32 | | A | 1505 / 1510 | 30 / 30 | RC | WH | P | 06-19-2010 | |

**Sheet Total** 1,696
**Total to Date** 20,657

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-19-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 14 of 16

**Project Total Carry Over** 20,657

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S97 / S99 | S99 / S98 | 1500 | DC | 3210 | 33 | | A | 1515 / 1520 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S97 / S98 | S98 / SEOS | 1502 | DC | 3210 | 32 | | A | 1513 / 1518 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S80 / S93 | WEOS / S92 | 1454 | WT | 3211 | 11 | | A | 1550 / 1555 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S80 / S92 | S92 / S79 | 1455 | WT | 3211 | 24 | | A | 1550 / 1555 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S79 / S92 | S79 / S91 | 1456 | WT | 3211 | 3 | | A | 1550 / 1555 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S79 / S91 | S91 / S82 | 1457 | WT | 3211 | 29 | | A | 1550 / 1555 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S79 / S82 | S82 / S83 | 1458 | WT | 3211 | 29 | | A | 1550 / 1555 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S79 / S83 | S83 / EEOS | 1500 | WT | 3211 | 29 | | A | 1550 / 1555 | 30 / 30 | R | WH | P | 06-19-2010 | |
| S84 / S90 | WEOS / S85 | 1402 | BV | 1219 | 48 | | A | 1412 / 1417 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S85 / S90 | S85 / S89 | 1409 | BV | 1219 | 5 | | A | 1413 / 1418 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S85 / S89 | S89 / S86 | 1410 | BV | 1219 | 44 | | A | 1418 / 1423 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S86 / S89 | S86 / S88 | 1415 | BV | 1219 | 13 | | A | 1419 / 1424 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S86 / S88 | S88 / S87 | 1416 | BV | 1219 | 36 | 42 | A | 1425 / 1430 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S87 / S88 | S87 / NEAT | 1422 | BV | 1219 | 15 | | A | 1428 / 1433 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| | | | | | | | | | | | | | | |

**Sheet Total** 351
**Total to Date** 21,008

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-19-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 15 of 16

**Project Total Carry Over** 21,008

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S48 / S80 | NEOS / SR130 | 1320 | BV | 1219 | 22 | | A | 1331 / 1336 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S47 / S78 | SR130 / SR114 | 1324 | BV | 1219 | 22 | | A | 1336 / 1341 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S46 / S77 | SR114 / SR115 | 1328 | BV | 1219 | 22 | | A | 1335 / 1340 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S45 / S76 | SR115 / SR116 | 1332 | BV | 1219 | 22 | | A | 1338 / 1343 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S44 / S75 | SR116 / SR131 | 1336 | BV | 1219 | 22 | | A | 1350 / 1355 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S43 / S74 | SR131 / SR132 | 1340 | BV | 1219 | 22 | | A | 1352 / 1357 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S42 / S73 | SR132 / SR133 | 1344 | BV | 1219 | 22 | | A | 1355 / 1400 | 30 / 30 | RC | WH | | 06-19-2010 | |
| S41 / S72 | SR133 / SR134 | 1348 | BV | 1219 | 22 | | A | 1405 / 1410 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S40 / S81 | SR134 / SEOS | 1352 | BV | 1219 | 7 | | A | 1400 / 1405 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S55 / S97 | NEOS / S54 | 1447 | BV | 1219 | 22 | | A | 1530 / 1535 | 30 / 28 | RC | WH | P | 06-19-2010 | |
| S54 / S97 | S54 / S96 | 1450 | BV | 1219 | 9 | | A | 1533 / 1538 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S54 / S96 | S96 / S53 | 1451 | BV | 1219 | 12 | | A | 1536 / 1541 | 30 / 29 | RC | WH | P | 06-19-2010 | |
| S53 / S96 | S53 / S95 | 1452 | BV | 1219 | 20 | 43 | A | 1538 / 1543 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S53 / S95 | S95 / S52 | 1455 | BV | 1219 | 2 | | V | 0 / 0 | 0 / 0 | RC | WH | P | 06-19-2010 | SR-141 |
| S52 / S95 | S52 / S51 | 1455 | BV | 1219 | 22 | | A | 1542 / 1547 | 30 / 30 | RC | WH | P | 06-19-2010 | |

**Sheet Total** 270
**Total to Date** 21,278

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-19-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 16 of 16

**Project Total Carry Over** 21,278

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S51 / S95 | S51 / S94 | 1457 | BV | 1219 | 9 | | A | 1544 / 1549 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S51 / S94 | S94 / S50 | 1458 | BV | 1219 | 13 | | A | 1545 / 1550 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S50 / S94 | S50 / SR118 | 1500 | BV | 1219 | 22 | | A | 1547 / 1552 | 30 / 30 | RC | WH | P | 06-19-2010 | |
| S49 / S93 | SR118 / SEOS | 1503 | BV | 1219 | 22 | | A | 1520 / 1525 | 30 / 28 | RC | WH | P | 06-19-2010 | |

**Sheet Total** 66
**Total to Date** 21,344

**CQA Personnel:** William Harrison

# Cell 1 Secondary HDPE Geomembrane Destructive Laboratory Test Results

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S1
Tested by: William Harrison
Date Tested: 06/15/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 192.0 | Elongation |
| S2 | 194.0 | Elongation |
| S3 | 193.0 | Elongation |
| S4 | 188.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 188.4 | *FTB - Film Tear Bond |
| Standard Deviation | 7.0 | |
| Maximum | 194.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 121.0 | FTB |
| P1B | 118.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 94.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 115.0 | FTB |
| P4A | 113.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 114.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 115.3 | *FTB - Film Tear Bond |
| Standard Deviation | 8.0 | |
| Maximum | 126.0 | |
| Minimum | 94.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S2
Tested by: William Harrison
Date Tested: 06/15/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 194.0 | Elongation |
| S2 | 197.0 | Elongation |
| S3 | 199.0 | Elongation |
| S4 | 194.0 | Elongation |
| S5 | 197.0 | Elongation |
| Average | 196.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.9 | |
| Maximum | 199.0 | |
| Minimum | 194.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 113.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 106.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 107.0 | FTB |
| P4A | 112.0 | FTB |
| P4B | 117.0 | FTB |
| P5A | 104.0 | FTB |
| P5B | 94.0 | FTB |
| Average | 111.6 | *FTB - Film Tear Bond |
| Standard Deviation | 8.9 | |
| Maximum | 125.0 | |
| Minimum | 94.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S3
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 208.0 | Elongation |
| S2 | 205.0 | Elongation |
| S3 | 201.0 | Elongation |
| S4 | 202.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 204.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.5 | |
| Maximum | 208.0 | |
| Minimum | 201.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 118.0 | FTB |
| P1B | 114.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 123.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 113.0 | FTB |
| Average | 117.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.6 | |
| Maximum | 123.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S4
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 203.0 | Elongation |
| S2 | 210.0 | Elongation |
| S3 | 213.0 | Elongation |
| S4 | 208.0 | Elongation |
| S5 | 209.0 | Elongation |
| Average | 208.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 213.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 129.0 | FTB |
| P2A | 138.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 138.0 | FTB |
| P3B | 126.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 103.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 124.1 | *FTB - Film Tear Bond |
| Standard Deviation | 9.6 | |
| Maximum | 138.0 | |
| Minimum | 103.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S5
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 208.0 | Elongation |
| S2 | 212.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 209.0 | Elongation |
| S5 | 210.0 | Elongation |
| Average | 208.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.3 | |
| Maximum | 212.0 | |
| Minimum | 205.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 109.0 | FTB |
| P2A | 111.0 | FTB |
| P2B | 104.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 125.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 121.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 108.0 | FTB |
| Average | 116.1 | *FTB - Film Tear Bond |
| Standard Deviation | 7.1 | |
| Maximum | 125.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S6
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 211.0 | Elongation |
| S2 | 211.0 | Elongation |
| S3 | 215.0 | Elongation |
| S4 | 215.0 | Elongation |
| S5 | 215.0 | Elongation |
| Average | 213.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 215.0 | |
| Minimum | 211.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 113.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 107.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 119.0 | FTB |
| Average | 115.4 | *FTB - Film Tear Bond |
| Standard Deviation | 4.8 | |
| Maximum | 124.0 | |
| Minimum | 107.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S7
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 205.0 | Elongation |
| S2 | 210.0 | Elongation |
| S3 | 206.0 | Elongation |
| S4 | 206.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 206.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 210.0 | |
| Minimum | 205.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 142.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 109.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 100.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 91.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 117.8 | *FTB - Film Tear Bond |
| Standard Deviation | 14.3 | |
| Maximum | 142.0 | |
| Minimum | 91.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S8
Tested by: James Addis
Date Tested: 06/16/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 170.0 | Elongation |
| S2 | 178.0 | Elongation |
| S3 | 181.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 178.0 | *FTB - Film Tear Bond |
| Standard Deviation | 4.4 | |
| Maximum | 183.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 127.0 | FTB |
| P2B | 96.0 | FTB |
| P3A | 126.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 115.0 | FTB |
| P4B | 109.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 118.5 | *FTB - Film Tear Bond |
| Standard Deviation | 9.9 | |
| Maximum | 131.0 | |
| Minimum | 96.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S9
Tested by: William Harrison
Date Tested: 06/17/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 206.0 | Elongation |
| S2 | 207.0 | Elongation |
| S3 | 199.0 | Elongation |
| S4 | 200.0 | Elongation |
| S5 | 200.0 | Elongation |
| Average | 202.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 207.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 123.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 129.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 144.0 | FTB |
| P4A | 100.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 116.0 | FTB |
| P5B | 137.0 | FTB |
| Average | 121.6 | *FTB - Film Tear Bond |
| Standard Deviation | 12.1 | |
| Maximum | 144.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S10
Tested by: William Harrison
Date Tested: 06/17/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 198.0 | Elongation |
| S2 | 199.0 | Elongation |
| S3 | 183.0 | Elongation |
| S4 | 196.0 | Elongation |
| S5 | 197.0 | Elongation |
| Average | 194.6 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 199.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 126.0 | FTB |
| P1B | 110.0 | FTB |
| P2A | 101.0 | FTB |
| P2B | 112.0 | FTB |
| P3A | 127.0 | FTB |
| P3B | 108.0 | FTB |
| P4A | 115.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 138.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 116.7 | *FTB - Film Tear Bond |
| Standard Deviation | 10.3 | |
| Maximum | 138.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S11
Tested by: William Harrison
Date Tested: 06/17/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 170.0 | Elongation |
| S2 | 196.0 | Elongation |
| S3 | 196.0 | Elongation |
| S4 | 188.0 | Elongation |
| S5 | 197.0 | Elongation |
| Average | 189.4 | *FTB - Film Tear Bond |
| Standard Deviation | 10.2 | |
| Maximum | 197.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 97.0 | FTB |
| P1B | 97.0 | FTB |
| P2A | 105.0 | FTB |
| P2B | 97.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 126.0 | FTB |
| P4B | 129.0 | FTB |
| P5A | 101.0 | FTB |
| P5B | 93.0 | FTB |
| Average | 110.1 | *FTB - Film Tear Bond |
| Standard Deviation | 14.8 | |
| Maximum | 131.0 | |
| Minimum | 93.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S12
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 211.0 | Elongation |
| S2 | 211.0 | Elongation |
| S3 | 208.0 | Elongation |
| S4 | 210.0 | Elongation |
| S5 | 203.0 | Elongation |
| Average | 208.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.0 | |
| Maximum | 211.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 113.0 | FTB |
| P2A | 113.0 | FTB |
| P2B | 131.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 127.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 120.4 | *FTB - Film Tear Bond |
| Standard Deviation | 6.7 | |
| Maximum | 131.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S13
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 214.0 | Elongation |
| S2 | 209.0 | Elongation |
| S3 | 210.0 | Elongation |
| S4 | 207.0 | Elongation |
| S5 | 200.0 | Elongation |
| Average | 208.0 | *FTB - Film Tear Bond |
| Standard Deviation | 4.6 | |
| Maximum | 214.0 | |
| Minimum | 200.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 116.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 120.0 | FTB |
| P2B | 130.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 138.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 116.0 | FTB |
| Average | 121.0 | *FTB - Film Tear Bond |
| Standard Deviation | 7.5 | |
| Maximum | 138.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S14
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 213.0 | Elongation |
| S2 | 214.0 | Elongation |
| S3 | 209.0 | Elongation |
| S4 | 205.0 | Elongation |
| S5 | 211.0 | Elongation |
| Average | 210.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 214.0 | |
| Minimum | 205.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 113.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 107.0 | FTB |
| P2B | 84.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 114.0 | FTB |
| P4B | 130.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 116.0 | FTB |
| Average | 115.1 | *FTB - Film Tear Bond |
| Standard Deviation | 12.8 | |
| Maximum | 131.0 | |
| Minimum | 84.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S15
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 219.0 | Elongation |
| S2 | 218.0 | Elongation |
| S3 | 215.0 | Elongation |
| S4 | 210.0 | Elongation |
| S5 | 212.0 | Elongation |
| Average | 214.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 219.0 | |
| Minimum | 210.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 126.0 | FTB |
| P1B | 114.0 | FTB |
| P2A | 120.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 117.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 119.6 | *FTB - Film Tear Bond |
| Standard Deviation | 4.1 | |
| Maximum | 126.0 | |
| Minimum | 114.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S16
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 215.0 | Elongation |
| S2 | 216.0 | Elongation |
| S3 | 213.0 | Elongation |
| S4 | 211.0 | Elongation |
| S5 | 208.0 | Elongation |
| Average | 212.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 216.0 | |
| Minimum | 208.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 129.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 125.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 126.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 122.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 130.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S17
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 206.0 | Elongation |
| S2 | 212.0 | Elongation |
| S3 | 217.0 | Elongation |
| S4 | 211.0 | Elongation |
| S5 | 215.0 | Elongation |
| Average | 212.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.8 | |
| Maximum | 217.0 | |
| Minimum | 206.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 121.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 121.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 125.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 124.3 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 130.0 | |
| Minimum | 121.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S18
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 202.0 | Elongation |
| S2 | 203.0 | Elongation |
| S3 | 199.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 202.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 205.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 125.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 104.0 | FTB |
| P3B | 123.0 | FTB |
| P4A | 118.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 107.0 | FTB |
| P5B | 128.0 | FTB |
| Average | 120.5 | *FTB - Film Tear Bond |
| Standard Deviation | 8.3 | |
| Maximum | 130.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | FAIL | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S19
Tested by: James Addis
Date Tested: 06/18/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 214.0 | Elongation |
| S2 | 215.0 | Elongation |
| S3 | 217.0 | Elongation |
| S4 | 203.0 | Elongation |
| S5 | 202.0 | Elongation |
| Average | 210.2 | *FTB - Film Tear Bond |
| Standard Deviation | 6.4 | |
| Maximum | 217.0 | |
| Minimum | 202.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 126.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 105.0 | FTB |
| P3A | 110.0 | FTB |
| P3B | 133.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 127.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 119.9 | *FTB - Film Tear Bond |
| Standard Deviation | 8.1 | |
| Maximum | 133.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S20
Tested by: William Harrison
Date Tested: 06/20/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 207.0 | Elongation |
| S2 | 210.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 212.0 | Elongation |
| S5 | 208.0 | Elongation |
| Average | 208.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.4 | |
| Maximum | 212.0 | |
| Minimum | 205.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 115.0 | FTB |
| P1B | 162.0 | FTB |
| P2A | 120.0 | FTB |
| P2B | 133.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 160.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 138.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 159.0 | FTB |
| Average | 134.2 | *FTB - Film Tear Bond |
| Standard Deviation | 18.5 | |
| Maximum | 162.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S21
Tested by: William Harrison
Date Tested: 06/20/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 206.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 201.0 | Elongation |
| S4 | 210.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 205.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 210.0 | |
| Minimum | 201.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 116.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 113.0 | FTB |
| P3A | 114.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 87.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 92.0 | FTB |
| P5B | 123.0 | FTB |
| Average | 111.2 | *FTB - Film Tear Bond |
| Standard Deviation | 11.6 | |
| Maximum | 123.0 | |
| Minimum | 87.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S22
Tested by: William Harrison
Date Tested: 06/20/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 211.0 | Elongation |
| S2 | 202.0 | Elongation |
| S3 | 213.0 | Elongation |
| S4 | 200.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 206.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.0 | |
| Maximum | 213.0 | |
| Minimum | 200.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 124.0 | FTB |
| P1B | 113.0 | FTB |
| P2A | 90.0 | FTB |
| P2B | 116.0 | FTB |
| P3A | 122.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 113.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 114.9 | *FTB - Film Tear Bond |
| Standard Deviation | 9.8 | |
| Maximum | 124.0 | |
| Minimum | 90.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S23
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 217.0 | Elongation |
| S3 | 208.0 | Elongation |
| S4 | 213.0 | Elongation |
| S5 | 202.0 | Elongation |
| Average | 204.0 | *FTB - Film Tear Bond |
| Standard Deviation | 13.0 | |
| Maximum | 217.0 | |
| Minimum | 180.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 110.0 | FTB |
| P1B | 92.0 | FTB |
| P2A | 113.0 | FTB |
| P2B | 93.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 104.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 107.0 | FTB |
| P5A | 81.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 104.6 | *FTB - Film Tear Bond |
| Standard Deviation | 11.9 | |
| Maximum | 121.0 | |
| Minimum | 81.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S24
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 211.0 | Elongation |
| S2 | 186.0 | Elongation |
| S3 | 215.0 | Elongation |
| S4 | 201.0 | Elongation |
| S5 | 180.0 | Elongation |
| Average | 198.6 | *FTB - Film Tear Bond |
| Standard Deviation | 13.7 | |
| Maximum | 215.0 | |
| Minimum | 180.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 102.0 | FTB |
| P1B | 103.0 | FTB |
| P2A | 102.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 126.0 | FTB |
| P4A | 129.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 101.0 | FTB |
| Average | 113.7 | *FTB - Film Tear Bond |
| Standard Deviation | 11.0 | |
| Maximum | 129.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S25
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 204.0 | Elongation |
| S2 | 210.0 | Elongation |
| S3 | 204.0 | Elongation |
| S4 | 198.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 204.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.9 | |
| Maximum | 210.0 | |
| Minimum | 198.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 102.0 | FTB |
| P1B | 112.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 83.0 | FTB |
| P3A | 97.0 | FTB |
| P3B | 97.0 | FTB |
| P4A | 138.0 | FTB |
| P4B | 114.0 | FTB |
| P5A | 113.0 | FTB |
| P5B | 112.0 | FTB |
| Average | 107.7 | *FTB - Film Tear Bond |
| Standard Deviation | 13.8 | |
| Maximum | 138.0 | |
| Minimum | 83.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S26
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 214.0 | Elongation |
| S2 | 211.0 | Elongation |
| S3 | 209.0 | Elongation |
| S4 | 211.0 | Elongation |
| S5 | 186.0 | Elongation |
| Average | 206.2 | *FTB - Film Tear Bond |
| Standard Deviation | 10.2 | |
| Maximum | 214.0 | |
| Minimum | 186.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 103.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 95.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 102.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 113.6 | *FTB - Film Tear Bond |
| Standard Deviation | 10.9 | |
| Maximum | 133.0 | |
| Minimum | 95.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S27
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 209.0 | Elongation |
| S2 | 206.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 196.0 | Elongation |
| S5 | 199.0 | Elongation |
| Average | 196.6 | *FTB - Film Tear Bond |
| Standard Deviation | 12.7 | |
| Maximum | 209.0 | |
| Minimum | 173.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 115.0 | FTB |
| P1B | 166.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 115.0 | FTB |
| P4B | 109.0 | FTB |
| P5A | 111.0 | FTB |
| P5B | 124.0 | FTB |
| Average | 120.0 | *FTB - Film Tear Bond |
| Standard Deviation | 16.3 | |
| Maximum | 166.0 | |
| Minimum | 108.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S28
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 213.0 | Elongation |
| S2 | 212.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 197.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 201.8 | *FTB - Film Tear Bond |
| Standard Deviation | 11.4 | |
| Maximum | 213.0 | |
| Minimum | 182.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 143.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 117.0 | FTB |
| P4A | 139.0 | FTB |
| P4B | 145.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 134.0 | FTB |
| Average | 130.2 | *FTB - Film Tear Bond |
| Standard Deviation | 9.5 | |
| Maximum | 145.0 | |
| Minimum | 116.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S29
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 206.0 | Elongation |
| S2 | 207.0 | Elongation |
| S3 | 191.0 | Elongation |
| S4 | 202.0 | Elongation |
| S5 | 209.0 | Elongation |
| Average | 203.0 | *FTB - Film Tear Bond |
| Standard Deviation | 6.4 | |
| Maximum | 209.0 | |
| Minimum | 191.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 114.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 108.0 | FTB |
| P2B | 107.0 | FTB |
| P3A | 104.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 113.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 102.0 | FTB |
| P5B | 91.0 | FTB |
| Average | 109.8 | *FTB - Film Tear Bond |
| Standard Deviation | 9.0 | |
| Maximum | 123.0 | |
| Minimum | 91.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S30
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 206.0 | Elongation |
| S2 | 203.0 | Elongation |
| S3 | 206.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 205.0 | *FTB - Film Tear Bond |
| Standard Deviation | 1.3 | |
| Maximum | 206.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 112.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 103.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 109.0 | FTB |
| P4B | 111.0 | FTB |
| P5A | 108.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 114.3 | *FTB - Film Tear Bond |
| Standard Deviation | 8.7 | |
| Maximum | 131.0 | |
| Minimum | 103.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S31
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 200.0 | Elongation |
| S2 | 202.0 | Elongation |
| S3 | 203.0 | Elongation |
| S4 | 208.0 | Elongation |
| S5 | 184.0 | Elongation |
| Average | 199.4 | *FTB - Film Tear Bond |
| Standard Deviation | 8.1 | |
| Maximum | 208.0 | |
| Minimum | 184.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 112.0 | FTB |
| P1B | 139.0 | FTB |
| P2A | 106.0 | FTB |
| P2B | 89.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 99.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 112.0 | FTB |
| P5B | 105.0 | FTB |
| Average | 112.0 | *FTB - Film Tear Bond |
| Standard Deviation | 13.1 | |
| Maximum | 139.0 | |
| Minimum | 89.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S32
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 184.0 | Elongation |
| S2 | 162.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 181.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 177.2 | *FTB - Film Tear Bond |
| Standard Deviation | 7.9 | |
| Maximum | 184.0 | |
| Minimum | 162.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 145.0 | FTB |
| P2A | 101.0 | FTB |
| P2B | 146.0 | FTB |
| P3A | 106.0 | FTB |
| P3B | 170.0 | FTB |
| P4A | 131.0 | FTB |
| P4B | 145.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 154.0 | FTB |
| Average | 134.2 | *FTB - Film Tear Bond |
| Standard Deviation | 20.6 | |
| Maximum | 170.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S33
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 177.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 174.0 | Elongation |
| Average | 174.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 177.0 | |
| Minimum | 169.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 100.0 | FTB |
| P1B | 157.0 | FTB |
| P2A | 102.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 97.0 | FTB |
| P3B | 161.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 105.0 | FTB |
| P5A | 138.0 | FTB |
| P5B | 112.0 | FTB |
| Average | 122.8 | *FTB - Film Tear Bond |
| Standard Deviation | 22.5 | |
| Maximum | 161.0 | |
| Minimum | 97.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S34
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 207.0 | Elongation |
| S2 | 184.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 207.0 | Elongation |
| S5 | 208.0 | Elongation |
| Average | 196.0 | *FTB - Film Tear Bond |
| Standard Deviation | 14.2 | |
| Maximum | 208.0 | |
| Minimum | 174.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 105.0 | FTB |
| P2A | 79.0 | FTB |
| P2B | 88.0 | FTB |
| P3A | 104.0 | FTB |
| P3B | 108.0 | FTB |
| P4A | 93.0 | FTB |
| P4B | 85.0 | FTB |
| P5A | 91.0 | FTB |
| P5B | 104.0 | FTB |
| Average | 98.0 | *FTB - Film Tear Bond |
| Standard Deviation | 12.4 | |
| Maximum | 123.0 | |
| Minimum | 79.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S35
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 203.0 | Elongation |
| S2 | 198.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 199.0 | Elongation |
| S5 | 194.0 | Elongation |
| Average | 199.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.9 | |
| Maximum | 205.0 | |
| Minimum | 194.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 114.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 104.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 111.0 | FTB |
| P3B | 127.0 | FTB |
| P4A | 118.0 | FTB |
| P4B | 109.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 114.5 | *FTB - Film Tear Bond |
| Standard Deviation | 6.6 | |
| Maximum | 127.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S36
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 205.0 | Elongation |
| S2 | 199.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 198.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 202.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 206.0 | |
| Minimum | 198.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 105.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 108.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 108.0 | FTB |
| P3B | 114.0 | FTB |
| P4A | 108.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 125.0 | FTB |
| P5B | 131.0 | FTB |
| Average | 114.8 | *FTB - Film Tear Bond |
| Standard Deviation | 8.1 | |
| Maximum | 131.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S37
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 206.0 | Elongation |
| S2 | 199.0 | Elongation |
| S3 | 204.0 | Elongation |
| S4 | 198.0 | Elongation |
| S5 | 195.0 | Elongation |
| Average | 200.4 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 206.0 | |
| Minimum | 195.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 96.0 | FTB |
| P1B | 100.0 | FTB |
| P2A | 106.0 | FTB |
| P2B | 96.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 122.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 98.0 | FTB |
| P5A | 102.0 | FTB |
| P5B | 88.0 | FTB |
| Average | 102.8 | *FTB - Film Tear Bond |
| Standard Deviation | 9.2 | |
| Maximum | 122.0 | |
| Minimum | 88.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S38
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 189.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 196.0 | Elongation |
| Average | 188.4 | *FTB - Film Tear Bond |
| Standard Deviation | 11.6 | |
| Maximum | 204.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 96.0 | FTB |
| P1B | 122.0 | FTB |
| P2A | 97.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 104.0 | FTB |
| P3B | 119.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 93.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 107.1 | *FTB - Film Tear Bond |
| Standard Deviation | 9.6 | |
| Maximum | 122.0 | |
| Minimum | 93.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S39
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 201.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 208.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 202.0 | Elongation |
| Average | 203.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.4 | |
| Maximum | 208.0 | |
| Minimum | 201.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 102.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 96.0 | FTB |
| P2B | 94.0 | FTB |
| P3A | 86.0 | FTB |
| P3B | 98.0 | FTB |
| P4A | 92.0 | FTB |
| P4B | 114.0 | FTB |
| P5A | 116.0 | FTB |
| P5B | 105.0 | FTB |
| Average | 103.0 | *FTB - Film Tear Bond |
| Standard Deviation | 12.0 | |
| Maximum | 127.0 | |
| Minimum | 86.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S40
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 197.0 | Elongation |
| S2 | 198.0 | Elongation |
| S3 | 183.0 | Elongation |
| S4 | 194.0 | Elongation |
| S5 | 195.0 | Elongation |
| Average | 193.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 198.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 100.0 | FTB |
| P1B | 104.0 | FTB |
| P2A | 105.0 | FTB |
| P2B | 109.0 | FTB |
| P3A | 99.0 | FTB |
| P3B | 105.0 | FTB |
| P4A | 84.0 | FTB |
| P4B | 98.0 | FTB |
| P5A | 98.0 | FTB |
| P5B | 104.0 | FTB |
| Average | 100.6 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 109.0 | |
| Minimum | 84.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S41
Tested by: William Harrison
Date Tested: 06/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 196.0 | Elongation |
| S2 | 189.0 | Elongation |
| S3 | 182.0 | Elongation |
| S4 | 201.0 | Elongation |
| S5 | 181.0 | Elongation |
| Average | 189.8 | *FTB - Film Tear Bond |
| Standard Deviation | 7.8 | |
| Maximum | 201.0 | |
| Minimum | 181.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 111.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 112.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 96.0 | FTB |
| P4B | 97.0 | FTB |
| P5A | 108.0 | FTB |
| P5B | 84.0 | FTB |
| Average | 110.6 | *FTB - Film Tear Bond |
| Standard Deviation | 14.0 | |
| Maximum | 132.0 | |
| Minimum | 84.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S42
Tested by: William Harrison
Date Tested: 06/22/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 183.0 | Elongation |
| S2 | 185.0 | Elongation |
| S3 | 189.0 | Elongation |
| S4 | 186.0 | Elongation |
| S5 | 184.0 | Elongation |
| Average | 185.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 189.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 136.0 | FTB |
| P1B | 119.0 | FTB |
| P2A | 153.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 153.0 | FTB |
| P3B | 120.0 | FTB |
| P4A | 132.0 | FTB |
| P4B | 113.0 | FTB |
| P5A | 112.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 129.4 | *FTB - Film Tear Bond |
| Standard Deviation | 14.3 | |
| Maximum | 153.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S43
Tested by: William Harrison
Date Tested: 06/22/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 186.0 | Elongation |
| S2 | 181.0 | Elongation |
| S3 | 185.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 187.0 | Elongation |
| Average | 183.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.1 | |
| Maximum | 187.0 | |
| Minimum | 179.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 142.0 | FTB |
| P1B | 136.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 150.0 | FTB |
| P3B | 138.0 | FTB |
| P4A | 134.0 | FTB |
| P4B | 138.0 | FTB |
| P5A | 146.0 | FTB |
| P5B | 139.0 | FTB |
| Average | 136.6 | *FTB - Film Tear Bond |
| Standard Deviation | 10.4 | |
| Maximum | 150.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Extrusion
Sample: S44
Tested by: William Harrison
Date Tested: 06/22/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 142.0 | Elongation |
| S2 | 143.0 | Elongation |
| S3 | 139.0 | Elongation |
| S4 | 143.0 | Elongation |
| S5 | 146.0 | Elongation |
| Average | 142.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 146.0 | |
| Minimum | 139.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 166.0 | FTB |
| P1B | 0.0 | |
| P2A | 135.0 | FTB |
| P2B | 0.0 | |
| P3A | 155.0 | FTB |
| P3B | 0.0 | |
| P4A | 161.0 | FTB |
| P4B | 0.0 | |
| P5A | 139.0 | FTB |
| P5B | 0.0 | |
| Average | 75.6 | *FTB - Film Tear Bond |
| Standard Deviation | 76.1 | |
| Maximum | 166.0 | |
| Minimum | 0.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

# Cell 1 Secondary HDPE Geomembrane Defect Log

SAMPLE

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 8

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 1 | S1/S2 | 450FT W OF EEOS | LDT | 06-14-2010 | LDT-1 | 06-16-2010 | JA |
| 2 | S2/S3 | 400FT W OF EEOS | LDT | 06-14-2010 | LDT-2 | 06-16-2010 | JA |
| 3 | S3/S4 | 350FT W OF EEOS | LDT | 06-14-2010 | LDT-3 | 06-16-2010 | JA |
| 4 | S4/S5 | 300FT W OF EEOS | LDT | 06-14-2010 | LDT-4 | 06-16-2010 | JA |
| 5 | S5/S6 | 20 FT E OF WAT | LDT | 06-14-2010 | LDT-5 | 06-16-2010 | JA |
| 6 | S13/S14 | 11FT N OF SEOS | LDT | 06-15-2010 | LDT-6 | 06-16-2010 | JA |
| 7 | S20/21 | 2 FT N OF SEOS | LDT | 06-15-2010 | LDT-7 | 06-16-2010 | JA |
| 8 | S6/27 | 4FT W OF EEOS | LDT | 06-15-2010 | LDT-8 | 06-16-2010 | JA |
| 9 | S2/3 | 26 FT W OF EEOS | O | 06-16-2010 | Burnout | 06-16-2010 | JA |
| 10 | S5/6 | 1FT. E OF WAT | O | 06-16-2010 | Burnout | 06-16-2010 | JA |
| 11 | S6/7 | 1FT E OF WAT | O | 06-16-2010 | Burnout | 06-16-2010 | JA |
| 12 | S7/8 | 22FT N OF SEOS | O | 06-16-2010 | | 06-16-2010 | JA |
| 13 | S7/8 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 14 | S8/9 | SEOS | T | 06-23-2010 | | 06-16-2010 | JA |
| 15 | S9/10 | SEOS | T | 06-16-2010 | | 06-15-2010 | JA |
| 16 | S9/10 | 6FT S OF WAT | O | 06-16-2010 | | 06-15-2010 | JA |
| 17 | S9/10 | WAT TO 6FT S OF | O | 06-16-2010 | | 06-16-2010 | JA |
| 18 | S10/11 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 19 | S11/12 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 20 | S12/13 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 21 | S13/14 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 22 | S13 | 5 FT N 10 FT W OF SEOS 13/14 | O | 06-16-2010 | | 06-16-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 8

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 23 | S13 | 12 FT N AND 10 FT W FR SEOS 13/14 | O | 06-16-2010 | | 06-16-2010 | JA |
| 24 | S13 | 21 FT N 10FT W OF SEOS13/14 | O | 06-16-2010 | | 06-16-2010 | JA |
| 25 | S13/14 | 3 FT FROM NAT TO 5 FT FROM NAT | O | 06-23-2010 | | 06-16-2010 | JA |
| 26 | S14/15 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 27 | S15/16 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 28 | S16/17 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 29 | S17/18 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 30 | S17/18 | 4 FT FROM NAT TO 5.5 FT FROM NAT | O | 06-16-2010 | | 06-16-2010 | JA |
| 31 | S18/19 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 32 | S19/20 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 33 | S20/21 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 34 | S21/22 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 35 | S22/23 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 36 | S23/24 | NAT | O | 06-16-2010 | | 06-16-2010 | JA |
| 37 | S26/27 | NAT | O | 06-16-2010 | | 06-16-2010 | JA |
| 38 | S23/24 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 39 | S24/25 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 40 | S25/26 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 41 | S26/27 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 42 | S27/28 | SEOS | T | 06-16-2010 | | 06-16-2010 | JA |
| 43 | S1/29 | 43 FT W OF EEOS | LDT | 06-17-2010 | LDT-9 | 06-17-2010 | JA |
| 44 | S29/30 | 48 FT E OF WAT | LDT | 06-17-2010 | LDT-10 | 06-17-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 8

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 45 | S30/31 | 55 FT E OF WAT | LDT | 06-17-2010 | LDT-11 | 06-17-2010 | JA |
| 46 | S31/32 | 62 FT E OF WAT | LDT | 06-17-2010 | LDT-12 | 06-17-2010 | JA |
| 47 | S32/33 | 70 FT E OF WAT | LDT | 06-17-2010 | LDT-13 | 06-17-2010 | KB |
| 48 | S33/34 | 78 FT E OF WAT | LDT | 06-17-2010 | LDT-14 | 06-17-2010 | KB |
| 49 | S34/35 | 84 FT E OF WAT | LDT | 06-17-2010 | LDT-15 | 06-17-2010 | JA |
| 50 | S35/36 | 90 FT E OF WAT | LDT | 06-17-2010 | LDT-16 | 06-17-2010 | JA |
| 51 | S36/37 | 95 FT E OF WAT | LDT | 06-17-2010 | LDT-17 | 06-17-2010 | JA |
| 52 | S37/38 | 22 FT E OF WAT | LDT | 06-17-2010 | LDT-18 | 06-17-2010 | JA |
| 53 | S38/39 | 108FT E OF WAT | LDT | 06-17-2010 | LDT-19 | 06-17-2010 | JA |
| 54 | S29 | 9 FT E 5 FT S OF S1/29 W END | O | 06-17-2010 | Cut due to wrinkle | 06-17-2010 | JA |
| 55 | S29 | EX WELD FROM SR 54 INTO WAT | O | 06-17-2010 | Wrinkle cut | 06-17-2010 | JA |
| 56 | S31/32 | 1 FT E OF WAT | O | 06-17-2010 | | 06-17-2010 | JA |
| 57 | S37/38 | 134FT E OF WAT | O | 06-17-2010 | Burnout | 06-17-2010 | JA |
| 58 | S38/39 | 143FT E OF WAT | O | 06-17-2010 | | 06-17-2010 | JA |
| 59 | S40/41 | 115 FT E OF WEOS | LDT | 06-18-2010 | LDT-20 | 06-19-2010 | KB |
| 60 | S40/41 | 168 FT E OF WEOS | O | 06-18-2010 | Burnout | 06-19-2010 | JA |
| 61 | S41/42 | 32 FT W OF EEOS | LDT | 06-18-2010 | LDT-21 | 06-19-2010 | JA |
| 62 | S43/44 | 144 FT E OF WEOS | LDT | 06-18-2010 | LDT-22 | 06-19-2010 | JA |
| 63 | S44/45 | 6FT W OF EEOS | LDT | 06-18-2010 | LDT-23 | 06-19-2010 | JA |
| 64 | 46/47 | 167FT E OF WEOS | LDT | 06-18-2010 | LDT-24 | 06-19-2010 | JA |
| 65 | S48/49 | 13FT E OF WEOS | LDT | 06-18-2010 | LDT-25 | 06-18-2010 | JA |
| 66 | S49/50 | 186 FT E OF WEOS | LDT | 06-18-2010 | LDT-26 | 06-18-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 8

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 67 | 51/52 | 35 FT W OF EEOS | LDT | 06-18-2010 | LDT-27 | 06-19-2010 | JA |
| 68 | S52/53 | 208 FT W OF EEOS | LDT | 06-18-2010 | LDT-28 | 06-19-2010 | JA |
| 69 | S54/55 | 60FT W OF EEOS | LDT | 06-18-2010 | LDT-29 | 06-19-2010 | JA |
| 70 | S55/56 | 62FT W OF EEOS | LDT | 06-18-2010 | LDT-30 | 06-19-2010 | JA |
| 71 | S28/58 | AT THE NAT | O | 06-18-2010 | | 06-19-2010 | KB |
| 72 | S58/59 | 50FT S OF NEOS | O | 06-18-2010 | | 06-19-2010 | JA |
| 73 | S63/S64 | 20 FT S OF NAT | LDT | 06-18-2010 | LDT-31 | 06-19-2010 | JA |
| 74 | S30/S49 | 40 FT S OF NEOS | LDT | 06-18-2010 | LDT-32 | 06-19-2010 | JA |
| 75 | S56/S63 | 173 FT W OF EEOS | LDT | 06-18-2010 | LDT-33 | 06-19-2010 | JA |
| 76 | S68/S69 | SEOS | T | 06-18-2010 | | 06-19-2010 | JA |
| 77 | S67/S68 | SEOS | T | 06-18-2010 | | 06-19-2010 | JA |
| 78 | S66/S67 | SEOS | T | 06-18-2010 | | 06-19-2010 | JA |
| 79 | S65/S66 | SEOS | T | 06-18-2010 | | 06-19-2010 | JA |
| 80 | S64/S65 | SEOS | T | 06-18-2010 | | 06-19-2010 | JA |
| 81 | S63/S64 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 82 | S62/S63 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 83 | S61/S62 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 84 | S60/S61 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 85 | S59/S60 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 86 | S58/S59 | SEOS | T | 06-19-2010 | | 06-19-2010 | JA |
| 87 | S61/S62 | AT NAT | O | 06-19-2010 | | 06-19-2010 | JA |
| 88 | S56/S57 | SEOS | O | 06-19-2010 | | 06-19-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
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| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 89 | S56/S57 | NEOS | O | 06-19-2010 | | 06-19-2010 | JA |
| 90 | S56/S58/S6/S28 | SEOS 28/58 | O | 06-19-2010 | | 06-19-2010 | JA |
| 91 | S5/S6/S55/S56 | EEOS 5/6 | O | 06-19-2010 | | 06-19-2010 | JA |
| 92 | S4/S5/S54/S55 | EEOS 4/5 | O | 06-19-2010 | | 06-19-2010 | JA |
| 93 | S3/S4/S53/S54 | EEOS 3/4 | O | 06-19-2010 | | 06-19-2010 | JA |
| 94 | S2/S3/S52/S53 | EEOS 2/3 | O | 06-19-2010 | | 06-19-2010 | JA |
| 95 | S1/S2/S51/S52 | EEOS 1/2 | O | 06-19-2010 | | 06-19-2010 | JA |
| 96 | S29/S1/S50/S51 | EEOS 29/1 | O | 06-19-2010 | | 06-19-2010 | JA |
| 97 | S29/S30/S50/S49 | EEOS 29/30 | O | 06-19-2010 | | 06-19-2010 | JA |
| 98 | S31/S32/S47/S48 | EEOS 31/32 | O | 06-19-2010 | | 06-19-2010 | JA |
| 99 | S47 | 15 FT S 0F S48 1 FT E OF S32 | O | 06-19-2010 | | 06-19-2010 | JA |
| 100 | S32/S33/S46/S47 | EEOS 32/33 | O | 06-19-2010 | | 06-19-2010 | JA |
| 101 | S45/S46/S33/S34 | EEOS 33/34 | O | 06-19-2010 | | 06-19-2010 | JA |
| 102 | S34/S35/S44/S45 | EEOS 34/35 | O | 06-19-2010 | | 06-19-2010 | JA |
| 103 | S35/S36/S43/S44 | EEOS 35/36 | O | 06-19-2010 | | 06-19-2010 | JA |
| 104 | S43 | 8 FT S OF 44 5FT E OF 36 | O | 06-19-2010 | | 06-19-2010 | JA |
| 105 | S43 | 8FT S OF 44 8FT E OF 36 | O | 06-19-2010 | | 06-19-2010 | JA |
| 106 | S43 | 8FT S OF 44 15FT E OF 36 | O | 06-19-2010 | | 06-19-2010 | JA |
| 107 | S36/S37/S42/S43 | EEOS 36/37 | O | 06-19-2010 | | 06-19-2010 | JA |
| 108 | S37/S38/S41/S42 | EEOS 37/38 | O | 06-19-2010 | | 06-19-2010 | JA |
| 109 | S38/S39/S40/S41 | EEOS 38/39 | O | 06-19-2010 | | 06-19-2010 | JA |
| 110 | S73/S74 | 27FT E OF WEOS | LDT | 06-19-2010 | LDT-34 | 06-21-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
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| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 111 | S75/S76 | 63FT E OF WEOS | LDT | 06-19-2010 | LDT-35 | 06-21-2010 | JA |
| 112 | S77/S78 | 79FT E OF WEOS | LDT | 06-21-2010 | LDT-36 | 06-21-2010 | JA |
| 113 | S83/S84 | 56FT E OF WEOS | LDT | 06-19-2010 | LDT-37 | 06-21-2010 | JA |
| 114 | S46/S47/S77/S78 | EEOS 46/47 | O | 06-19-2010 | | 06-19-2010 | JA |
| 115 | S45/S46/S76/S77 | EEOS 45/46 | O | 06-19-2010 | | 06-19-2010 | JA |
| 116 | S44/S45/S75/S76 | EEOS 44/45 | O | 06-19-2010 | | 06-19-2010 | JA |
| 117 | S48/S49/S80/S93 | EEOS 48/49 | O | 06-19-2010 | | 06-19-2010 | JA |
| 118 | S49/S50/S93/S94 | EEOS 49/50 | O | 06-19-2010 | | 06-19-2010 | JA |
| 119 | S92/S93 | 144FT FROM NEAT | O | 06-19-2010 | | 06-21-2010 | JA |
| 120 | S83/S84/S79/S90 | EEOS 83,84,90 | O | 06-19-2010 | | 06-21-2010 | JA |
| 121 | S55/S57/S97/S98 | EEOS 55/57 | O | 06-19-2010 | | 06-19-2010 | JA |
| 122 | S57/S71/S98 | EEOS 57/71 | O | 06-19-2010 | | 06-21-2010 | JA |
| 123 | S57/S70/S71 | SEOS 70/71 | O | 06-19-2010 | | 06-21-2010 | JA |
| 124 | S96/S53/S54 | EEOS 53/54 | O | 06-19-2010 | | 06-21-2010 | JA |
| 125 | S92/S93 | 12FT W 0F EAT | LDT | 06-20-2010 | LDT-39 | 06-21-2010 | JA |
| 126 | S84/S85 | 39 FT E OF WEOS | LDT | 06-20-2010 | LDT-38 | 06-21-2010 | JA |
| 127 | S94/S95 | 5FT W OF EAT | LDT | 06-20-2010 | LDT-40 | 06-21-2010 | JA |
| 128 | S71/S98 | 41 FT S OF NAT | LDT | 06-20-2010 | LDT-41 | 06-21-2010 | JA |
| 129 | S86/S88 | 13 FT SW OF NEAT | LDT | 06-20-2010 | LDT-42 | 06-21-2010 | JA |
| 130 | S78/S80 | WEOS | O | 06-20-2010 | Covers EEOS 47/48 | 06-21-2010 | JA |
| 131 | S74/S75 | WEOS | O | 06-20-2010 | Covers EEOS 43/44 also | 06-21-2010 | JA |
| 132 | S73/S74 | WEOS | O | 06-20-2010 | Covers EEOS 42/43 also | 06-21-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
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| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 133 | S72/S73 | WEOS | O | 06-20-2010 | Covers EEOS 41/42 also | 06-21-2010 | JA |
| 134 | S72/S81 | WEOS | O | 06-20-2010 | Covers EEOS 40/41 also | 06-21-2010 | JA |
| 135 | S53/S96 | 10 FT S OF NEOS | LDT | 06-20-2010 | LDT-43 | 06-21-2010 | JA |
| 136 | S79/S92 | ALL OF SEAM | O | 06-21-2010 | Cap entire seam, did not air test. | 06-21-2010 | JA |
| 137 | SR-117/S93 | CUT OFF E SIDE OF EXISTING PATCH | LDT | 06-21-2010 | Extrusion destruct taken. LDT-44 | 06-21-2010 | JA |
| 138 | S50/S51 | EEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 139 | S94/S95 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 140 | S51/S52 | EEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 141 | S52/S53 | EEOS & WEOS 95/96 | O | 06-21-2010 | | 06-21-2010 | JA |
| 142 | S96/S97 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 143 | S54/S55 | EEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 144 | S69/S70 | SEOS | T | 06-21-2010 | | 06-19-2010 | JA |
| 145 | S98/S99 | SEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 146 | S99/S100 | SEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 147 | S97/S100 | NAT | O | 06-21-2010 | Extends into anchor trench. | 06-21-2010 | JA |
| 148 | S96/S97 | EAT | O | 06-21-2010 | Extends into anchor trench. | 06-21-2010 | JA |
| 149 | S91 | AT EAT | O | 06-21-2010 | Short, added liner into anchor trench. | 06-21-2010 | JA |
| 150 | S77 | EAT | O | 06-21-2010 | Short, added liner into anchor trench. | 06-21-2010 | JA |
| 151 | S86/S87 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 152 | S86/S88/S89 | TIE-IN WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 153 | S85/S86/S89 | TIE-IN WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| 154 | S89/S90 | TIE-IN WEOS | O | 06-21-2010 | | 06-21-2010 | JA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
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| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| **155** | S84/S85 | TIE-IN WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **156** | S82/S83 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **157** | S82/S83 | 35FT E OF WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **158** | S82/S91 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **159** | S79/S80 | SEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **160** | S92/S93 | WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
| **161** | S92/S93 | 81FT E OF WEOS | O | 06-21-2010 | | 06-21-2010 | JA |
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Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

# Cell [illegible] Secondary [illegible] HDPE Geomembrane Repair Testing [illegible]

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | P | 6 FT X 2 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 2 | P | 6 FT X 2 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 3 | P | 6 FT X 2 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 4 | P | 6 FT X 2 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 5 | P | 6 FT X 2 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 6 | P | 6 FT X 2 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 7 | P | 6 FT X 1.5 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 8 | P | 5 FT X 2 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 9 | P | 8 FT X 3 FT | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 10 | P | 3 FT X 1.5 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 11 | P | 1 FT X 3 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 12 | P | 2 FT X 2 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 13 | P | 1.5 FT X 4 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 14 | P | 1.5 FT X 4 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 15 | P | 1.5 FT X 4 IN | MM | JA | 06-15-2010 | VB | HG | JA | P | 06-16-2010 | |
| 16 | P | 3 FT X 2 FT | MM | JA | 06-15-2010 | VB | HG | JA | P | 06-16-2010 | |
| 17 | G&W | 6 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 18 | G&W | 1.5 FT X 4 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 19 | G&W | 1.5 FT X 4 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 20 | G&W | 1.5 FT X 5 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 21 | G&W | 1.5 FT X 5 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 22 | P | 2 FT X 3 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
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| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | P | 2 FT X 2 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 24 | P | 2 FT X 2 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 25 | P | 1.5 FT X 1.5 FT | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 26 | G&W | 1.5 FT X 4 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 27 | G&W | 1.5 FT X8 IN | MM | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 28 | G&W | 1 FT X 7 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 29 | G&W | 1.5 FT X 7 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 30 | P | 1.5 FT X 1 FT | MV | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 31 | G&W | 1.5 FT X 6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 32 | G&W | 1.5 FT X 6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 33 | G&W | 1.5 FT X 9 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 34 | G&W | 1 FT X 6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 35 | G&W | 1.5 FT X 6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 36 | P | 3 FT X 1.5 FT | MV | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 37 | P | 3 FT X 2 FT | MV | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 38 | G&W | 2 FT X6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 39 | G&W | 2 FT X8 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 40 | G&W | 1 FT X6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 41 | G&W | 1 FT X8 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 42 | G&W | 1 FT X6 IN | JT | JA | 06-16-2010 | VB | HG | JA | P | 06-16-2010 | |
| 43 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 44 | P | 6 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 46 | P | 6 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 47 | P | 6 FT X 2 FT | JT | KB | 06-17-2010 | VB | HG | KB | P | 06-17-2010 | |
| 48 | P | 6 FT X 2 FT | JT | KB | 06-17-2010 | VB | HG | KB | P | 06-17-2010 | |
| 49 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 50 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 51 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 52 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 53 | P | 5 FT X 2 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 54 | P | 1.5 FT X 1.5 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 55 | G&W | 14 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 56 | P | 1.5 FT X 1 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 57 | P | 1.5 FT X 1.5 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 58 | P | 1.5 FT X 1.5 FT | JT | JA | 06-17-2010 | VB | HG | JA | P | 06-17-2010 | |
| 59 | P | 6 FT X 2 FT | JT | KB | 06-19-2010 | VB | HG | KB | P | 06-21-2010 | |
| 60 | P | 3 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 61 | P | 5.5 FT X 2FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 62 | P | 5 FT X 2.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 63 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 64 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 65 | P | 5 FT X 2 FT | JT | JA | 06-18-2010 | VB | HG | JA | P | 06-21-2010 | |
| 66 | P | 5 FT X 2 FT | JT | JA | 06-18-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 68 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 69 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 70 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 71 | P | 5 FT X 1.5 FT | JT | KB | 06-19-2010 | VB | HG | KB | P | 06-21-2010 | |
| 72 | P | 5 FT X 1.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 73 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 74 | P | 10 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 75 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 76 | G&W | 1 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 77 | G&W | 1.5 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 78 | G&W | 1.5 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 79 | G&W | 1.5 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 80 | G&W | 1.5 FT X 6 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 81 | G&W | 1.5 FT X 6 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 82 | G&W | 1 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 83 | G&W | 1 FT X 6 IN | JT | JA | 06-19-2010 | SP | HG | JA | P | 06-21-2010 | |
| 84 | G&W | 1 FT X 8 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 85 | G&W | 1 FT X 6 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 86 | G&W | 1 FT X 6 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 87 | P | 6 FT X 1.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 88 | P | 2 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | P | 2 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 90 | P | 3 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 91 | P | 2 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 92 | P | 2 FT X 5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 93 | P | 2 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 94 | P | 2 FT X 4.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-19-2010 | |
| 95 | P | 2 FT X 5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-19-2010 | |
| 96 | P | 5 FT X 5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 97 | P | 2 FT X 5.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 98 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 99 | P | 1.5 FT X 1 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 100 | P | 6 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 101 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 102 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 103 | P | 5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 104 | P | 1 FT X 1 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 105 | P | 1 FT X 1 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 106 | P | 1 FT X 1 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 107 | P | 4 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 108 | P | 4.5 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 109 | P | 3 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 110 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 112 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 113 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 114 | P | 1.5 FT X 2.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 115 | P | 3 FT X 3 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 116 | P | 1.5 FT X 2.5 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 117 | P | 8 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 118 | P | 4 FT X 2 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 119 | P | 9 FT X 3.5 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 120 | P | 7 FT X 4 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 121 | P | 5 FT X 4 FT | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 122 | P | 4 FT X 3 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 123 | P | 3 FT X 3 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 124 | P | 2 FT X 1.5 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 125 | P | 5 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 126 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 127 | P | 5 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 128 | P | 5 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 129 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 130 | P | 2.5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 131 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 132 | P | 2 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

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# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | P | 4 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 134 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 135 | P | 5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 136 | P | 7 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 137 | P | 4.5 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 138 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 139 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 140 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 141 | P | 3.5 FT X 1.5 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 142 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 143 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 144 | G&W | 1 FT X 6 IN | JT | JA | 06-19-2010 | VB | HG | JA | P | 06-21-2010 | |
| 145 | P | 2 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 146 | P | 2.5 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 147 | P | 3 FT X 4 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 148 | P | 2 FT X 4 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 149 | P | 6 FT X 22 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 150 | P | 7 FT X 22 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 151 | P | 4 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 152 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 153 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 154 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 8 of 8

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 156 | P | 2 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 157 | P | 2 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 158 | P | 2 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 159 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 160 | P | 3 FT X 2 FT | JT | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |
| 161 | P | 4 FT X 2 FT | MV | JA | 06-21-2010 | VB | HG | JA | P | 06-21-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

# APPENDIX II – GEOSYNTHETICS
# Section 6 – Cell 1 Primary HDPE Geomembrane CQA Forms

**Geomembrane Deployment Report**
**Geomembrane Trial Seam Log**
**Geomembrane Seam Log**
**Destructive Laboratory Test Results**
**Geomembrane Defect Log**
**Geomembrane Repair Testing Log**

# Cell 1 Primary HDPE Geomembrane Deployment Report

S&ME

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# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/25,6/26,6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Carry Over | ----- | ----- | | |
| P01 | 218589 | 496 | 22 | 10,912 | 0 | TB | |
| P02 | 218607 | 496 | 22 | 10,912 | 0 | TB | |
| P03 | 218699 | 496 | 22 | 10,912 | 0 | TB | |
| P04 | 218698 | 496 | 22 | 10,912 | 0 | TB | |
| P05 | 218697 | 496 | 22 | 10,912 | 0 | TB | |
| P06 | 218601 | 496 | 22 | 10,912 | 0 | TB | |
| P07 | 218721 | 497 | 22 | 10,934 | 0 | TB | |
| P08 | 211435 | 328 | 22 | 7,216 | 0 | TB | |
| P09 | 211440 | 329 | 22 | 7,238 | 0 | TB | |
| P10 | 219110 | 331 | 22 | 7,282 | 0 | TB | |
| P11 | 218729 | 331 | 22 | 7,282 | 0 | TB | |
| P12 | 219102 | 331 | 22 | 7,282 | 0 | TB | |
| P13 | 218696 | 331 | 22 | 7,282 | 0 | TB | |
| P14 | 218696 | 134 | 22 | 2,948 | 0 | TB | |
| P15 | 219110 | 24 | 22 | 528 | 0 | TB | Measured center cut on 45 |
| P16 | 218729 | 51 | 22 | 1,122 | 0 | TB | Measured center cut on 45 |
| P17 | 218729 | 71 | 22 | 1,562 | 0 | TB | Measured center cut on 45 |
| P18 | 219110 | 66 | 22 | 1,452 | 0 | TB | |
| P19 | 219102 | 65 | 22 | 1,430 | 0 | TB | |
| P20 | 219102 | 66 | 22 | 1,452 | 0 | TB | |
| P21 | 211435 | 67 | 22 | 1,474 | 0 | TB | |
| P22 | 211435 | 67 | 22 | 1,474 | 0 | TB | |
| P23 | 211440 | 68 | 22 | 1,496 | 0 | TB | |
| P24 | 211440 | 70 | 22 | 1,540 | 0 | TB | |
| P25 | 219224 | 68 | 22 | 1,496 | 0 | TB | |
| P26 | 219224 | 68 | 22 | 1,496 | 0 | TB | |
| P27 | 219224 | 68 | 22 | 1,496 | 0 | TB | |
| P28 | 219224 | 70 | 22 | 1,540 | 0 | TB | |
| P29 | 219224 | 69 | 22 | 1,518 | 0 | TB | |
| | | | **Sheet Total** | 144,012 | 0 | | |
| | | | **Total to Date** | 144,012 | 0 | | |

**CQA Personnel:** Travis Bowman, Kyle Baucom

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/25,6/26,6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 4

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 144,012 | 0 | | |
| P30 | 219224 | 70 | 22 | 1,540 | 0 | TB | |
| P31 | 219224 | 71 | 22 | 1,562 | 0 | TB | |
| P32 | 219612 | 72 | 22 | 1,584 | 0 | TB | |
| P33 | 218612 | 55 | 22 | 1,210 | 0 | TB | |
| P34 | 219612 | 54 | 22 | 1,188 | 0 | TB | |
| P35 | 218612 | 54 | 22 | 1,188 | 0 | TB | |
| P36 | 218612 | 52 | 22 | 1,144 | 0 | TB | |
| P37 | 218612 | 51 | 22 | 1,122 | 0 | TB | |
| P38 | 218612 | 50 | 22 | 1,100 | 0 | TB | |
| P39 | 218612 | 53 | 22 | 1,166 | 0 | TB | |
| P40 | 219223 | 55 | 22 | 1,210 | 0 | TB | |
| P41 | 219223 | 54 | 22 | 1,188 | 0 | TB | |
| P42 | 219223 | 53 | 22 | 1,166 | 0 | TB | |
| P43 | 219223 | 54 | 22 | 1,188 | 0 | TB | |
| P44 | 219223 | 54 | 22 | 1,188 | 0 | TB | |
| P45 | 219223 | 54 | 22 | 1,188 | 0 | TB | |
| P46 | 219223 | 56 | 22 | 1,232 | 0 | TB | |
| P47 | 219223 | 58 | 22 | 1,276 | 0 | TB | |
| P48 | 211529 | 54 | 22 | 1,188 | 0 | TB | |
| P49 | 211529 | 58 | 22 | 1,276 | 0 | TB | |
| P50 | 211561 | 58 | 22 | 1,276 | 0 | TB | |
| P51 | 211561 | 57 | 22 | 1,254 | 0 | TB | |
| P52 | 211797 | 57 | 22 | 1,254 | 0 | TB | |
| P53 | 211797 | 57 | 22 | 1,254 | 0 | TB | |
| P54 | 211797 | 58 | 22 | 1,276 | 0 | TB | |
| P55 | 219114 | 240 | 22 | 5,280 | 0 | KB | |
| P56 | 219114 | 241 | 22 | 5,302 | 0 | KB | Deployed N to S starting @ W end of southern half of cell |
| P57 | 218722 | 238 | 22 | 5,236 | 0 | KB | |
| P58 | 218722 | 237 | 22 | 5,214 | 0 | KB | |
| | | | **Sheet Total** | 52,250 | 0 | | |
| | | | **Total to Date** | 196,262 | 0 | | |

**CQA Personnel:** Travis Bowman, Kyle Baucom

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/25,6/26,6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 **of** 4

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 196,262 | 0 | | |
| **Panel No.** | **Roll Number** | **Length (ft)** | **Width (ft)** | **Approximate Area ($ft^2$) Textured** | **Smooth** | **CQA Initials** | **Remarks** |
| P59 | 218603 | 497 | 22 | 10,934 | 0 | KB | Start E to W full roll deployment |
| P60 | 218591 | 499 | 22 | 10,978 | 0 | KB | |
| P61 | 218694 | 498 | 22 | 10,956 | 0 | KB | |
| P62 | 219106 | 498 | 22 | 10,956 | 0 | KB | |
| P63 | 218592 | 498 | 22 | 10,956 | 0 | KB | |
| P64 | 219105 | 500 | 22 | 11,000 | 0 | KB | |
| P65 | 219103 | 500 | 22 | 11,000 | 0 | KB | |
| P66 | 218590 | 500 | 22 | 11,000 | 0 | KB | |
| P67 | 219104 | 500 | 22 | 11,000 | 0 | KB | |
| P68 | 218609 | 500 | 22 | 11,000 | 0 | KB | |
| P69 | 211321 | 500 | 3 | 1,500 | 0 | KB | |
| P70 | 211797 | 230 | 22 | 5,060 | 0 | KB | |
| P71 | 218602 | 180 | 22 | 3,960 | 0 | KB | |
| P71A | 218602 | 323 | 22 | 7,106 | 0 | KB | |
| P72 | 219111 | 181 | 22 | 3,982 | 0 | KB | |
| P72A | 219111 | 319 | 22 | 7,018 | 0 | KB | |
| P73 | 218610 | 310 | 22 | 6,820 | 0 | KB | |
| P73A | 218610 | 187 | 22 | 4,114 | 0 | KB | |
| P74 | 218604 | 312 | 22 | 6,864 | 0 | KB | |
| P74A | 218604 | 186 | 22 | 4,092 | 0 | KB | |
| P75 | 218605 | 317 | 22 | 6,974 | 0 | KB | |
| P75A | 218605 | 173 | 22 | 3,806 | 0 | KB | |
| P76 | 218606 | 315 | 22 | 6,930 | 0 | KB | |
| P76A | 218606 | 172 | 22 | 3,784 | 0 | KB | |
| P77 | 218611 | 314 | 22 | 6,908 | 0 | KB | |
| P77A | 218611 | 171 | 22 | 3,762 | 0 | KB | |
| P78 | 218724 | 314 | 22 | 6,908 | 0 | KB | |
| P78A | 218724 | 154 | 22 | 3,388 | 0 | KB | |
| P79 | 218726 | 310 | 22 | 6,820 | 0 | KB | |
| | | | **Sheet Total** | 209,576 | 0 | | |
| | | | **Total to Date** | 405,838 | 0 | | |

**CQA Personnel:** Kyle Baucom

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 6/25,6/26,6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 **of** 4

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 405,838 | 0 | | |
| **Panel No.** | **Roll Number** | **Length (ft)** | **Width (ft)** | **Approximate Area ($ft^2$) Textured** | **Smooth** | **CQA Initials** | **Remarks** |
| P79A | 218726 | 148 | 22 | 3,256 | 0 | KB | |
| P80 | 211321 | 312 | 4 | 1,248 | 0 | KB | |
| P81 | 211321 | 48 | 4 | 192 | 0 | KB | |
| P82 | 219222 | 153 | 22 | 3,366 | 0 | KB | Measured center cut on 45 |
| P83 | 219222 | 176 | 22 | 3,872 | 0 | KB | Measured center cut on 45 |
| P84 | 219110 | 43 | 22 | 946 | 0 | KB | Measured center cut on 45 |
| P85 | 219222 | 145 | 22 | 3,190 | 0 | KB | |
| P86 | 218600 | 159 | 22 | 3,498 | 0 | KB | Measuree center cut on 45 |
| P87 | 218600 | 152 | 22 | 3,344 | 0 | KB | Measured center cut on 45 |
| P88 | 218720 | 130 | 22 | 2,860 | 0 | KB | Measured center cut on 45 |
| P89 | 218720 | 111 | 22 | 2,442 | 0 | KB | Measured center cut on 45 |
| P90 | 218720 | 78 | 22 | 1,716 | 0 | KB | Measured center cut on 45 |
| P91 | 218720 | 73 | 22 | 1,606 | 0 | KB | Measured cwnter cut on 45 |
| P92 | 218600 | 56 | 22 | 1,232 | 0 | KB | Measured center cut on 45 |
| P93 | 218600 | 33 | 22 | 726 | 0 | KB | Measured center cut on 45 |
| P94 | 218600 | 12 | 11 | 132 | 0 | KB | Measured center cut on 45 |
| P95 | 218718 | 287 | 22 | 6,314 | 0 | JA | |
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| | | | **Sheet Total** | 39,940 | 0 | | |
| | | | **Total to Date** | 445,778 | 0 | | |

**CQA Personnel:** James Addis/Kyle Baucom

# Cell 1 Primary HDPE Geomembrane Trial Seam Log

S&ME

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 3

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| P1 | 732 | DC | 3210 | 78 | 30 | 860 | 121 | 119 | 130 | 134 | 126 | 101 | 171 | 178 | 174 | P | F | SS | JA | 06/25/2010 |
| P2 | 724 | WT | 3211 | 78 | 30 | 860 | 121 | 134 | 117 | 124 | 114 | 110 | 126 | 125 | 181 | P | F | SS | JA | 06/25/2010 |
| P3 | 730 | JT | 5171 | 78 | 500 | 550 | 126 | 0 | 118 | 0 | 124 | 0 | 176 | 182 | 181 | P | Ex | TT | KB | 06/25/2010 |
| P4 | 1010 | BV | 1221 | 85 | 5 | 860 | 132 | 133 | 122 | 134 | 129 | 131 | 166 | 168 | 174 | P | F | TT | KB | 06/25/2010 |
| P5 | 1120 | BV | 1221 | 85 | 5 | 860 | 111 | 116 | 120 | 117 | 124 | 126 | 172 | 181 | 170 | P | F | ST | KB | 06/25/2010 |
| P6 | 1025 | LN | 1220 | 85 | 7 | 860 | 118 | 121 | 115 | 116 | 126 | 110 | 145 | 162 | 171 | P | F | SS | KB | 06/25/2010 |
| P7 | 1250 | BV | 1221 | 92 | 5 | 860 | 120 | 123 | 122 | 119 | 117 | 109 | 144 | 145 | 148 | P | F | ST | KB | 06/25/2010 |
| P8 | 1249 | LN | 1220 | 92 | 7 | 860 | 100 | 97 | 101 | 103 | 109 | 107 | 150 | 149 | 143 | P | F | SS | KB | 06/25/2010 |
| P9 | 1250 | DC | 3210 | 92 | 30 | 860 | 110 | 105 | 115 | 110 | 119 | 121 | 141 | 147 | 143 | P | F | SS | KB | 06/25/2010 |
| P10 | 1251 | LN | 1220 | 92 | 9 | 860 | 114 | 111 | 121 | 118 | 114 | 116 | 146 | 137 | 140 | P | F | ST | KB | 06/25/2010 |
| P11 | 728 | BV | 1219 | 78 | 7 | 860 | 124 | 117 | 122 | 125 | 118 | 115 | 158 | 140 | 153 | P | F | SS | JA | 06/26/2010 |
| P12 | 730 | DC | 3210 | 78 | 7 | 860 | 124 | 121 | 118 | 126 | 131 | 141 | 166 | 174 | 166 | P | F | SS | JA | 06/26/2010 |
| P13 | 725 | LN | 1220 | 78 | 7 | 860 | 121 | 134 | 126 | 117 | 107 | 114 | 155 | 147 | 161 | P | F | SS | JA | 06/26/2010 |
| P14 | 740 | JT | 5171 | 78 | 500 | 550 | 131 | 0 | 140 | 0 | 145 | 0 | 160 | 162 | 167 | P | Ex | TT | JA | 06/26/2010 |
| P15 | 1100 | LN | 1220 | 87 | 5 | 860 | 113 | 112 | 116 | 121 | 114 | 118 | 162 | 154 | 161 | P | F | ST | JA | 06/26/2010 |

Weld Type: **(Ex)**trusion, **(F)**usion
Material: **(SS)** Smooth/Smooth - **(ST)** Smooth/Texture - **(TT)** Texture /Texture

**CQA Personnel:** James Addis, Kyle Baucom

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 3

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| P16 | 1300 | DC | 3210 | 94 | 30 | 860 | 118 | 120 | 114 | 119 | 121 | 116 | 134 | 142 | 155 | P | F | SS | JA | 06/26/2010 |
| P17 | 1305 | DC | 3210 | 94 | 17 | 860 | 110 | 114 | 120 | 116 | 122 | 116 | 141 | 146 | 152 | P | F | TT | JA | 06/26/2010 |
| P18 | 1310 | BV | 1219 | 94 | 5 | 860 | 106 | 108 | 114 | 121 | 118 | 120 | 152 | 146 | 150 | P | F | SS | JA | 06/26/2010 |
| P19 | 1305 | LN | 1220 | 94 | 5 | 860 | 120 | 115 | 118 | 105 | 104 | 110 | 150 | 142 | 150 | P | F | ST | JA | 06/26/2010 |
| P20 | 1300 | JT | 5171 | 94 | 500 | 550 | 115 | 0 | 120 | 0 | 118 | 0 | 136 | 139 | 141 | P | Ex | TT | JA | 06/26/2010 |
| P21 | 745 | DC | 249 | 75 | 500 | 550 | 133 | 0 | 137 | 0 | 130 | 0 | 157 | 151 | 155 | P | Ex | TT | JA | 06/28/2010 |
| P22 | 710 | JT | 5171 | 75 | 500 | 550 | 131 | 0 | 128 | 0 | 124 | 0 | 148 | 155 | 142 | P | Ex | TT | JA | 06/28/2010 |
| P23 | 720 | MV | 5155 | 75 | 500 | 550 | 119 | 0 | 128 | 0 | 116 | 0 | 151 | 142 | 150 | P | Ex | TT | JA | 06/28/2010 |
| P24 | 1031 | WT | 3211 | 80 | 30 | 860 | 111 | 119 | 109 | 100 | 115 | 116 | 146 | 149 | 141 | P | F | SS | JA | 06/28/2010 |
| P25 | 1035 | DC | 3210 | 80 | 30 | 860 | 110 | 100 | 99 | 101 | 103 | 101 | 141 | 149 | 153 | P | F | SS | JA | 06/28/2010 |
| P26 | 1315 | WT | 3211 | 90 | 30 | 860 | 116 | 120 | 115 | 110 | 109 | 106 | 151 | 140 | 143 | P | F | SS | JA | 06/28/2010 |
| P27 | 1310 | DC | 3210 | 90 | 30 | 860 | 122 | 115 | 118 | 130 | 114 | 116 | 140 | 137 | 136 | P | F | SS | JA | 06/28/2010 |
| P28 | 1315 | DC | 3210 | 90 | 17 | 860 | 118 | 109 | 105 | 113 | 114 | 100 | 149 | 138 | 130 | P | F | TT | JA | 06/28/2010 |
| P29 | 1312 | WT | 3211 | 90 | 17 | 860 | 110 | 102 | 106 | 117 | 114 | 118 | 137 | 138 | 136 | P | F | TT | JA | 06/28/2010 |
| P30 | 1318 | WT | 3211 | 90 | 17 | 860 | 116 | 114 | 118 | 110 | 116 | 131 | 139 | 141 | 146 | P | F | ST | JA | 06/28/2010 |

Weld Type: **(Ex)**trusion, **(F)**usion
Material: **(SS)** Smooth/Smooth - **(ST)** Smooth/Texture - **(TT)** Texture /Texture

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 **of** 3

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| P31 | 1300 | JT | 5171 | 90 | 500 | 550 | 122 | 0 | 110 | 0 | 114 | 0 | 146 | 152 | 148 | P | Ex | TT | JA | 06/28/2010 |
| P32 | 730 | JT | 5171 | 78 | 450 | 550 | 121 | 0 | 116 | 0 | 110 | 0 | 148 | 156 | 162 | P | Ex | TT | JA | 06/29/2010 |
| P33 | 735 | MV | 5155 | 78 | 450 | 550 | 132 | 0 | 128 | 0 | 119 | 0 | 152 | 155 | 160 | P | Ex | TT | WH | 06/29/2010 |

Weld Type: **(Ex)**trusion, **(F)**usion
Material: **(SS)** Smooth/Smooth - **(ST)** Smooth/Texture - **(TT)** Texture /Texture

**CQA Personnel:** James Addis, William Harrison

# Cell 1 Primary HDPE Geomembrane Seam Log

S&ME

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06/25/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 14

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 / P2 | EEOS / WAT | 739 | DC | 3210 | 492 | 1 | A | 803 / 808 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P2 / P3 | EEOS / WAT | 746 | WT | 3211 | 493 | 2 | A | 815 / 820 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P3 / P4 | EEOS / WAT | 806 | DC | 3210 | 493 | 3 | A | 832 / 837 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P4 / P5 | EEOS / WAT | 816 | WT | 3211 | 497 | 4 | A | 845 / 850 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P5 / P6 | EEOS / WAT | 830 | DC | 3210 | 497 | 5 | A | 900 / 905 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P6 / P7 | EEOS / WAT | 849 | WT | 3211 | 497 | 6 | A | 914 / 919 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P8 / P9 | EEOS / WEOS | 913 | DC | 3210 | 324 | | A | 935 / 940 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P9 / P10 | EEOS / WEOS | 926 | WT | 3211 | 323 | 7 | A | 945 / 950 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P10 / P11 | EEOS / WEOS | 935 | DC | 3210 | 323 | | A | 1000 / 1005 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P11 / P12 | EEOS / WEOS | 946 | WT | 3211 | 323 | 8 | A | 1005 / 1010 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P12 / P13 | EEOS / WEOS | 955 | DC | 3210 | 324 | 9 | A | 1013 / 1018 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P16 / P17 | NAT / SEOS | 1010 | WT | 3211 | 63 | | A | 1033 / 1038 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P15 / P16 | NAT / SEOS | 1016 | WT | 3211 | 34 | | A | 1030 / 1035 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P17 / P18 | NAT / SEOS | 1018 | DC | 3210 | 64 | | A | 1026 / 1031 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P18 / P19 | NAT / SEOS | 1025 | WT | 3211 | 62 | | A | 1041 / 1046 | 30 / 30 | RC | WH | P | 06-25-2010 | Z2 1038/1043 30/29<br>Z3 1040/1045 30/30 |
| | | | | **Sheet Total** | 4,809 | | | | | | | | | |
| | | | | **Total to Date** | 4,809 | | | | | | | | | |

**CQA Personnel:** Will Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06/25/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 14

**Project Total Carry Over** 4,809

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P19 / P20 | NAT / SEOS | 1033 | DC | 3210 | 64 | | A | 1044 / 1049 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P21 / P22 | NAT / SEOS | 1048 | DC | 3210 | 64 | 10 | A | 1053 / 1058 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P6 / P13 | NEOS / SEOS | 1052 | BV | 1221 | 22 | | A | 1354 / 1359 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P20 / P21 | NAT / SEOS | 1055 | DC | 3210 | 63 | | A | 1047 / 1052 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P5 / P12 | NEOS / SEOS | 1100 | BV | 1221 | 22 | | A | 1133 / 1138 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P4 / P11 | NEOS / SEOS | 1103 | BV | 1221 | 22 | | A | 1132 / 1137 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1126/1131 30/30 |
| P22 / P23 | NAT / SEOS | 1104 | DC | 3210 | 65 | | A | 1110 / 1115 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P23 / P24 | NAT / SEOS | 1108 | DC | 3210 | 63 | | A | 1108 / 1113 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P3 / P10 | NEOS / SEOS | 1108 | BV | 1221 | 22 | | A | 1124 / 1129 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P24 / P25 | NAT / SEOS | 1110 | DC | 3210 | 65 | | A | 1115 / 1120 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P2 / P9 | NEOS / SEOS | 1112 | BV | 1221 | 22 | | A | 1130 / 1135 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P1 / P8 | NEOS / SEOS | 1116 | BV | 1221 | 22 | | A | 1124 / 1129 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1123/1128 30/30 |
| P25 / P26 | NAT / SEOS | 1118 | LN | 1220 | 66 | | A | 1230 / 1235 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P26 / P27 | NAT / SEOS | 1120 | DC | 3210 | 64 | | A | 1233 / 1238 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P27 / P28 | NAT / SEOS | 1125 | DC | 3210 | 67 | 11 | A | 1250 / 1255 | 30 / 30 | RC | WH | P | 06-25-2010 | |

**Sheet Total** 713
**Total to Date** 5,522

**CQA Personnel:** Kyle Baucom, Will Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06/25/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 14

**Project Total Carry Over** 5,522

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P28 / P29 | NAT / SEOS | 1129 | DC | 3210 | 68 | | A | 1300 / 1305 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P14 / P15 | NEAT / SWEOS | 1129 | BV | 1221 | 36 | | A | 1240 / 1245 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P29 / P30 | NAT / SEOS | 1133 | LN | 1220 | 69 | | A | 1304 / 1309 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P30 / P31 | NAT / SEOS | 1133 | DC | 3210 | 69 | | A | 1310 / 1315 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P14 / P16 | NEEOS / SWEOS | 1135 | BV | 1221 | 37 | | A | 1240 / 1245 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P14 / P17 | NEEOS / SWEOS | 1140 | BV | 1221 | 35 | | A | 1240 / 1245 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P31 / P32 | NAT / SEOS | 1143 | DC | 3210 | 72 | | A | 1312 / 1317 | 30 / 29 | RC | WH | P | 06-25-2010 | Z2 1315/1320 30/30 |
| P32 / P33 | NAT / SEOS | 1251 | LN | 1220 | 56 | 12 | A | 1404 / 1409 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P33 / P34 | NAT / SEOS | 1255 | DC | 3210 | 54 | | A | 1410 / 1415 | 30 / 30 | RC | WH | P | 06-25-2010 | Z2 1415/1419 30/30 |
| P34 / P35 | NAT / SEOS | 1259 | DC | 3210 | 53 | | A | 1426 / 1431 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P35 / P36 | NAT / SEOS | 1302 | LN | 1220 | 51 | | A | 1433 / 1438 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P13 / P18 | EEOS / WEOS | 1303 | BV | 1221 | 22 | | A | 1324 / 1329 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1317/1323 30/30 |
| P36 / P37 | NAT / SEOS | 1304 | DC | 3210 | 50 | | A | 1436 / 1441 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P37 / P38 | NAT / SEOS | 1307 | DC | 3210 | 51 | | A | 1437 / 1441 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / P19 | EEOS / WEOS | 1308 | BV | 1221 | 22 | | A | 1317 / 1323 | 30 / 30 | RC | KB | P | 06-25-2010 | |

**Sheet Total** 745
**Total to Date** 6,267

**CQA Personnel:** Will Harrison, Kyle Baucom

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06/25/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 14

**Project Total Carry Over** 6,267

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P38 / P39 | NAT / SEOS | 1310 | LN | 1220 | 52 | | A | 1443 / 1448 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / P20 | EEOS / WEOS | 1311 | BV | 1221 | 22 | | A | 1317 / 1323 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P13 / P21 | EEOS / WEOS | 1314 | BV | 1221 | 22 | | A | 1317 / 1323 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1330/1335 30/30 |
| P13 / P22 | EEOS / WEOS | 1317 | BV | 1221 | 22 | | A | 1330 / 1335 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P39 / P40 | NAT / SEOS | 1320 | LN | 1220 | 52 | | A | 1448 / 1453 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P13 / P23 | EEOS / WEOS | 1321 | BV | 1221 | 22 | | A | 1332 / 1337 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P13 / P24 | EEOS / WEOS | 1324 | BV | 1221 | 22 | | A | 1334 / 1339 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1334/1339 30/29 |
| P40 / P41 | NAT / SEOS | 1325 | DC | 3210 | 51 | 13 | A | 1453 / 1458 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / P25 | EEOS / WEOS | 1327 | BV | 1221 | 22 | 16 | A | 1334 / 1339 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P41 / P42 | NAT / SEOS | 1330 | LN | 1220 | 53 | | A | 1456 / 1501 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P42 / P43 | NAT / SEOS | 1330 | DC | 3210 | 53 | | A | 1500 / 1505 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / P26 | EEOS / WEOS | 1330 | BV | 1221 | 22 | | A | 1421 / 1426 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P13 / P27 | EEOS / WEOS | 1333 | BV | 1221 | 22 | | A | 1421 / 1426 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P13 / P28 | EEOS / WEOS | 1336 | BV | 1221 | 22 | | A | 1421 / 1426 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1345/1350 30/29 |
| P13 / P29 | EEOS / WEOS | 1340 | BV | 1221 | 22 | | A | 1345 / 1350 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1346/1351 30/30 |

**Sheet Total** 481
**Total to Date** 6,748

**CQA Personnel:** Will Harrison, Kyle Baucom

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/17/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 14

**Project Total Carry Over** 6,748

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P43 / P44 | NAT / SEOS | 1343 | LN | 1220 | 52 | | A | 1505 / 1510 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / P30 | EEOS / WEOS | 1343 | BV | 1221 | 22 | | A | 1350 / 1355 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P13 / P31 | EEOS / WEOS | 1346 | BV | 1221 | 22 | | A | 1350 / 1355 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1352/1357 30/30 |
| P44 / P45 | NAT / SEOS | 1348 | DC | 3210 | 51 | | A | 1508 / 1513 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P13 / | EEOS / WEOS | 1349 | BV | 1221 | 12 | | A | 1352 / 1357 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P45 / P46 | NAT / SEOS | 1351 | LN | 1220 | 53 | | A | 1518 / 1523 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P32 | SEOS / NWEOS | 1352 | BV | 1221 | 30 | | A | 1400 / 1405 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1432/1437 30/30 L-SHAPED TIE-IN |
| P46 / P47 | NAT / SEOS | 1355 | DC | 3210 | 53 | 14 | A | 1520 / 1525 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P33 | EEOS / WEOS | 1357 | BV | 1221 | 22 | | A | 1432 / 1437 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P7 / P34 | EEOS / WEOS | 1400 | BV | 1221 | 22 | | A | 1432 / 1437 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P35 | EEOS / WEOS | 1403 | BV | 1221 | 22 | | A | 1432 / 1437 | 30 / 30 | RC | KB | P | 06-25-2010 | Z2 1435/1440 30/30 Z3 1450/1455 30/30 |
| P47 / P48 | NAT / SEOS | 1405 | LN | 1220 | 56 | | A | 1523 / 1528 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P48 / P49 | NAT / SEOS | 1405 | DC | 3210 | 55 | | A | 1530 / 1535 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P36 | EEOS / WEOS | 1406 | BV | 1221 | 22 | | A | 1450 / 1455 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P7 / P37 | EEOS / WEOS | 1409 | BV | 1221 | 22 | | A | 1450 / 1455 | 30 / 30 | RC | KB | P | 06-25-2010 | |

**Sheet Total** 516
**Total to Date** 7,264

**CQA Personnel:** Will Harrison, Kyle Baucom

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-25-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 14

**Project Total Carry Over** 7,264

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P7 / P38 | EEOS / WEOS | 1412 | BV | 1221 | 22 | | A | 1450 / 1455 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P49 / P50 | NAT / SEOS | 1413 | DC | 3210 | 55 | | A | 1532 / 1537 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P39 | EEOS / WEOS | 1415 | BV | 1221 | 22 | | A | 1450 / 1455 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P7 / P40 | EEOS / WEOS | 1415 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P50 / P51 | NAT / SEOS | 1416 | LN | 1220 | 55 | | A | 1540 / 1545 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P7 / P41 | EEOS / WEOS | 1421 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P42 | EEOS / WEOS | 1424 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P43 | EEOS / WEOS | 1427 | BV | 1221 | 22 | 15 | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P52 / P53 | NAT / SEOS | 1428 | LN | 1220 | 54 | | A | 1552 / 1557 | 30 / 29 | RC | WH | P | 06-25-2010 | Z2 1550/1555 30/30 |
| P7 / P44 | EEOS / WEOS | 1430 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P45 | EEOS / WEOS | 1433 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P51 / P52 | NAT / SEOS | 1434 | DC | 3210 | 54 | | A | 1542 / 1547 | 30 / 30 | RC | WH | P | 06-25-2010 | |
| P53 / P54 | NAT / SEOS | 1436 | LN | 1220 | 57 | | A | 1555 / 1600 | 30 / 29 | RC | WH | P | 06-25-2010 | |
| P7 / P46 | EEOS / WEOS | 1436 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P47 | EEOS / WEOS | 1439 | BV | 1221 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1535/1540 30/29 |

**Sheet Total** 495
**Total to Date** 7,759

**CQA Personnel:** Will Harrison, Kyle Baucom

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 06-25-2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 14

**Project Total Carry Over** 7,759

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P7 / P48 | EEOS / WEOS | 1442 | BV | 1221 | 22 | | A | 1535 / 1540 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P49 | EEOS / WEOS | 1445 | BV | 1221 | 22 | | A | 1535 / 1540 | 30 / 29 | RC | KB | P | 06-25-2010 | |
| P7 / P50 | EEOS / WEOS | 1448 | BV | 1221 | 22 | | A | 1535 / 1540 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1603/1608 30/30 |
| P7 / P51 | EEOS / WEOS | 1451 | BV | 1221 | 22 | | A | 1603 / 1608 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P7 / P52 | EEOS / WEOS | 1454 | BV | 1221 | 22 | | A | 1603 / 1608 | 30 / 30 | RC | KB | P | 06-25-2010 | |
| P7 / P54 | EEOS / WAT | 1500 | BV | 1221 | 22 | | A | 1605 / 1610 | 30 / 29 | RC | KB | P | 06-25-2010 | Z2 1610/1615 30/30 |
| P7 / P53 | EEOS / WEOS | 1557 | BV | 1221 | 11 | | A | 1403 / 1408 | 30 / 30 | RC | KB | P | 06-25-2010 | |
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**Sheet Total** 143
**Total to Date** 7,902

**CQA Personnel:** Kyle Baucom

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/26/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 8 of 14

**Project Total Carry Over** 7,902

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P55 / P56 | NEOS / SEOS | 754 | LN | 1220 | 231 | | A | 1155 / 1200 | 30 / 30 | RC | KB | P | 06-26-2010 | Z2 1200/1205 30/30<br>Z3 1210/1215 30/30 |
| P56 / P57 | NEOS / SEOS | 800 | DC | 3210 | 231 | 17 | A | 1215 / 1220 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P57 / P58 | NEOS / SEOS | 810 | DC | 3210 | 230 | | A | 1120 / 1125 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P59 / P60 | WEOS / EEOS | 825 | LN | 1220 | 489 | 19 | A | 1020 / 1025 | 30 / 30 | RC | KB | P | 06-26-2010 | Z2 1010/1015 30/29 |
| P8 / P59 | EEOS / WEOS | 826 | BV | 1219 | 87 | | A | 1000 / 1005 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P60 / P61 | EEOS / WEOS | 835 | DC | 3210 | 489 | 20 | A | 1030 / 1035 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P1 / P59 | EEOS / WEOS | 836 | BV | 1219 | 404 | 18 | A | 1025 / 1030 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P61 / P62 | WEOS / EEOS | 902 | DC | 3210 | 489 | 21 | A | 1040 / 1045 | 30 / 29 | RC | KB | P | 06-26-2010 | Z2 1042/1047 30/30 |
| P62 / P63 | WEOS / EEOS | 912 | BV | 1219 | 490 | 22 | A | 1045 / 1050 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P63 / P64 | WEOS / EEOS | 919 | LN | 1220 | 491 | 23 | A | 1050 / 1055 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P64 / P65 | WEOS / EEOS | 927 | DC | 3210 | 491 | 24 | A | 1120 / 1125 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P65 / P66 | WEOS / EEOS | 954 | DC | 3210 | 492 | 25 | A | 1145 / 1150 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P66 / P67 | WEOS / EEOS | 958 | BV | 1219 | 491 | 26 | A | 1142 / 1147 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P67 / P68 | WEOS / EEOS | 1011 | LN | 1220 | 491 | 27 | A | 1145 / 1150 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P8 / P70 | WEOS / T E OF | 1054 | DC | 3210 | 491 | | A | 1310 / 1315 | 30 / 30 | RC | JA | P | 06-26-2010 | |

**Sheet Total** 6,087
**Total to Date** 13,989

**CQA Personnel:** Kyle Baucom, James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/26/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 9 of 14

**Project Total Carry Over** 13,989

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P68 / P69 | WEOS / EEOS | 1108 | LN | 1220 | 495 | 28 | A | 1300 / 1305 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P70 / P71 | WEOS / EEOS | 1112 | DC | 3210 | 179 | | A | 1307 / 1312 | 30 / 29 | RC | KB | P | 06-26-2010 | |
| P71 / P72 | WEOS / EEOS | 1118 | BV | 1219 | 179 | 29 | A | 1313 / 1318 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P72 / P73 | WEOS / EEOS | 1126 | DC | 3210 | 183 | | A | 1320 / 1325 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P73 / P74 | WEOS / EEOS | 1134 | BV | 1219 | 309 | 30 | A | 1326 / 1331 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P74 / P75 | WEOS / EEOS | 1142 | DC | 3210 | 312 | | A | 1342 / 1347 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P75 / P76 | WEOS / EEOS | 1159 | DC | 3210 | 313 | 31 | A | 1328 / 1333 | 30 / 29 | RC | JA | P | 06-26-2010 | |
| P76 / P77 | WEOS / EEOS | 1200 | BV | 1219 | 312 | 32 | A | 1342 / 1347 | 30 / 30 | RC | JA | P | 06-26-2010 | |
| P77 / P78 | EEOS / WEOS | 1318 | DC | 3210 | 313 | | | 1345 / 1350 | 30 / 29 | RC | KB | P | 06-26-2010 | |
| P78 / P79 | WEOS / EEOS | 1335 | DC | 3210 | 309 | 33 | A | 1350 / 1355 | 30 / 29 | RC | KB | P | 06-26-2010 | Z2 1353/1358 30/30 |
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**Sheet Total** 2,904
**Total to Date** 16,893

**CQA Personnel:** Kyle Baucom, James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 10 of 14

**Project Total Carry Over** 16,893

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 / P58 | EEOS / WEOS | 1335 | LN | 1220 | 22 | | A | 745 / 750 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P1 / P57 | EEOS / WEOS | 1339 | LN | 1220 | 22 | | A | 745 / 750 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P1 / P56 | EEOS / WEOS | 1342 | LN | 1220 | 22 | | A | 745 / 750 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P1 / P55 | EEOS / WEOS | 1345 | LN | 1220 | 22 | | A | 745 / 50 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P79 / P80 | WEOS / EEOS | 1348 | BV | 1219 | 309 | 34 | | 717 / 722 | 30 / 29 | RC | KB | P | 06-28-2010 | |
| P58 / P59 | NEOS / SEOS | 1353 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P58 / P60 | NEOS / SEOS | 1357 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P59 / P70 | NEOS / SEOS | 1400 | DC | 3210 | 22 | | A | 1405 / 1410 | 30 / 30 | RC | KB | P | 06-26-2010 | |
| P58 / P61 | NEOS / SEOS | 1400 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P60 / P71 | NEOS / SEOS | 1403 | DC | 3210 | 22 | | A | 1408 / 1413 | 30 / 30 | RC | JA | P | 06-26-2010 | |
| P58 / P62 | NEOS / SEOS | 1403 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P61 / P72 | NEOS / SEOS | 1405 | DC | 3210 | 22 | | A | 1410 / 1415 | 30 / 29 | RC | JA | P | 06-26-2010 | |
| P58 / P63 | NEOS / SEOS | 1406 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P58 / P64 | NEOS / SEOS | 1409 | LN | 1220 | 22 | | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P62 / P73 | NEOS / SEOS | 1410 | DC | 3210 | 22 | | | 700 / 705 | 30 / 29 | RC | KB | P | 06-28-2010 | |

**Sheet Total** 617
**Total to Date** 17,510

**CQA Personnel:** Kyle Baucom, James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 11 of 14

**Project Total Carry Over** 17,510

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P63 / P74 | NEOS / SEOS | 1412 | DC | 3210 | 22 | | A | 702 / 707 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P58 / P65 | NEOS / SEOS | 1412 | LN | 1220 | 22 | 36 | A | 741 / 746 | 30 / 30 | RC | JA | P | 06-28-2010 | Z2 735/740 30/30 Z3 725/730 30/30 |
| P64 / P75 | NEOS / SEOS | 1414 | DC | 3210 | 12 | | A | 704 / 709 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P58 / P66 | NEOS / SEOS | 1415 | LN | 1220 | 22 | | A | 725 / 730 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P65 / P76 | NEOS / SEOS | 1416 | DC | 3210 | 22 | | A | 710 / 715 | 30 / 29 | RC | KB | P | 06-28-2010 | |
| P58 / P67 | NEOS / SEOS | 1418 | LN | 1220 | 22 | | A | 725 / 730 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P66 / P77 | NEOS / SEOS | 1418 | DC | 3210 | 22 | | A | 711 / 716 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P67 / P78 | NEOS / SEOS | 1420 | DC | 3210 | 22 | | A | 714 / 719 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P58 / P68 | NEOS / SEOS | 1421 | LN | 1220 | 22 | | A | 725 / 730 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P68 / P79 | NEOS / SEOS | 1422 | DC | 3210 | 22 | 35 | A | 715 / 720 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P58 / P69 | NEOS / SEOS | 1424 | LN | 1220 | 4 | | A | 705 / 710 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P69 / P8O | NEOS / SEOS | 1424 | DC | 3210 | 4 | | A | 717 / 722 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P73A / P74A | WEOS / EEOS | 1043 | WT | 3211 | 185 | | A | 1102 / 1107 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P74A / P75A | WEOS / EEOS | 1050 | DC | 3210 | 171 | 38 | A | 1106 / 1111 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P75A / P76A | WEOS / EEOS | 1055 | WT | 3211 | 170 | | A | 1116 / 1121 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| | | | | **Sheet Total** | 744 | | | | | | | | | |
| | | | | **Total to Date** | 18,254 | | | | | | | | | |

**CQA Personnel:** Kyle Baucom, James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 12 of 14

**Project Total Carry Over** 18,254

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P76A / P77A | WEOS / EEOS | 1100 | DC | 3210 | 160 | | A | 1118 / 1123 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P77A / P78A | WEOS / EEOS | 1109 | WT | 3211 | 154 | | A | 1124 / 1129 | 30 / 29 | RC | KB | P | 06-28-2010 | |
| P78A / P79A | WEOS / EEOS | 1112 | DC | 3210 | 148 | | A | 1125 / 1130 | 30 / 30 | RC | KB | P | 06-28-2010 | |
| P72A / P73 | WEOS / EEOS | 1129 | WT | 3211 | 126 | | A | 1140 / 1145 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P72A / P73A | WEOS / EEOS | 1139 | WT | 3211 | 187 | | A | 1154 / 1159 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P82 / P83 | NEAT / SWEOS | 1325 | DC | 3210 | 166 | 39 | A | 1418 / 1423 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P83 / P84 | WEOS / EEOS | 1334 | WT | 3211 | 49 | | A | 1428 / 1433 | 30 / 29 | RC | KB | P | 06-28-2010 | |
| P83 / P85 | NEAT / SWEOS | 1334 | WT | 3211 | 143 | | A | 1353 / 1358 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P92 / P93 | SWEOS / NEEPS | 1337 | DC | 3210 | 39 | | A | 1542 / 1548 | 30 / 29 | RC | JA | P | 06-28-2010 | |
| P84 / P85 | NWEOS / SEEOS | 1340 | DC | 3210 | 22 | | A | 1350 / 1355 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P85 / P86 | NEEOS / SWEOS | 1359 | DC | 3210 | 143 | 40 | A | 1440 / 1445 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P13 / P17 | NEOS / SEOS | 1400 | WT | 3211 | 22 | 43 | A | 1405 / 1410 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P12 / P14 | NEOS / SEOS | 1400 | WT | 3211 | 16 | | A | 1408 / 1413 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P11 / P14 | NEOS / SEOS | 1400 | WT | 3211 | 16 | | A | 1409 / 1414 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P11 / P82 | NEOS / SEOS | 1400 | WT | 3211 | 6 | | A | 1412 / 1417 | 30 / 30 | RC | WH | P | 06-28-2010 | |

**Sheet Total** 1,397
**Total to Date** 19,651

**CQA Personnel:** K Baucom, J Addis, W Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 13 of 14

**Project Total Carry Over** 19,651

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P10 / P82 | NEOS / SEOS | 1400 | WT | 3211 | 22 | | A | 1415 / 1420 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P84 / P86 | SWEOS / NEEOS | 1406 | DC | 3210 | 33 | | A | 1430 / 1435 | 30 / 29 | RC | JA | P | 06-28-2010 | |
| P9 / P82 | NEOS / SEOS | 1407 | WT | 3211 | 6 | | A | 1416 / 1421 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P9 / P83 | NEOS / SEOS | 1408 | WT | 3211 | 16 | | A | 1420 / 1425 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P8 / P83 | NEOS / SEOS | 1409 | WT | 3211 | 22 | | A | 1424 / 1429 | 30 / 30 | RC | WH | P | 06-28-2010 | |
| P86 / P87 | NEEOS / SWEOS | 1430 | DC | 3210 | 155 | | A | 1445 / 1450 | 30 / 29 | RC | JA | P | 06-28-2010 | |
| P87 / P88 | NEEOS / SWEOS | 1442 | DC | 3210 | 137 | 41 | A | 1500 / 1505 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P88 / P89 | NEEOS / SWEOS | 1454 | DC | 3210 | 115 | | A | 1505 / 1510 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P89 / P90 | NEEOS / SWEOS | 1516 | DC | 3210 | 98 | | A | 1520 / 1525 | 30 / 29 | RC | JA | P | 06-28-2010 | |
| P90 / P91 | SWEOS / NEEOS | 1520 | DC | 3210 | 81 | | A | 1527 / 1532 | 30 / 30 | RC | JA | P | 06-28-2010 | |
| P91 / P92 | SWEOS / NEEOS | 1533 | DC | 3210 | 64 | | A | 1537 / 1542 | 30 / 29 | RC | JA | P | 06-28-2010 | |
| P93 / P94 | SWEOS / NEEOS | 1541 | DC | 3210 | 24 | | A | 1546 / 1551 | 20 / 29 | RC | JA | P | 06-28-2010 | |
| P71A / P72A | WEOS / EEOS | 1547 | DC | 3210 | 317 | | A | 1555 / 1600 | 30 / 30 | RC | WH | P | 06-28-2010 | Z2 1600/1605 30/29<br>Z3 1605/1610 30/30 |
| P71A / P70 | WEOS / EEOS | 1606 | DC | 3210 | 44 | | A | 1618 / 1623 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P70 | NEOS / SEOS | 1615 | DC | 3210 | 17 | | A | 1623 / 1628 | 30 / 29 | RC | WH | P | 06-28-2010 | |

**Sheet Total** 1,151
**Total to Date** 20,802

**CQA Personnel:** Will Harrison, James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 6/28/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 14 of 14

**Project Total Carry Over** 20,802

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P95 / P71A | WEOS / EEOS | 1620 | DC | 3210 | 284 | | A | 1633 / 1638 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P94 | EEOS / WEOS | 1625 | WT | 3211 | 9 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P93 | EEOS / WEOS | 1626 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P92 | EEOS / WEOS | 1628 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P91 | EEOS / WEOS | 1630 | WT | 3211 | 30 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P90 | EEOS / WEOS | 1633 | WT | 3211 | 30 | 42 | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P89 | EEOS / WEOS | 1635 | WT | 3211 | 30 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P88 | EEOS / WEOS | 1637 | WT | 3211 | 30 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P87 | EEOS / WEOS | 1639 | WT | 3211 | 30 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P86 | EEOS / WEOS | 1644 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P84 | EEOS / WEOS | 1647 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P84 | EEOS / WEOS | 1647 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| P95 / P84 | EEOS / WEOS | 1647 | WT | 3211 | 29 | | A | 1650 / 1655 | 30 / 29 | RC | WH | P | 06-28-2010 | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

**Sheet Total** 617
**Total to Date** 21,419

**CQA Personnel:** William Harrison

# Cell 1 Primary HDPE Geomembrane Destructive Laboratory Test Results

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P1
Tested by: James Addis
Date Tested: 06/28/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 179.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 170.0 | Elongation |
| S5 | 180.0 | Elongation |
| Average | 175.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.9 | |
| Maximum | 180.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 136.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 127.0 | FTB |
| P4A | 141.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 144.0 | FTB |
| P5B | 129.0 | FTB |
| Average | 131.0 | *FTB - Film Tear Bond |
| Standard Deviation | 6.8 | |
| Maximum | 144.0 | |
| Minimum | 123.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P2
Tested by: James Addis
Date Tested: 06/28/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 173.0 | Elongation |
| S2 | 165.0 | Elongation |
| S3 | 167.0 | Elongation |
| S4 | 166.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 169.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 175.0 | |
| Minimum | 165.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 116.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 113.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 113.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 120.6 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 131.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P3
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 174.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 163.0 | Elongation |
| Average | 169.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.8 | |
| Maximum | 174.0 | |
| Minimum | 163.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 111.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 116.0 | FTB |
| P2B | 119.0 | FTB |
| P3A | 148.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 130.0 | FTB |
| P4B | 122.0 | FTB |
| P5A | 132.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 125.4 | *FTB - Film Tear Bond |
| Standard Deviation | 9.8 | |
| Maximum | 148.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P4
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 173.0 | Elongation |
| S2 | 175.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 170.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 173.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 176.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 115.0 | FTB |
| P2B | 113.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 114.0 | FTB |
| P4A | 112.0 | FTB |
| P4B | 121.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 117.0 | FTB |
| Average | 116.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 121.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P5
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 178.0 | Elongation |
| S2 | 180.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 170.0 | Elongation |
| Average | 176.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 180.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 120.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 120.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 115.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 137.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 128.0 | FTB |
| Average | 123.9 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 137.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P6
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 175.0 | Elongation |
| S2 | 173.0 | Elongation |
| S3 | 178.0 | Elongation |
| S4 | 173.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 174.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.8 | |
| Maximum | 178.0 | |
| Minimum | 173.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 134.0 | FTB |
| P1B | 119.0 | FTB |
| P2A | 132.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 126.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 113.0 | FTB |
| P4B | 109.0 | FTB |
| P5A | 116.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 120.5 | *FTB - Film Tear Bond |
| Standard Deviation | 7.6 | |
| Maximum | 134.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P7
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 161.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 166.0 | Elongation |
| S5 | 169.0 | Elongation |
| Average | 166.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 170.0 | |
| Minimum | 161.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 139.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 139.0 | FTB |
| P2B | 133.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 136.0 | FTB |
| P4B | 129.0 | FTB |
| P5A | 125.0 | FTB |
| P5B | 123.0 | FTB |
| Average | 131.1 | *FTB - Film Tear Bond |
| Standard Deviation | 5.6 | |
| Maximum | 139.0 | |
| Minimum | 123.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P8
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 167.0 | Elongation |
| S4 | 167.0 | Elongation |
| S5 | 166.0 | Elongation |
| Average | 167.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 169.0 | |
| Minimum | 166.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 129.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 114.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 117.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 119.0 | FTB |
| P5B | 122.0 | FTB |
| Average | 121.1 | *FTB - Film Tear Bond |
| Standard Deviation | 4.5 | |
| Maximum | 129.0 | |
| Minimum | 114.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P9
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 167.0 | Elongation |
| S2 | 165.0 | Elongation |
| S3 | 166.0 | Elongation |
| S4 | 163.0 | Elongation |
| S5 | 164.0 | Elongation |
| Average | 165.0 | *FTB - Film Tear Bond |
| Standard Deviation | 1.4 | |
| Maximum | 167.0 | |
| Minimum | 163.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 106.0 | FTB |
| P1B | 108.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 108.0 | FTB |
| Average | 113.8 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 127.0 | |
| Minimum | 106.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P10
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 189.0 | Elongation |
| S2 | 189.0 | Elongation |
| S3 | 182.0 | Elongation |
| S4 | 181.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 184.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.6 | |
| Maximum | 189.0 | |
| Minimum | 181.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 144.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 155.0 | FTB |
| P2B | 125.0 | FTB |
| P3A | 126.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 130.0 | FTB |
| P4B | 145.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 144.0 | FTB |
| Average | 135.1 | *FTB - Film Tear Bond |
| Standard Deviation | 10.3 | |
| Maximum | 155.0 | |
| Minimum | 124.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P11
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 165.0 | Elongation |
| S2 | 162.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 169.0 | Elongation |
| S5 | 180.0 | Elongation |
| Average | 169.2 | *FTB - Film Tear Bond |
| Standard Deviation | 6.1 | |
| Maximum | 180.0 | |
| Minimum | 162.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 116.0 | FTB |
| P2B | 121.0 | FTB |
| P3A | 109.0 | FTB |
| P3B | 115.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 132.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 118.8 | *FTB - Film Tear Bond |
| Standard Deviation | 5.7 | |
| Maximum | 132.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P12
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 175.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 164.0 | Elongation |
| S4 | 171.0 | Elongation |
| S5 | 168.0 | Elongation |
| Average | 169.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.6 | |
| Maximum | 175.0 | |
| Minimum | 164.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 137.0 | FTB |
| P2A | 129.0 | FTB |
| P2B | 139.0 | FTB |
| P3A | 135.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 131.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 120.0 | FTB |
| Average | 130.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.3 | |
| Maximum | 139.0 | |
| Minimum | 120.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P13
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 172.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 169.0 | Elongation |
| S5 | 173.0 | Elongation |
| Average | 172.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.4 | |
| Maximum | 176.0 | |
| Minimum | 169.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 121.0 | FTB |
| P1B | 111.0 | FTB |
| P2A | 117.0 | FTB |
| P2B | 133.0 | FTB |
| P3A | 121.0 | FTB |
| P3B | 123.0 | FTB |
| P4A | 118.0 | FTB |
| P4B | 140.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 141.0 | FTB |
| Average | 125.3 | *FTB - Film Tear Bond |
| Standard Deviation | 9.5 | |
| Maximum | 141.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P14
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 175.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 175.0 | Elongation |
| S4 | 172.0 | Elongation |
| S5 | 177.0 | Elongation |
| Average | 173.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.5 | |
| Maximum | 177.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 118.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 114.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 119.3 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 123.0 | |
| Minimum | 114.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P15
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 164.0 | Elongation |
| S2 | 162.0 | Elongation |
| S3 | 168.0 | Elongation |
| S4 | 167.0 | Elongation |
| S5 | 170.0 | Elongation |
| Average | 166.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 170.0 | |
| Minimum | 162.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 131.0 | FTB |
| P1B | 150.0 | FTB |
| P2A | 124.0 | FTB |
| P2B | 133.0 | FTB |
| P3A | 146.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 147.0 | FTB |
| Average | 133.6 | *FTB - Film Tear Bond |
| Standard Deviation | 10.0 | |
| Maximum | 150.0 | |
| Minimum | 121.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P16
Tested by: James Addis
Date Tested: 06/29/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 176.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 175.0 | Elongation |
| S5 | 179.0 | Elongation |
| Average | 175.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 179.0 | |
| Minimum | 172.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 149.0 | FTB |
| P1B | 160.0 | FTB |
| P2A | 149.0 | FTB |
| P2B | 153.0 | FTB |
| P3A | 144.0 | FTB |
| P3B | 172.0 | FTB |
| P4A | 159.0 | FTB |
| P4B | 155.0 | FTB |
| P5A | 166.0 | FTB |
| P5B | 152.0 | FTB |
| Average | 155.9 | *FTB - Film Tear Bond |
| Standard Deviation | 8.1 | |
| Maximum | 172.0 | |
| Minimum | 144.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P17
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 195.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 203.0 | Elongation |
| S4 | 203.0 | Elongation |
| S5 | 202.0 | Elongation |
| Average | 201.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 204.0 | |
| Minimum | 195.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 124.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 107.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 120.0 | FTB |
| P4A | 142.0 | FTB |
| P4B | 76.0 | FTB |
| P5A | 149.0 | FTB |
| P5B | 99.0 | FTB |
| Average | 116.9 | *FTB - Film Tear Bond |
| Standard Deviation | 19.6 | |
| Maximum | 149.0 | |
| Minimum | 76.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P18
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 214.0 | Elongation |
| S2 | 209.0 | Elongation |
| S3 | 208.0 | Elongation |
| S4 | 209.0 | Elongation |
| S5 | 211.0 | Elongation |
| Average | 210.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 214.0 | |
| Minimum | 208.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 117.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 104.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 140.0 | FTB |
| P5A | 104.0 | FTB |
| P5B | 122.0 | FTB |
| Average | 118.4 | *FTB - Film Tear Bond |
| Standard Deviation | 9.9 | |
| Maximum | 140.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | FAIL | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P19
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 211.0 | Elongation |
| S2 | 207.0 | Elongation |
| S3 | 209.0 | Elongation |
| S4 | 213.0 | Elongation |
| S5 | 210.0 | Elongation |
| Average | 210.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 213.0 | |
| Minimum | 207.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 106.0 | FTB |
| P1B | 157.0 | FTB |
| P2A | 94.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 82.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 96.0 | FTB |
| P5A | 119.0 | FTB |
| P5B | 124.0 | FTB |
| Average | 111.9 | *FTB - Film Tear Bond |
| Standard Deviation | 19.4 | |
| Maximum | 157.0 | |
| Minimum | 82.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P20
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 199.0 | Elongation |
| S2 | 206.0 | Elongation |
| S3 | 205.0 | Elongation |
| S4 | 207.0 | Elongation |
| S5 | 208.0 | Elongation |
| Average | 205.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 208.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 103.0 | FTB |
| P2B | 98.0 | FTB |
| P3A | 104.0 | FTB |
| P3B | 105.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 100.0 | FTB |
| P5A | 102.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 108.0 | *FTB - Film Tear Bond |
| Standard Deviation | 8.5 | |
| Maximum | 123.0 | |
| Minimum | 98.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P21
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 209.0 | Elongation |
| S2 | 203.0 | Elongation |
| S3 | 200.0 | Elongation |
| S4 | 202.0 | Elongation |
| S5 | 207.0 | Elongation |
| Average | 204.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 209.0 | |
| Minimum | 200.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 96.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 103.0 | FTB |
| P2B | 106.0 | FTB |
| P3A | 115.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 105.0 | FTB |
| P4B | 100.0 | FTB |
| P5A | 108.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 106.9 | *FTB - Film Tear Bond |
| Standard Deviation | 6.0 | |
| Maximum | 116.0 | |
| Minimum | 96.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P22
Tested by: William Harrison
Date Tested: 07/01/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 210.0 | Elongation |
| S2 | 205.0 | Elongation |
| S3 | 207.0 | Elongation |
| S4 | 206.0 | Elongation |
| S5 | 203.0 | Elongation |
| Average | 206.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.3 | |
| Maximum | 210.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 109.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 77.0 | FTB |
| P2B | 99.0 | FTB |
| P3A | 94.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 104.0 | FTB |
| P4B | 107.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 104.6 | *FTB - Film Tear Bond |
| Standard Deviation | 12.0 | |
| Maximum | 120.0 | |
| Minimum | 77.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P23
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 209.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 202.0 | Elongation |
| S4 | 207.0 | Elongation |
| S5 | 203.0 | Elongation |
| Average | 205.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 209.0 | |
| Minimum | 202.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 104.0 | FTB |
| P1B | 93.0 | FTB |
| P2A | 95.0 | FTB |
| P2B | 107.0 | FTB |
| P3A | 100.0 | FTB |
| P3B | 83.0 | FTB |
| P4A | 109.0 | FTB |
| P4B | 100.0 | FTB |
| P5A | 102.0 | FTB |
| P5B | 103.0 | FTB |
| Average | 99.6 | *FTB - Film Tear Bond |
| Standard Deviation | 7.2 | |
| Maximum | 109.0 | |
| Minimum | 83.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P24
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 200.0 | Elongation |
| S2 | 200.0 | Elongation |
| S3 | 200.0 | Elongation |
| S4 | 199.0 | Elongation |
| S5 | 201.0 | Elongation |
| Average | 200.0 | *FTB - Film Tear Bond |
| Standard Deviation | 0.6 | |
| Maximum | 201.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 130.0 | FTB |
| P1B | 117.0 | FTB |
| P2A | 107.0 | FTB |
| P2B | 121.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 105.0 | FTB |
| P4A | 130.0 | FTB |
| P4B | 113.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 112.0 | FTB |
| Average | 118.4 | *FTB - Film Tear Bond |
| Standard Deviation | 9.4 | |
| Maximum | 133.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P25
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 202.0 | Elongation |
| S2 | 203.0 | Elongation |
| S3 | 208.0 | Elongation |
| S4 | 201.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 203.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.5 | |
| Maximum | 208.0 | |
| Minimum | 201.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 105.0 | FTB |
| P1B | 109.0 | FTB |
| P2A | 133.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 97.0 | FTB |
| P4A | 126.0 | FTB |
| P4B | 108.0 | FTB |
| P5A | 114.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 113.9 | *FTB - Film Tear Bond |
| Standard Deviation | 10.1 | |
| Maximum | 133.0 | |
| Minimum | 97.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P26
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 171.0 | Elongation |
| S2 | 171.0 | Elongation |
| S3 | 172.0 | Elongation |
| S4 | 160.0 | Elongation |
| S5 | 173.0 | Elongation |
| Average | 169.4 | *FTB - Film Tear Bond |
| Standard Deviation | 4.8 | |
| Maximum | 173.0 | |
| Minimum | 160.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 105.0 | FTB |
| P1B | 105.0 | FTB |
| P2A | 103.0 | FTB |
| P2B | 101.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 104.0 | FTB |
| P4A | 103.0 | FTB |
| P4B | 104.0 | FTB |
| P5A | 109.0 | FTB |
| P5B | 122.0 | FTB |
| Average | 107.2 | *FTB - Film Tear Bond |
| Standard Deviation | 6.4 | |
| Maximum | 122.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P27
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 173.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 171.0 | Elongation |
| S5 | 171.0 | Elongation |
| Average | 171.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 173.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 113.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 112.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 111.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 124.0 | FTB |
| Average | 117.5 | *FTB - Film Tear Bond |
| Standard Deviation | 4.8 | |
| Maximum | 124.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P28
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 167.0 | Elongation |
| S2 | 165.0 | Elongation |
| S3 | 168.0 | Elongation |
| S4 | 167.0 | Elongation |
| S5 | 166.0 | Elongation |
| Average | 166.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 168.0 | |
| Minimum | 165.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 125.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 128.0 | FTB |
| P2B | 138.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 122.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 119.0 | FTB |
| P5A | 123.0 | FTB |
| P5B | 117.0 | FTB |
| Average | 124.8 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 138.0 | |
| Minimum | 117.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P29
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 182.0 | Elongation |
| S2 | 178.0 | Elongation |
| S3 | 179.0 | Elongation |
| S4 | 180.0 | Elongation |
| S5 | 183.0 | Elongation |
| Average | 180.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.9 | |
| Maximum | 183.0 | |
| Minimum | 178.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 121.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 124.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 133.0 | FTB |
| P3B | 113.0 | FTB |
| P4A | 100.0 | FTB |
| P4B | 141.0 | FTB |
| P5A | 1116.0 | FTB |
| P5B | 107.0 | FTB |
| Average | 219.2 | *FTB - Film Tear Bond |
| Standard Deviation | 299.1 | |
| Maximum | 1116.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P30
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 176.0 | Elongation |
| S2 | 176.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 176.0 | Elongation |
| Average | 176.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.2 | |
| Maximum | 179.0 | |
| Minimum | 176.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 131.0 | FTB |
| P1B | 131.0 | FTB |
| P2A | 121.0 | FTB |
| P2B | 115.0 | FTB |
| P3A | 117.0 | FTB |
| P3B | 135.0 | FTB |
| P4A | 115.0 | FTB |
| P4B | 111.0 | FTB |
| P5A | 113.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 120.7 | *FTB - Film Tear Bond |
| Standard Deviation | 8.1 | |
| Maximum | 135.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P31
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 175.0 | Elongation |
| S2 | 177.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 176.0 | Elongation |
| Average | 176.2 | *FTB - Film Tear Bond |
| Standard Deviation | 0.7 | |
| Maximum | 177.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 146.0 | FTB |
| P2A | 106.0 | FTB |
| P2B | 100.0 | FTB |
| P3A | 122.0 | FTB |
| P3B | 113.0 | FTB |
| P4A | 110.0 | FTB |
| P4B | 131.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 109.0 | FTB |
| Average | 116.9 | *FTB - Film Tear Bond |
| Standard Deviation | 12.7 | |
| Maximum | 146.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P32
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 176.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 175.0 | Elongation |
| S5 | 177.0 | Elongation |
| Average | 176.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 180.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 114.0 | FTB |
| P1B | 111.0 | FTB |
| P2A | 110.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 126.0 | FTB |
| P3B | 119.0 | FTB |
| P4A | 120.0 | FTB |
| P4B | 113.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 116.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.6 | |
| Maximum | 126.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P33
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 172.0 | Elongation |
| S2 | 174.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 172.0 | Elongation |
| S5 | 171.0 | Elongation |
| Average | 172.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.2 | |
| Maximum | 174.0 | |
| Minimum | 171.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 128.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 111.0 | FTB |
| P4B | 117.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 115.0 | FTB |
| Average | 118.1 | *FTB - Film Tear Bond |
| Standard Deviation | 4.9 | |
| Maximum | 128.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P34
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 175.0 | Elongation |
| S2 | 177.0 | Elongation |
| S3 | 178.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 174.0 | Elongation |
| Average | 176.0 | *FTB - Film Tear Bond |
| Standard Deviation | 1.4 | |
| Maximum | 178.0 | |
| Minimum | 174.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 129.0 | FTB |
| P1B | 117.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 115.0 | FTB |
| P3A | 127.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 111.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 115.0 | FTB |
| Average | 118.1 | *FTB - Film Tear Bond |
| Standard Deviation | 6.1 | |
| Maximum | 129.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P35
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 192.0 | Elongation |
| S2 | 194.0 | Elongation |
| S3 | 195.0 | Elongation |
| S4 | 194.0 | Elongation |
| S5 | 193.0 | Elongation |
| Average | 193.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 195.0 | |
| Minimum | 192.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 149.0 | FTB |
| P1B | 140.0 | FTB |
| P2A | 129.0 | FTB |
| P2B | 130.0 | FTB |
| P3A | 135.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 119.0 | FTB |
| Average | 129.6 | *FTB - Film Tear Bond |
| Standard Deviation | 9.0 | |
| Maximum | 149.0 | |
| Minimum | 119.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P36
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 188.0 | Elongation |
| S2 | 190.0 | Elongation |
| S3 | 192.0 | Elongation |
| S4 | 191.0 | Elongation |
| S5 | 187.0 | Elongation |
| Average | 189.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.9 | |
| Maximum | 192.0 | |
| Minimum | 187.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 138.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 118.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 124.0 | FTB |
| P4B | 133.0 | FTB |
| P5A | 126.0 | FTB |
| P5B | 131.0 | FTB |
| Average | 128.5 | *FTB - Film Tear Bond |
| Standard Deviation | 5.6 | |
| Maximum | 138.0 | |
| Minimum | 118.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Extrusion
Sample: P37
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 190.0 | Elongation |
| S2 | 188.0 | Elongation |
| S3 | 191.0 | Elongation |
| S4 | 191.0 | Elongation |
| S5 | 189.0 | Elongation |
| Average | 189.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.2 | |
| Maximum | 191.0 | |
| Minimum | 188.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 145.0 | FTB |
| P1B | 0.0 | |
| P2A | 131.0 | FTB |
| P2B | 0.0 | |
| P3A | 126.0 | FTB |
| P3B | 0.0 | |
| P4A | 136.0 | FTB |
| P4B | 0.0 | |
| P5A | 129.0 | FTB |
| P5B | 0.0 | |
| Average | 66.7 | *FTB - Film Tear Bond |
| Standard Deviation | 66.9 | |
| Maximum | 145.0 | |
| Minimum | 0.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P38
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 209.0 | Elongation |
| S2 | 211.0 | Elongation |
| S3 | 206.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 210.0 | Elongation |
| Average | 208.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 211.0 | |
| Minimum | 204.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 115.0 | FTB |
| P1B | 110.0 | FTB |
| P2A | 108.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 132.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 121.0 | FTB |
| P5A | 145.0 | FTB |
| P5B | 104.0 | FTB |
| Average | 121.2 | *FTB - Film Tear Bond |
| Standard Deviation | 11.8 | |
| Maximum | 145.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P39
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 205.0 | Elongation |
| S2 | 200.0 | Elongation |
| S3 | 207.0 | Elongation |
| S4 | 203.0 | Elongation |
| S5 | 209.0 | Elongation |
| Average | 204.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.1 | |
| Maximum | 209.0 | |
| Minimum | 200.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 104.0 | FTB |
| P1B | 91.0 | FTB |
| P2A | 108.0 | FTB |
| P2B | 98.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 106.0 | FTB |
| P4A | 113.0 | FTB |
| P4B | 102.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 100.0 | FTB |
| Average | 104.4 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 113.0 | |
| Minimum | 91.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P40
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 210.0 | Elongation |
| S2 | 203.0 | Elongation |
| S3 | 199.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 200.0 | Elongation |
| Average | 203.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.9 | |
| Maximum | 210.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 131.0 | FTB |
| P1B | 109.0 | FTB |
| P2A | 101.0 | FTB |
| P2B | 106.0 | FTB |
| P3A | 111.0 | FTB |
| P3B | 105.0 | FTB |
| P4A | 110.0 | FTB |
| P4B | 91.0 | FTB |
| P5A | 131.0 | FTB |
| P5B | 103.0 | FTB |
| Average | 109.8 | *FTB - Film Tear Bond |
| Standard Deviation | 11.9 | |
| Maximum | 131.0 | |
| Minimum | 91.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P41
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 195.0 | Elongation |
| S2 | 198.0 | Elongation |
| S3 | 200.0 | Elongation |
| S4 | 195.0 | Elongation |
| S5 | 194.0 | Elongation |
| Average | 196.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 200.0 | |
| Minimum | 194.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 114.0 | FTB |
| P2A | 114.0 | FTB |
| P2B | 106.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 106.0 | FTB |
| P4A | 114.0 | FTB |
| P4B | 115.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 103.0 | FTB |
| Average | 111.3 | *FTB - Film Tear Bond |
| Standard Deviation | 4.7 | |
| Maximum | 119.0 | |
| Minimum | 103.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P42
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 196.0 | Elongation |
| S2 | 194.0 | Elongation |
| S3 | 196.0 | Elongation |
| S4 | 192.0 | Elongation |
| S5 | 194.0 | Elongation |
| Average | 194.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.5 | |
| Maximum | 196.0 | |
| Minimum | 192.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 141.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 138.0 | FTB |
| P2B | 130.0 | FTB |
| P3A | 142.0 | FTB |
| P3B | 145.0 | FTB |
| P4A | 146.0 | FTB |
| P4B | 134.0 | FTB |
| P5A | 137.0 | FTB |
| P5B | 128.0 | FTB |
| Average | 135.6 | *FTB - Film Tear Bond |
| Standard Deviation | 8.9 | |
| Maximum | 146.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 1, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P43
Tested by: William Harrison
Date Tested: 07/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 195.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 190.0 | Elongation |
| S4 | 196.0 | Elongation |
| S5 | 197.0 | Elongation |
| Average | 192.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.2 | |
| Maximum | 197.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 104.0 | FTB |
| P1B | 117.0 | FTB |
| P2A | 100.0 | FTB |
| P2B | 102.0 | FTB |
| P3A | 105.0 | FTB |
| P3B | 114.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 105.0 | FTB |
| P5A | 103.0 | FTB |
| P5B | 95.0 | FTB |
| Average | 105.2 | *FTB - Film Tear Bond |
| Standard Deviation | 6.1 | |
| Maximum | 117.0 | |
| Minimum | 95.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

# Cell 1 Primary HDPE Geomembrane Defect Log

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 1 | P1/P2 | 100F WOEEOS | LDT | 06-25-2010 | LDT-1 | 06-28-2010 | JA |
| 2 | P2/P3 | 200F WOEEOS | LDT | 06-25-2010 | LDT-2 | 06-28-2010 | JA |
| 3 | P3/P4 | 300F WOEEOS | LDT | 06-25-2010 | LDT-3 | 06-28-2010 | JA |
| 4 | P4/P5 | 400F WOEEOS | LDT | 06-25-2010 | LDT-4 | 06-28-2010 | JA |
| 5 | P5/P6 | 100F WOEEOS | LDT | 06-25-2010 | LDT-5 | 06-28-2010 | JA |
| 6 | P6/P7 | 200F WPEEOS | LDT | 06-25-2010 | LDT-6 | 06-28-2010 | JA |
| 7 | P9/P10 | 176WOEEOS | LDT | 06-25-2010 | LDT-7 | 06-28-2010 | JA |
| 8 | P11/P12 | 31F WOEEOS | LDT | 06-25-2010 | LDT-8 | 06-28-2010 | JA |
| 9 | P12/P13 | 208F WOEEOS | LDT | 06-25-2010 | LDT-9 | 06-28-2010 | JA |
| 10 | 18/19 | 28FT S OF NAT | O | 06-25-2010 | Burnout | 06-28-2010 | WH |
| 11 | 18/19 | 37 FT S OF NAT | O | 06-26-2010 | Gap | 06-28-2010 | KB |
| 12 | 21/22 | 34 FT S OF NAT | LDT | 06-26-2010 | LDT-10 | 06-28-2010 | KB |
| 13 | 46/47 | 40 FT N OF SEPS | LDT | 06-26-2010 | LDT-14 | 06-28-2010 | KB |
| 14 | 7/43 | 11 FT W OF EEOS | LDT | 06-26-2010 | LDT-15 | 06-28-2010 | KB |
| 15 | 40/41 | 21 FT N OF SEOS | LDT | 06-26-2010 | LDT-13 | 06-28-2010 | KB |
| 16 | 32/33 | 35 FT N OF SEOS | LDT | 06-26-2010 | LDT-12 | 06-28-2010 | KB |
| 17 | 27/28 | 10 FT N OF SEOS | LDT | 06-26-2010 | LDT-11 | 06-28-2010 | KB |
| 18 | 25/13 | 11 FT W OF EEOS | LDT | 06-26-2010 | LDT-16 | 06-28-2010 | KB |
| 19 | 14/15/16 | 15/16 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 20 | 14/16/17 | 16/17 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 21 | 17/18 | SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 22 | 13/18 | 18 FT W OF EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 23 | 13/18/19 | 18/19 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 24 | 19/20/13 | 19/20 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 25 | 20/21/13 | 20/21 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 26 | 21/13 | 3 FT W OF EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 27 | 21/22/13 | 21/22 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 28 | 22/13 | 21 FT W OF EEOS 22/13 | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 29 | 22/23/13 | 22/23 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 30 | 23/24/13 | 23/24 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 31 | 24/13 | 15 FT W OF EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 32 | 24/25/13 | 24/25 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 33 | 25/26/13 | 25/26 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 34 | 26/27/13 | 26/27 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 35 | 27/28/13 | 27/28 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 36 | 28/13 | 6 FT W OF EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 37 | 28/29/13 | 29/20 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 38 | 29/13 | 11 FT W OC EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 39 | 29/30/13 | 29/30 SEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 40 | 30/31/13 | 30/31 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 41 | 31/13 | 4 FT W OF EEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 42 | 31/32/13 | 31/32 SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | KB |
| 43 | 31/32 | 24 FT N OF SEOS | O | 06-26-2010 | Burnout | 06-28-2010 | KB |
| 44 | P6/P7/P13/P32 | WEO P32/13 E-W SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 45 | P32/P7 | EEO E-W SEAM P32/P7 | O | 06-26-2010 | Corner Cut Fix at E-W and N-S Corner Seam Intersection | 06-28-2010 | WH |
| 46 | P32/P33/P7 | SEO P32/33 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 47 | P33/P34/P7 | SEO 33/34 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 48 | P33/P34 | 26F NOSEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 49 | P34/P35/P7 | SEO 34/35 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 50 | P7/P35 | 12F WOEEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 51 | P35/P36/P7 | SEOS | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 52 | P36/P37/P7 | SEO 36/37 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 53 | P37/P38/P7 | SEO P37/P38 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 54 | P37/P38 | 12F NOSEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 55 | P38/P39/P7 | SEO 38/39 SEAM | T | 06-26-2010 | Tie-In | 06-28-2010 | WH |
| 56 | P39/P40/P7 | SEO 39/40 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 57 | P40/P41/P7 | SEO 40/41 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 58 | P41/P42/P7 | SEO 41/42 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 59 | P42/P43/P7 | SEO 42/43 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 60 | P43/P44/P7 | SEO 43/44 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 61 | P44/P45/P7 | SEO 44/45 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 62 | P45/P46/P7 | SEO 45/46 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 63 | P46/P47/P7 | SEO 46/47 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 64 | P47/P7 | 3F WOEEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 65 | P47/P48/P7 | SEO 47/48 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 66 | P48/P49/P7 | SEO 48/49 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 67 | P49/P50/P7 | SEO 49/50 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 68 | P50/P7 | 3F WOEEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 69 | P50/P51/P7 | SEO 50/51 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 70 | P51/P52/P7 | SEO 51/52 SEAM | T | 06-26-2010 | Tie-In Corner | 06-28-2010 | WH |
| 71 | P52/P53/P7 | SEO 52/53 SEAM | T | 06-26-2010 | Tie-In | 06-28-2010 | WH |
| 72 | P52/P53 | 38F NOSEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 73 | P53/P54/P7 | SEO 53/54 SEAM | O | 06-26-2010 | Burnout and Tie-In Corner | 06-28-2010 | WH |
| 74 | P54/P7 | 8F WOEEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 75 | P5/P6/P12/P13 | EEO 5/6 SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |
| 76 | P4/P5/P11/P12 | EEO 4/5 SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |
| 77 | P4/P11 | 9F WONEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 78 | P3/P4/P10/P11 | EEO 3/4 SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |
| 79 | P2/P3/P9/P10 | EEO 2/3 SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |
| 80 | P1/P2/P8/P9 | EEO 1/2 SEAM | O | 06-26-2010 | 4 Panel Intersection Patch | 06-28-2010 | WH |
| 81 | P1/P8 | 4F SONEOS | O | 06-26-2010 | Burnout | 06-28-2010 | WH |
| 82 | P56/P57 | 170F SONEOS | LDT | 06-26-2010 | LDT-17 | 06-28-2010 | WH |
| 83 | P1/P59 | 100F EOWEOS | LDT | 06-26-2010 | LDT-18 | 06-28-2010 | WH |
| 84 | P59/P60 | 200F EOWEOS | LDT | 06-26-2010 | LDT-19 | 06-28-2010 | WH |
| 85 | P60/P61 | 300F EOWEOS | LDT | 06-26-2010 | LDT-20 | 06-28-2010 | WH |
| 86 | P61/62 | 400F EOWEOS | LDT | 06-26-2010 | LDT-21 | 06-28-2010 | WH |
| 87 | P62/P63 | 100F EOWEOS | LDT | 06-26-2010 | LDT-22 | 06-28-2010 | WH |
| 88 | P63/P64 | 200F EOWEOS | LDT | 06-26-2010 | LDT-23 | 06-28-2010 | WH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 89 | P64/P65 | 300F EOWEOS | LDT | 06-26-2010 | LDT-24 | 06-28-2010 | WH |
| 90 | P65/P66 | 400F EOWEOS | LDT | 06-26-2010 | LDT-25 | 06-28-2010 | WH |
| 91 | P66/P67 | 100F EOWEOS | LDT | 06-26-2010 | LDT-26 | 06-28-2010 | WH |
| 92 | P67/P68 | 200F EOWEOS | LDT | 06-26-2010 | LDT-27 | 06-28-2010 | WH |
| 93 | P68/P69 | 300F EOWEOS | LDT | 06-26-2010 | LDT-28 | 06-28-2010 | WH |
| 94 | P71/P72 | 46F EOWEOS | LDT | 06-28-2010 | LDT-29 | 06-28-2010 | WH |
| 95 | P73/P74 | 184F EOWEOS | LDT | 06-28-2010 | LDT-30 | 06-28-2010 | WH |
| 96 | P75/P76 | 65F EOWEOS | LDT | 06-28-2010 | LDT-31 | 06-28-2010 | WH |
| 97 | P76/P77 | 252F EOWEOS | LDT | 06-28-2010 | LDT-32 | 06-28-2010 | WH |
| 98 | P78/P79 | 105F EOWEOS | LDT | 06-28-2010 | LDT-33 | 06-28-2010 | WH |
| 99 | P79/P80 | 230F EOWEOS | LDT | 06-28-2010 | LDT-34 | 06-28-2010 | WH |
| 100 | P68/P79 | 11F SONEOS | LDT | 06-28-2010 | LDT-35 | 06-28-2010 | WH |
| 101 | P65/P58 | 11F SONEOS | LDT | 06-28-2010 | LDT-36 | 06-28-2010 | WH |
| 102 | P55/P56/P1 | NEO P55/P56 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 103 | P56/P57/P1 | NEO P56/P57 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 104 | P57/P58/P1 | NEO P57/P58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 105 | P58/P59/P1 | NEO P58/P59 Seam | B | 06-28-2010 | Patch at Tie-In Corner | 06-28-2010 | WH |
| 106 | P55/P56 | 87F SONEOS | O | 06-28-2010 | Patch Burnout | 06-28-2010 | WH |
| 107 | P55/P56 | 111F SONEOS | O | 06-28-2010 | Burnout | 06-28-2010 | WH |
| 108 | P68/P69/P58 | SEO 58/68 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 109 | P67/P68/P58 | SEO 58/67 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 110 | P66/P67/P58 | SEO 58/66 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 111 | P65/P66/P58 | SEO 65/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 112 | P65/P58 | 3F SONEOS | O | 06-28-2010 | Burnout | 06-28-2010 | WH |
| 113 | P65/P64/P58 | SEO 64/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 114 | P63/P64/P58 | SEO 63/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 115 | P62/P63/P58 | SEO 62/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 116 | P62/P61/P58 | SEO 61/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 117 | P60/P61/P58 | SEO 60/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 118 | P59/P60/P58 | SEO 59/58 Seam | T | 06-28-2010 | Tie-In Corner | 06-28-2010 | WH |
| 119 | P1/P8/P59 | EEO 1/59 Seam | O | 06-28-2010 | Patch at Tie-In Corner | 06-28-2010 | WH |
| 120 | P8/P59/P70 | EEO 8/59 Seam | O | 06-28-2010 | Patch at Tie-In Corner | 06-28-2010 | WH |
| 121 | P59/P70 | 1F WO Seam in Panel @ 3F NOSEOS | O | 06-28-2010 | Patch at Pull Holes | 06-28-2010 | WH |
| 122 | P59/P70/P60/P71 | NEO 60/71 Seam | O | 06-28-2010 | Patch at 4 Panel Corner and Burnout | 06-28-2010 | WH |
| 123 | P60/P71/P61/P72 | NEO 61/72 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 124 | P61/P72 | 4F EO 4F NOSEO 61/72 Seam | O | 06-28-2010 | Hole Patch | 06-28-2010 | WH |
| 125 | P61/P72/P62/P73 | NEO 62/73 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 126 | P62/P73/P63/P74 | NEO 63/74 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 127 | P63/P74/P64/P75 | NEO 64/75 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 128 | P64/P75/P65/P76 | NEO 65/76 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 129 | P65/P76/P66/P77 | NEO 66/77 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 130 | P66/P77/P67/P78 | NEO 67/78 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 131 | P67/P78/P68/P79 | NEO 68/79 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 132 | P68/P79/P69/P80 | NEO 69/80 Seam | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 133 | P59/P60 | 63F EOWEOS | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 134 | P78/P79 | 90F WOEEOS | O | 06-28-2010 | Patch at 4 Panel Corner | 06-28-2010 | WH |
| 135 | P76/PR-97 | North Side of PR-97 Patch | LDT | 06-28-2010 | LDT - 37 | 06-28-2010 | WH |
| 136 | P61/P62 | 398F EOWEOS | O | 06-28-2010 | Burnout | 06-28-2010 | WH |
| 137 | P72/P73/P72A | 180F EOWEOS | O | 06-29-2010 | BURNOUT | 06-29-2010 | TB |
| 138 | P71/P72/P71A/P72A | 178F EOWEOS | O | 06-29-2010 | BURNOUT | 06-29-2010 | TB |
| 139 | P70/P71/P71A | 175F EOWEOS | O | 06-29-2010 | BURNOUT | 06-29-2010 | TB |
| 140 | P8/P70 | 180F EOWEOS | O | 06-29-2010 | BURNOUT | 06-29-2010 | TB |
| 141 | P8/P70/P95 | NEOS P70/P95 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 142 | P70/P95/71A | SEOS P70/P95 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 143 | P8/P83/P84/P95 | SEOS P8/P83 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 144 | P72A/P73/P73A | 172F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 145 | P71A/P72A | 139F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 146 | P71A/P72A | 154F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 147 | P73/P74/P73A/P74A | 306F EOWEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 148 | P74/P75/P74A/P75A | 169F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 149 | P75/P76/P75A/P76A | 310F EOWEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 150 | P76/P77/P76A/P77A | 159F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 151 | P77/P78/P77A/P78A | 307F EOWEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 152 | P78/P79/P78A/P79A | 142F WOEEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 153 | P79/P80/P81/P79A | NEOS P81/P80 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 154 | P74A/P75A | 64F WOEAT | LDT | 06-29-2010 | LDT-38 | 06-29-2010 | TB |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis / Kyle Baucom

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 8 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 155 | P71A/P95 | EEOS | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 156 | P17/P13 | 9F NO P12 | LDT | 06-29-2010 | LDT-43 | 06-29-2010 | TB |
| 157 | P12/P13/P17/P14 | EEOS P12/P13 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 158 | P11/P12/P14 | EEOS P11/P12 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 159 | P11/P14/P82 | SWEOS P14/P82 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 160 | P10/P11/P82 | EEOS P10/P11 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 161 | P9/P10/P82 | EEOS P9/P10 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 162 | P9/P82/P83 | SWEOS P14/P82 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 163 | P8/P9/P83 | EEOS P8/P9 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| 164 | P84/P86/P95 | SWEOS P84/P86 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 165 | P86/P87/P95 | SWEOS P86/P87 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 166 | P87/P88/P95 | SWEOS P87/P88 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 167 | P88/P89/P95 | SWEOS P88/P89 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 168 | P89/P90/P95 | SWEOS P89/P90 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 169 | P90/P95 | 12F EOWEOS | LDT | 06-29-2010 | LDT-42 | 06-29-2010 | TB |
| 170 | P90/P91/P95 | SWEOS P90/P91 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 171 | P91/P92/P95 | SWEOS P91/P92 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 172 | P92/P93/P95 | SWEOS P92/P93 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 173 | P93/P94/P95 | SWEOS P93/P94 | O | 06-29-2010 | T-INTERSECTION | 06-29-2010 | TB |
| 174 | P87/P88 | 51F SWONEEOS | LDT | 06-29-2010 | LDT-41 | 06-29-2010 | TB |
| 175 | P85/P86 | 95F SWONEEOS | LDT | 06-29-2010 | LDT-40 | 06-29-2010 | TB |
| 176 | P84/P85/P86 | SEEOS P84/P85 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 9 of 9

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| **177** | P83/P84/P85 | NWEOS P84/P85 | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| **178** | P82/P83 | 29F NEOSWEOS | LDT | 06-29-2010 | LDT-39 | 06-29-2010 | TB |
| **179** | P14/P15 | NAT | O | 06-29-2010 | PATCH | 06-29-2010 | TB |
| **180** | P95 | SKIRT FOR BOOT | O | 06-29-2010 | SKIRT FOR BOOTS | 06-29-2010 | TB |
| **181** | P95 | BOOT AT NAT | O | 06-29-2010 | 18" PIPE BOOT | 06-29-2010 | TB |
| **182** | P95 | BOOT AT NAT | O | 06-29-2010 | 10" PIPE BOOT | 06-29-2010 | TB |
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Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William Harrison

# Cell 1 Primary HDPE Geomembrane Repair Testing Log

SAMPLE

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | P | 5 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 2 | P | 4 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 3 | P | 4.5 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 4 | P | 4.5 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 5 | P | 5 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 6 | P | 5 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 7 | P | 4 FT x 2 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 8 | P | 4 FT x 1.5 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 9 | P | 4 FT x 1.5 FT | JT | JA | 06-28-2010 | VB | HG | JA | P | 06-28-2010 | |
| 10 | P | 3 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 11 | P | 4.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 12 | P | 4.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 13 | P | 4.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 14 | P | 4 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 15 | P | 5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 16 | P | 7 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 17 | P | 5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 18 | P | 6 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 19 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 20 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 21 | P | 3 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 22 | P | 3 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** W Harrison, K Baucom, J Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 24 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 25 | P | 5.5 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | 25 and 26 Repaired with 1 Patch |
| 26 | P | 5.5 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | 25 and 26 Repaired with 1 Patch |
| 27 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 28 | P | 3.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | 28 and 29 Repaired with 1 Patch |
| 29 | P | 3.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | 28 and 29 Repaired with 1 Patch |
| 30 | P | 2.5 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 31 | P | 2.5 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 32 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 33 | P | 4 FT x 1.5 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 34 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 35 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 36 | P | 3 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 37 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 38 | P | 3.5 FT x 3 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 39 | P | 5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 40 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 41 | P | 3.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 42 | G&W | 6 IN x 6 IN x 6 IN | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 43 | P | 4.5 FT x 2 FT | JT | KB | 06-28-2010 | VB | HG | KB | P | 06-28-2010 | |
| 44 | P | 2.5 FT x 3 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** Will Harrison, Kyle Baucom

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | P | 3.5 FT x 2.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 46 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 47 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 48 | P | 3 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 49 | P | 4 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 50 | P | 2 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 51 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 52 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 53 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 54 | P | 2.5 FT x 1 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 55 | G&W | 6 IN x 6 IN x 1' | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 56 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 57 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 58 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 59 | G&W | 6 IN x 6 IN x 1' | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 60 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 61 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 62 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 63 | G&W | 6 IN x 6 IN x 2' | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 64 | P | 3 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 65 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 66 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** Will Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | G&W | 6 IN x 6 IN x 2' | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 68 | P | 3 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 69 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 70 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 71 | G&W | 6 IN x 6 IN x 6 IN | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 72 | P | 6.5 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 73 | P | 3.5 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 74 | P | 3 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 75 | P | 4 FT x 4 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 76 | P | 3 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 77 | P | 2.5 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 78 | P | 3 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 79 | P | 3 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 80 | P | 3 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 81 | P | 2 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 82 | P | 4.5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 83 | P | 4 FT x 2 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 84 | P | 4 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 85 | P | 4 FT x 2 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 86 | P | 5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 87 | P | 4.5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 88 | P | 4.5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | P | 4 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 90 | P | 4 FT x 2 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 91 | P | 4 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 92 | P | 5 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 93 | P | 5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 94 | P | 5 FT x 2 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 95 | P | 5 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 96 | P | 5.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 97 | P | 5 FT x 2 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 98 | P | 5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 99 | P | 5 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 100 | P | 4.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 101 | P | 6 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 102 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 103 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 104 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 105 | P | 2.5 FT x 2 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 106 | P | 3 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 107 | P | 1.5 FT x 1 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 108 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 109 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 110 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 112 | P | 3 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 113 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 114 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 115 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 116 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 117 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 118 | G&W | 6 IN x 6 IN x 6 IN | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 119 | P | 3 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 120 | P | 2 FT x 4 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 121 | P | 2.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 122 | P | 6 FT x 2.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 123 | P | 2.5 FT x 2.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 124 | P | 3 FT x 1 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 125 | P | 7.5 FT x 5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 126 | P | 3 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 127 | P | 5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 128 | P | 2.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 129 | P | 3.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 130 | P | 2.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 131 | P | 2 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 132 | P | 1.5 FT x 1.5 FT | DC | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | P | 2 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 134 | P | 3.5 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 135 | P | 4 FT x 1.5 FT | JT | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 136 | P | 3.5 FT x 1.5 FT | MV | WH | 06-28-2010 | VB | HG | WH | P | 06-28-2010 | |
| 137 | P | 3 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 138 | P | 4.5 FT X 3.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 139 | P | 4.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 140 | P | 3.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 141 | P | 3.5 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 142 | P | 5.5 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 143 | P | 6.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 144 | P | 2.5 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 145 | P | 7 FT X 2 FT | MV | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 146 | P | 7 FT X 2 FT | MV | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 147 | P | 3.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 148 | P | 4.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 149 | P | 3 FT X 2.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 150 | P | 5 FT X 4 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 151 | P | 3.5 FT X 2.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 152 | P | 6 FT X 3.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 153 | P | 8 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 154 | P | 5 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** Will Harrison, Travis Bowman

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 8 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | P | 12 FT X 4.5 FT | MV | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 156 | P | 5 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 157 | P | 7 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 158 | P | 2.5 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 159 | P | 5 FT X 4 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 160 | P | 3 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 161 | P | 2.5 FT X 2.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 162 | P | 5.5 FT X 3 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 163 | P | 3.5 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 164 | G&W | 1.5 FT X 6 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 165 | G&W | 1.5 FT X 8 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 166 | G&W | 1.5 FT X 6 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 167 | G&W | 1.5 FT X 6 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 168 | G&W | 1.5 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 169 | P | 6 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 170 | G&W | 1.5 FT X 1 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 171 | G&W | 1.5 FT X 10 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 172 | G&W | 1.5 FT X 8 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 173 | G&W | 1.5 FT X 6 IN | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 174 | P | 4.5 FT X 2.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 175 | P | 4 FT X 2 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 176 | P | 2 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** Travis Bowman

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 1, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 9 of 9

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 177 | P | 2.5 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 178 | P | 6 FT X 1.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 179 | P | 5 FT X 2.5 FT | JT | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 180 | P | 12 FT X 7 FT | MV | TB | 06-29-2010 | VB | HG | TB | P | 06-29-2010 | |
| 181 | BOOT | 18" BOOT | DC | JA | 7/30/2010 | SP | JHA | JA | P | 7/30/2010 | TESTED WITH CELL 2 BOOTS |
| 182 | BOOT | 10" BOOT | DC | JA | 7/30/2010 | SP | JHA | JA | P | 7/30/2010 | TESTED WITH CELL 2 BOOTS |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis, Travis Bowman

# APPENDIX II – GEOSYNTHETICS
# Section 7 – Cell 2 Secondary HDPE Geomembrane CQA Forms

**Subgrade Certification Forms**
**Geomembrane Deployment Report**
**Geomembrane Trial Seam Log**
**Geomembrane Seam Log**
**Destructive Laboratory Test Results**
**Geomembrane Defect Log**
**Geomembrane Repair Testing Log**

S&ME

# Cell 2 Secondary HDPE Geomembrane Subgrade Certification Forms

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Steam Plant Industrial LF # 2 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC.

**AREA ACCEPTED:** PANEL- 01 THRU. PANEL- 09

**PANEL NUMBERS:** PANEL - 01 THRU. PANEL- 09

**GRADE ACCEPTANCE: INSPECTOR:** SAME(WILLIAM [illegible])

**GENERAL CONTRACTOR:** EARNHARDT GRADING,INC.(WILSON WARLICK)

**OWNER:** [illegible]

**AUTHORIZED REPRESENTATIVE:** DARRELL WOLFE(DUKE)

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 20-Jul and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 20-Jul |

## OWNER REPRESENTATIVE:

| Signature | Title | DATE |
|---|---|---|
| [illegible] | Project Engineer | 20-Jul-2010 |

7943 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2706 ~ FAX 225-291-2708

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Steam Plant Industrial LF # 2 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC.

**AREA ACCEPTED:** PANEL- 10 THRU. PANEL- 20

**PANEL NUMBERS:** PANEL - 10 THRU. PANEL- 20

**GRADE ACCEPTANCE: INSPECTOR:** [illegible]

**GENERAL CONTRACTOR:** EARNHARDT GRADING,INC.(WILSON WARLICK)

**OWNER:** Darrell L. Wolfe

**AUTHORIZED REPRESENTATIVE:** DARRELL WOLFE(DUKE)

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 21-Jul and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 21-Jul |

## OWNER REPRESENTATIVE:

| Signature | Title | DATE |
|---|---|---|
| [illegible] | Owners Engineer | 21-Jul-2010 |

7943 PECUE LANE SUITE A - BATON ROUGE, LA 70809 - PHONE 225-201-0700 - FAX 225-201-2714

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Steam Plant Industrial LF # 2 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC.

**AREA ACCEPTED:** PANEL- 21 THRU. PANEL- 38

**PANEL NUMBERS:** PANEL - 21 THRU. PANEL- 38

**GRADE ACCEPTANCE: INSPECTOR:** HAME(WILLIAM M. HARRIS

**GENERAL CONTRACTOR:** EARNHARDT GRADING,INC.(WILSON WARLICK)

**OWNER:** Darrell S. Wolfe

**AUTHORIZED REPRESENTATIVE:** DARRELL WOLFE(DUKE)

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 22-Jul and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Mohammed Malimar M | SUPERINTENDENT | 22-Jul |
|---|---|---|
| ***Signature*** | ***Title*** | ***DATE*** |

## OWNER REPRESENTATIVE:

| Will N. Harris | Owner's Engineer | 22-Jul-201 |
|---|---|---|
| ***Signature*** | ***Title*** | ***DATE*** |

7942 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70809 ~ PHONE 225-291-2700 ~ FAX 225-291-3788

# CERTIFICATE OF SUBGRADE SURFACE ACCEPTANCE

**INSTALLER:** ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.

**PROJECT NAME:** Duke Energy Marshall Steam Plant Industrial LF # 2 **PROJECT NO:** 10 - 01 - 1001

**LOCATION:** Terrell,NC.

**AREA ACCEPTED:** PANEL- 39 THRU. PANEL- 58

**PANEL NUMBERS:** PANEL - 39 THRU. PANEL- 58

**GRADE ACCEPTANCE: INSPECTOR:** [illegible]

**GENERAL CONTRACTOR:** EARNHARDT GRADING,INC.(WILSON WARLICK)

**OWNER:** Darrell B. Wolfe

**AUTHORIZED REPRESENTATIVE:** DARRELL WOLFE(DUKE)

The undersigned, MOHAMMED MALIMAR ,certifies that he/she is a representative of Environmental Specialties International, Inc. authorized to execute this certificate, that he/she has visually inspected the subgrade surface described above on 23-Jul and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observation of the surface of the subgrade only. No subsurface inspections or test have been performed and Environmental Specialties International, Inc. makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

**AUTHORIZED REPRESENTATIVE OF ENVIRONMENTAL SPECIALTIES INTERNATIONAL, INC.**

| Signature | Title | DATE |
|---|---|---|
| Mohammed Malimar A. | SUPERINTENDENT | 23-Jul |

## OWNER REPRESENTATIVE:

| Signature | Title | DATE |
|---|---|---|
| [illegible] | Owners Engineer | 23-Jul-2010 |

7043 PECUE LANE SUITE A ~ BATON ROUGE, LA. 70805 ~ PHONE 225-291-3700 ~ FAX 225-291-3701

# Cell 2 Secondary HDPE Geomembrane Deployment Report

S&ME

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 7/20-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 2

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Carry Over | ----- | ----- | | |
| S1 | 211315 | 502 | 22 | 11,044 | 0 | WH | 7/20/10 |
| S2 | 211212 | 499 | 22 | 10,978 | 0 | WH | 7/20/10 |
| S3 | 218716 | 500 | 22 | 11,000 | 0 | WH | 7/20/10 |
| S4 | 218727 | 502 | 22 | 11,044 | 0 | WH | 7/20/10 |
| S5 | 211316 | 500 | 22 | 11,000 | 0 | WH | 7/20/10 |
| S6 | 211681 | 500 | 22 | 11,000 | 0 | WH | 7/20/10 |
| S7 | 211446 | 501 | 22 | 11,022 | 0 | WH | 7/20/10 |
| S8 | 211444 | 500 | 22 | 11,000 | 0 | WH | 7/20/10 |
| S9 | 219118 | 499 | 22 | 10,978 | 0 | WH | 7/20/10 |
| S10 | 211795 | 501 | 22 | 11,022 | 0 | WH | 7/21/10 |
| S11 | 218723 | 502 | 22 | 11,044 | 0 | WH | 7/21/10 |
| S12 | 218608 | 502 | 22 | 11,044 | 0 | WH | 7/21/10 |
| S13 | 219108 | 504 | 22 | 11,088 | 0 | WH | 7/21/10 |
| S14 | 211552 | 501 | 22 | 11,022 | 0 | WH | 7/21/10 |
| S15 | 219116 | 502 | 22 | 11,044 | 0 | WH | 7/21/10 |
| S16 | 219107 | 504 | 22 | 11,088 | 0 | WH | 7/21/10 |
| S17 | 218713 | 502 | 22 | 11,044 | 0 | WH | 7/21/10 |
| S18 | 218695 | 503 | 22 | 11,066 | 0 | WH | 7/21/10 |
| S19 | 219109 | 504 | 22 | 11,088 | 0 | WH | 7/21/10 |
| S20 | 211667 | 500 | 8 | 4,000 | 0 | WH | 7/21/10 |
| S21 | 211554 | 434 | 22 | 9,548 | 0 | WH | 7/22/10 |
| S22 | 219113 | 436 | 22 | 9,592 | 0 | WH | 7/22/10 |
| S23 | 218731 | 435 | 22 | 9,570 | 0 | WH | 7/22/10 |
| S24 | 211675 | 435 | 22 | 9,570 | 0 | WH | 7/22/10 |
| S25 | 219115 | 436 | 22 | 9,592 | 0 | WH | 7/22/10 |
| S26 | 219112 | 433 | 22 | 9,526 | 0 | WH | 7/22/10 |
| S27 | 219101 | 434 | 22 | 9,548 | 0 | WH | 7/22/10 |
| S28 | 211439 | 430 | 22 | 9,460 | 0 | WH | 7/22/10 |
| S29 | 219221 | 383 | 22 | 8,426 | 0 | WH | 7/22/10 |
| | | | **Sheet Total** | 298,448 | 0 | | |
| | | | **Total to Date** | 298,448 | 0 | | |

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 7/20-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 2

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 298,448 | 0 | | |
| S30 | 211670 | 81 | 22 | 1,782 | 0 | WH | 7/22/10 |
| S31 | 211670 | 84 | 22 | 1,848 | 0 | WH | 7/22/10 |
| S32 | 211670 | 90 | 22 | 1,980 | 0 | WH | 7/22/10 |
| S33 | 211670 | 96 | 22 | 2,112 | 0 | WH | 7/22/10 |
| S34 | 211670 | 103 | 22 | 2,266 | 0 | WH | 7/22/10 |
| S35 | 211436 | 113 | 22 | 2,486 | 0 | WH | 7/22/10 |
| S36 | 211436 | 118 | 22 | 2,596 | 0 | WH | 7/22/10 |
| S37 | 211436 | 120 | 22 | 2,640 | 0 | WH | 7/22/10 |
| S38 | 211436 | 52 | 22 | 572 | 0 | WH | Triangular Section 7/22/10 |
| S39 | 218593 | 375 | 22 | 8,250 | 0 | WH | 7/23/10 |
| S40 | 218598 | 116 | 22 | 2,552 | 0 | WH | 7/23/10 |
| S41 | 218718 | 114 | 22 | 2,508 | 0 | WH | 7/23/10 |
| S42 | 218718 | 71 | 4 | 284 | 0 | WH | 7/23/10 |
| S43 | 211675 | 66 | 22 | 1,452 | 0 | WH | 7/23/10 |
| S44 | 219731 | 67 | 22 | 1,474 | 0 | WH | 7/23/10 |
| S45 | 219112 | 63 | 22 | 1,386 | 0 | WH | 7/23/10 |
| S46 | 219112 | 66 | 22 | 1,452 | 0 | WH | 7/23/10 |
| S47 | 211554 | 63 | 22 | 1,386 | 0 | WH | 7/23/10 |
| S48 | 219113 | 68 | 22 | 1,496 | 0 | WH | 7/23/10 |
| S49 | 218725 | 504 | 22 | 11,088 | 0 | WH | 7/23/10 |
| S50 | 212102 | 500 | 22 | 11,000 | 0 | WH | 7/23/10 |
| S51 | 211702 | 502 | 22 | 11,044 | 0 | WH | 7/23/10 |
| S52 | 211700 | 502 | 22 | 11,044 | 0 | WH | 7/23/10 |
| S53 | 211798 | 483 | 22 | 10,626 | 0 | WH | 7/23/10 |
| S54 | 211318 | 480 | 22 | 10,560 | 0 | WH | 7/23/10 |
| S55 | 218732 | 470 | 22 | 10,340 | 0 | WH | 7/23/10 |
| S56 | 211332 | 464 | 22 | 10,208 | 0 | WH | 7/23/10 |
| S57 | 211667 | 476 | 3 | 1,428 | 0 | WH | 7/23/10 |
| S58 | 211665 | 107 | 22 | 2,354 | 0 | WH | 7/23/10 |
| | | | **Sheet Total** | 130,214 | 0 | | |
| | | | **Total to Date** | 428,662 | 0 | | |

**CQA Personnel:** William M. Harrison

# Cell 2 Secondary HDPE Geomembrane Trial Seam Log

S&ME

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| S1 | 1334 | DC | 3210 | 88 | 30 | 860 | 128 | 122 | 119 | 126 | 124 | 126 | 152 | 161 | 168 | P | F | SS | WH | 7/20/10 |
| S2 | 1339 | WT | 3211 | 88 | 30 | 860 | 116 | 132 | 126 | 133 | 124 | 128 | 147 | 149 | 152 | P | F | SS | WH | 7/20/10 |
| S3 | 1345 | BV | 1220 | 88 | 4 | 860 | 118 | 126 | 119 | 124 | 132 | 136 | 147 | 152 | 158 | P | F | ST | WH | 7/20/10 |
| S4 | 735 | JT | 5171 | 73 | 500 | 550 | 110 | 0 | 112 | 0 | 115 | 0 | 149 | 151 | 156 | P | Ex | TT | WH | 7/21/10 |
| S5 | 1240 | DC | 3210 | 84 | 30 | 860 | 109 | 117 | 105 | 122 | 118 | 114 | 146 | 152 | 140 | P | F | SS | WH | 7/21/10 |
| S6 | 1239 | WT | 3211 | 84 | 30 | 860 | 121 | 118 | 116 | 121 | 114 | 107 | 153 | 148 | 147 | P | F | SS | WH | 7/21/10 |
| S7 | 100 | BV | 1218 | 84 | 20 | 860 | 101 | 117 | 118 | 119 | 121 | 114 | 140 | 148 | 152 | P | F | SS | WH | 7/21/10 |
| S8 | 247 | WT | 3211 | 92 | 17 | 860 | 121 | 131 | 141 | 148 | 138 | 124 | 161 | 158 | 147 | P | F | ST | WH | 7/21/10 |
| S9 | 730 | JT | 5171 | 90 | 500 | 550 | 111 | 0 | 115 | 0 | 125 | 0 | 140 | 150 | 147 | P | F | TT | WH | 7/22/10 |
| S10 | 1250 | DC | 3210 | 90 | 30 | 860 | 111 | 121 | 110 | 106 | 115 | 109 | 147 | 155 | 148 | P | F | SS | WH | 7/22/10 |
| S11 | 115 | WT | 3211 | 90 | 30 | 860 | 122 | 117 | 116 | 118 | 121 | 114 | 152 | 156 | 141 | P | F | SS | WH | 7/22/10 |
| S12 | 230 | BV | 1220 | 90 | 5 | 860 | 115 | 110 | 123 | 120 | 118 | 122 | 151 | 162 | 156 | P | F | TT | WH | 7/22/10 |
| S13 | 110 | BV | 1220 | 90 | 5 | 860 | 118 | 110 | 112 | 119 | 121 | 114 | 141 | 151 | 152 | P | F | ST | WH | 7/22/10 |
| S14 | 410 | WT | 3211 | 92 | 17 | 860 | 122 | 117 | 114 | 121 | 118 | 117 | 146 | 147 | 152 | P | F | ST | WH | 7/22/10 |
| S15 | 720 | JT | 5171 | 78 | 500 | 550 | 121 | 0 | 114 | 0 | 127 | 0 | 145 | 150 | 152 | P | Ex | TT | WH | 7/23/10 |

Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| S16 | 910 | DC | 3210 | 80 | 27 | 860 | 106 | 112 | 108 | 111 | 114 | 121 | 160 | 163 | 161 | P | F | SS | WH | 7/23/10 |
| S17 | 1000 | BV | 1220 | 82 | 5 | 860 | 118 | 116 | 124 | 119 | 110 | 126 | 146 | 151 | 148 | P | F | ST | WH | 7/23/10 |
| S18 | 1005 | BV | 1220 | 82 | 5 | 860 | 122 | 126 | 131 | 124 | 120 | 126 | 151 | 161 | 165 | P | F | TT | WH | 7/23/10 |
| S19 | 1300 | BV | 1220 | 100 | 5 | 860 | 118 | 114 | 121 | 117 | 118 | 106 | 142 | 151 | 147 | P | F | TT | WH | 7/23/10 |
| S20 | 1300 | WT | 3211 | 100 | 30 | 860 | 119 | 116 | 110 | 118 | 121 | 114 | 161 | 152 | 161 | P | F | SS | WH | 7/23/10 |
| S21 | 1305 | DC | 3210 | 100 | 27 | 860 | 116 | 117 | 121 | 114 | 118 | 116 | 151 | 147 | 146 | P | F | SS | WH | 7/23/10 |
| S22 | 1310 | BV | 1220 | 100 | 7 | 860 | 121 | 118 | 122 | 114 | 119 | 121 | 141 | 147 | 151 | P | F | SS | WH | 7/23/10 |
| S23 | 1310 | JT | 5171 | 100 | 500 | 550 | 121 | 0 | 118 | 0 | 114 | 0 | 146 | 160 | 151 | P | Ex | TT | WH | 7/23/10 |
| S24 | 1310 | WT | 3211 | 80 | 17 | 860 | 118 | 124 | 126 | 136 | 141 | 121 | 155 | 147 | 152 | P | F | TT | WH | 7/23/10 |
| S25 | 1645 | DC | 3210 | 100 | 15 | 860 | 126 | 110 | 116 | 118 | 126 | 124 | 152 | 141 | 148 | P | F | ST | WH | 7/23/10 |
| S26 | 715 | MV | 5155 | 78 | 500 | 550 | 121 | 0 | 119 | 0 | 120 | 0 | 148 | 151 | 147 | P | Ex | TT | WH | 7/24/10 |
| S27 | 710 | JT | 5171 | 78 | 500 | 550 | 120 | 0 | 117 | 0 | 126 | 0 | 145 | 150 | 151 | P | Ex | TT | WH | 7/24/10 |
| S28 | 725 | DC | 3210 | 78 | 27 | 860 | 116 | 111 | 109 | 104 | 114 | 101 | 149 | 154 | 154 | P | F | SS | WH | 7/24/10 |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** William Harrison

# Cell 2 Secondary HDPE Geomembrane Seam Log

S&ME

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 / S2 | EEOS / WEOS | 1421 | DC | 3210 | 495 | 2 | A | 1500 / 1505 | 30 / 29 | RC | WH | P | 07-20-2010 | |
| S2 / S3 | EEOS / WEOS | 1430 | WT | 3211 | 490 | 3 | A | 1503 / 1508 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S1 / CELL | EEOS / WEOS | 1431 | BV | 1220 | 8 | | A | 1440 / 1445 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S1 / CELL | EEOS / WEOS | 1433 | BV | 1220 | 491 | 1 | A | 1518 / 1523 | 30 / 30 | RC | WH | P | 07-20-2010 | Z2 1528/1533 30/30 Z3 7/21 710/715 30/30 |
| S3 / S4 | EEOS / WEOS | 1451 | DC | 3210 | 494 | 4 | A | 1530 / 1535 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S4 / S5 | EEOS / WEOS | 1500 | WT | 3211 | 495 | 5 | A | 1530 / 1535 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S6 / S7 | EEOS / WEOS | 1530 | WT | 3211 | 496 | 7 | A | 1555 / 1600 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S5 / S6 | EEOS / WEOS | 1532 | DC | 3210 | 494 | 6 | A | 1610 / 1615 | 30 / 30 | RC | WH | P | 07-20-2010 | |
| S7 / S8 | EEOS / WEOS | 1550 | DC | 3210 | 496 | 8 | A | 1618 / 1623 | 30 / 29 | RC | WH | P | 07-20-2010 | |
| S8 / S9 | EEOS / WEOS | 1557 | WT | 3211 | 496 | 9 | A | 705 / 710 | 30 / 29 | RC | WH | P | 07-21-2010 | SEAM COMPLETED 7/20 AIR TEST COMPLETED 7/21 |
| S9 / S10 | WAT / EEOS | 1245 | WT | 3211 | 495 | 10 | A | 1320 / 1325 | 30 / 29 | RC | WH | P | 07-21-2010 | |
| S10 / S11 | WAT / EEOS | 1250 | DC | 3210 | 499 | 11 | A | 1324 / 1329 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S11 / S12 | WAT / EEOS | 1314 | WT | 3211 | 501 | 12 | A | 1342 / 1347 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S12 / S13 | WAT / EEOS | 1314 | BV | 1218 | 500 | 13 | A | 1405 / 1410 | 30 / 29 | RC | WH | P | 07-21-2010 | |
| S13 / S14 | WAT / EEOS | 1318 | DC | 3210 | 499 | 14 | A | 1346 / 1351 | 30 / 29 | RC | WH | P | 07-21-2010 | |
| | | | | **Sheet Total** | 6,949 | | | | | | | | | |
| | | | | **Total to Date** | 6,949 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S14 / S15 | WAT / EEOS | 1347 | WT | 3211 | 494 | 15 | A | 1412 / 1417 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S15 / S16 | WAT / EEOS | 1348 | DC | 3210 | 501 | 16 | A | 1420 / 1425 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S16 / S17 | WAT / EEOS | 1410 | BV | 1218 | 499 | 17 | A | 1503 / 1508 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S17 / S18 | WAT / EEOS | 1417 | WT | 3211 | 498 | 18 | A | 1455 / 1500 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S18 / S19 | WAT / EEOS | 1437 | DC | 3210 | 498 | 19 | A | 1505 / 1510 | 30 / 30 | RC | WH | P | 07-21-2010 | |
| S19 / S20 | WAT / EEOS | 1522 | WT | 3211 | 499 | 20 | A | 1606 / 1611 | 30 / 29 | RC | WH | P | 07-21-2010 | Z2 1600/1605 30/30 |
| S21 / S22 | EEOS / WEOS | 1316 | DC | 3210 | 425 | 22 | A | 1340 / 1345 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S22 / S23 | EEOS / WEOS | 1327 | WT | 3210 | 420 | | A | 1350 / 1355 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S21 / CELL | EEOS / WEOS | 1331 | BV | 1220 | 312 | 21 | A | 1419 / 1024 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S23 / S24 | EEOS / WEOS | 1342 | DC | 3210 | 422 | 23 | A | 1406 / 1411 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S24 / S25 | EEOS / WEOS | 1352 | WT | 3211 | 427 | 24 | A | 1413 / 1418 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S25 / S26 | EEOS / WEOS | 1412 | DC | 3210 | 422 | 25 | A | 1430 / 1435 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S26 / S27 | EEOS / WEOS | 1417 | WT | 3211 | 420 | 26 | A | 1435 / 1440 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S27 / S28 | EEOS / WEOS | 1432 | DC | 3210 | 420 | 27 | A | 1455 / 1500 | 30 / 30 | RC | WH | P | 07-22-2010 | Z2 1445/1450 30/30 |
| S28 / S29 | EEOS / WEOS | 1439 | WT | 3211 | 376 | | A | 1500 / 1505 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| | | | | **Sheet Total** | 6,633 | | | | | | | | | |
| | | | | **Total to Date** | 13,582 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 / S21 | NEOS / SEOS | 1505 | BV | 1220 | 21 | | A | 1511 / 1516 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S30 / S31 | EAT / WEOS | 1507 | DC | 3210 | 77 | 28 | A | 1540 / 1545 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S2 / S22 | NEOS / SEOS | 1509 | BV | 1220 | 22 | 31 | A | 1514 / 1519 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S31 / S32 | EAT / WEOS | 1511 | WT | 3211 | 81 | | A | 1545 / 1550 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S3 / S23 | NEOS / SEOS | 1512 | BV | 1220 | 22 | | A | 1518 / 1523 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S32 / S33 | EAT / WEOS | 1514 | DC | 3210 | 86 | | A | 1550 / 1555 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S4 / S24 | NEOS / SEOS | 1516 | BV | 1220 | 22 | | A | 1522 / 1527 | 30 / 30 | RC | WH | P | 07-22-2010 | Z2 1521/1526 30/30 |
| S33 / S34 | EAT / WEOS | 1519 | WT | 3211 | 91 | | A | 1553 / 1558 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S5 / S25 | NEOS / SEOS | 1519 | BV | 1220 | 22 | | A | 1525 / 1530 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S6 / S26 | NEOS / SEOS | 1522 | BV | 1220 | 22 | | A | 1527 / 1532 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S7 / S27 | NEOS / SEOS | 1525 | BV | 1220 | 22 | | A | 1533 / 1538 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S8 / S28 | NEOS / SEOS | 1529 | BV | 1220 | 22 | | A | 1541 / 1546 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S34 / S35 | EAT / WEOS | 1530 | DC | 3210 | 97 | | A | 1600 / 1605 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S9 / S29 | NEOS / SEOS | 1532 | BV | 1220 | 22 | | A | 1543 / 1548 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S35 / S36 | EAT / WEOS | 1542 | WT | 3211 | 105 | | A | 1603 / 1608 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| | | | | **Sheet Total** | 734 | | | | | | | | | |
| | | | | **Total to Date** | 14,316 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S36 / S37 | EAT / WEOS | 1550 | DC | 3210 | 111 | 29 | A | 1605 / 1610 | 30 / 29 | RC | WH | P | 07-22-2010 | |
| S37 / S38 | EAT / WEOS | 1558 | WT | 3211 | 101 | | A | 1615 / 1620 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| CELL 1 / S38 | EAT / WEOS | 1619 | WT | 3211 | 77 | | A | 1620 / 1625 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S21 / S37 | NEOS / SEOS | 1623 | BV | 1220 | 18 | | A | 1628 / 1633 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S21 / S36 | NEOS / SEOS | 1624 | BV | 1220 | 5 | | A | 1629 / 1634 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S22 / S36 | NEOS / SEOS | 1627 | BV | 1220 | 19 | | A | 1631 / 1636 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S22 / S35 | NEOS / SEOS | 1629 | BV | 1220 | 5 | | A | 1633 / 1638 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S23 / S35 | NEOS / SEOS | 1630 | BV | 1220 | 22 | 30 | A | 1635 / 1640 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S24 / S34 | NEOS / SEOS | 1632 | BV | 1220 | 20 | | A | 1637 / 1642 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S25 / S33 | NEOS / SEOS | 1635 | BV | 1220 | 21 | | A | 1641 / 1646 | 30 / 30 | RC | WH | P | 07-22-2010 | |
| S26 / S32 | NEOS / SEOS | 1638 | BV | 1220 | 22 | | A | 700 / 705 | 30 / 30 | RC | WH | P | 07-23-2010 | SEAM COMPLETED 7/22 AIR TEST COMPLETED 7/23 |
| S27 / S31 | NEOS / SEOS | 1641 | BV | 1220 | 22 | | A | 707 / 712 | 30 / 30 | RC | WH | P | 07-23-2010 | SEAM COMPLETED 7/22 AIR TEST COMPLETED 7/23 |
| S28 / S30 | NEOS / SEOS | 1644 | BV | 1220 | 22 | | A | 710 / 715 | 30 / 30 | RC | WH | P | 07-23-2010 | SEAM COMPLETED 7/22 AIR TEST COMPLETED 7/23 |
| S39 / S29 | EEOS / WEOS | 921 | DC | 3210 | 370 | 32 | A | 1502 / 1507 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S40 / S41 | EAT / WEOS | 947 | DC | 3210 | 114 | | A | 1320 / 1325 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| | | | | **Sheet Total** | 949 | | | | | | | | | |
| | | | | **Total to Date** | 15,265 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S42 / S41 | EEOS / WEOS | 958 | DC | 3210 | 70 | | A | 1300 / 1305 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S42 / S28 | EEOS / WEOS | 1005 | BV | 1220 | 40 | | A | 1150 / 1155 | 30 / 30 | RC | WH | P | 07-23-2010 | Z2 1210/1215 30/30 |
| S41 / S30 | EAT / WEOS | 1018 | BV | 1220 | 45 | | A | 1410 / 1415 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S42 / S30 | EEOS / WEOS | 1025 | BV | 1220 | 30 | | A | 1130 / 1135 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S39 / S40 | NEOS / SEOS | 1030 | BV | 1220 | 22 | | A | 1333 / 1338 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S29 / S41 | NEOS / SEOS | 1048 | BV | 1220 | 22 | | A | 1307 / 1312 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S47 / S46 | NEOS / SEOS | 1056 | BV | 1220 | 22 | | A | 1420 / 1425 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S48 / S47 | NEOS / SEOS | 1124 | BV | 1220 | 22 | 33 | A | 1355 / 1400 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S48 / S39 | WEOS / EEOS | 1131 | DC | 3210 | 52 | | A | 1344 / 1349 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S48 / S58 | NEOS / SEOS | 1135 | BV | 1220 | 22 | | A | 1145 / 1150 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S46 / S45 | NEOS / SEOS | 1307 | BV | 1220 | 22 | | A | 1431 / 1436 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S45 / S44 | NEOS / SEOS | 1314 | BV | 1220 | 22 | | A | 1433 / 1438 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S43 / S39 | WEOS / EEOS | 1319 | DC | 3210 | 65 | | A | 1455 / 1500 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S44 / S39 | WEOS / EEOS | 1322 | DC | 3210 | 66 | | A | 1440 / 1445 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S45 / S39 | WEOS / EEOS | 1324 | DC | 3210 | 62 | | A | 1435 / 1440 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| | | | | **Sheet Total** | 584 | | | | | | | | | |
| | | | | **Total to Date** | 15,849 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S44 / S43 | NEOS / SEOS | 1324 | BV | 1220 | 22 | | A | 1450 / 1455 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S46 / S39 | WEOS / EEOS | 1327 | DC | 3210 | 68 | 34 | A | 1422 / 1427 | 30 / 30 | RC | WH | P | 07-23-2010 | Z2 1430/1455 30/29 |
| S47 / S39 | WEOS / EEOS | 1330 | DC | 3210 | 62 | | A | 1413 / 1418 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S49 / S50 | WEOS / EEOS | 1430 | DC | 3210 | 490 | 35 | A | 1515 / 1520 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S50 / S51 | WEOS / EEOS | 1442 | WT | 3211 | 483 | 36 | A | 1518 / 1523 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S51 / S52 | WEOS / EEOS | 1500 | DC | 3210 | 476 | 37 | A | 1528 / 1533 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S52 / S53 | WEOS / EEOS | 1513 | WT | 3211 | 468 | 38 | A | 1535 / 1540 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S53 / S54 | WEOS / EEOS | 1535 | DC | 3210 | 465 | 39 | A | 1600 / 1605 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S54 / S55 | WEOS / EEOS | 1544 | WT | 3211 | 461 | 40 | A | 1610 / 1615 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S55 / S56 | WEOS / EEOS | 1610 | DC | 3210 | 465 | 41 | A | 1737 / 1742 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S40 / S58 | WEOS / EEOS | 1615 | WT | 3211 | 107 | | A | 1629 / 1634 | 30 / 30 | RC | WH | P | 07-23-2010 | Z2 1735/1740 30/30 |
| S56 / S57 | WEOS / EEOS | 1631 | WT | 3211 | 471 | 42 | A | 1735 / 1740 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S10 / S39 | NEOS / SEOS | 1631 | BV | 1220 | 22 | | A | 1636 / 1641 | 30 / 30 | RC | WH | P | 07-23-2010 | Z2 1627/1632 30/30 |
| S11 / S43 | NEOS / SEOS | 1635 | BV | 1220 | 22 | | A | 1641 / 1646 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S12 / S56 | NEOS / SEOS | 1639 | BV | 1220 | 22 | | A | 1646 / 1651 | 30 / 29 | RC | WH | P | 07-23-2010 | Z2 1647/1652 30/30 |
| | | | | **Sheet Total** | 4,104 | | | | | | | | | |
| | | | | **Total to Date** | 19,953 | | | | | | | | | |

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/20/2010-7/23/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Secondary GM
**Project Location:** Terrell, North Carolina
**Page:** 7 of 7

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S13 / S55 | NEOS / SEOS | 1643 | BV | 1220 | 22 | | A | 1648 / 1653 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S14 / S54 | NEOS / SEOS | 1646 | BV | 1220 | 22 | | A | 1653 / 1658 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S57 / S43 | WEOS / EEOS | 1647 | DC | 3210 | 60 | | A | 1714 / 1719 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S15 / S53 | NEOS / SEOS | 1649 | BV | 1220 | 22 | | A | 1655 / 1700 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S16 / S52 | NEOS / SEOS | 1652 | BV | 1220 | 22 | | A | 1659 / 1704 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| S44 / S57 | WEOS / EEOS | 1653 | DC | 3210 | 64 | | A | 1718 / 1723 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S17 / S51 | NEOS / SEOS | 1655 | BV | 1220 | 22 | | A | 1703 / 1708 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S18 / S50 | NEOS / SEOS | 1655 | BV | 1220 | 22 | | A | 1706 / 1711 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S45 / S57 | WEOS / EEOS | 1658 | DC | 3210 | 66 | 43 | A | 1720 / 1725 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S19 / S49 | NEOS / SEOS | 1701 | BV | 1220 | 18 | | A | 1707 / 1712 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S46 / S57 | WEOS / EEOS | 1702 | DC | 3210 | 65 | | A | 1720 / 1725 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S47 / S57 | WEOS / EEOS | 1707 | DC | 3210 | 63 | | A | 1725 / 1730 | 30 / 30 | RC | WH | P | 07-23-2010 | |
| S57 / S58 | WEOS / EEOS | 1709 | WT | 3211 | 149 | | A | 1730 / 1735 | 30 / 29 | RC | WH | P | 07-23-2010 | Z2 1733/1737 30/30 |
| S48 / S57 | WEOS / EEOS | 1711 | DC | 3210 | 48 | | A | 1728 / 1733 | 30 / 29 | RC | WH | P | 07-23-2010 | |
| | | | | | | | | | | | | | | |

| | |
|---|---|
| **Sheet Total** | 665 |
| **Total to Date** | 20,618 |

**CQA Personnel:** William Harrison

# Cell 2 Secondary HDPE Geomembrane Destructive Laboratory Test Results

S&ME

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S1
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 165.0 | Elongation |
| S2 | 165.0 | Elongation |
| S3 | 167.0 | Elongation |
| S4 | 165.0 | Elongation |
| S5 | 165.0 | Elongation |
| Average | 165.4 | *FTB - Film Tear Bond |
| Standard Deviation | 0.8 | |
| Maximum | 167.0 | |
| Minimum | 165.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 104.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 117.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 106.0 | FTB |
| P5A | 136.0 | FTB |
| P5B | 129.0 | FTB |
| Average | 122.0 | *FTB - Film Tear Bond |
| Standard Deviation | 10.1 | |
| Maximum | 136.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S2
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 165.0 | Elongation |
| S2 | 140.0 | Elongation |
| S3 | 136.0 | Elongation |
| S4 | 126.0 | Elongation |
| S5 | 145.0 | Elongation |
| Average | 142.4 | *FTB - Film Tear Bond |
| Standard Deviation | 12.9 | |
| Maximum | 165.0 | |
| Minimum | 126.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 106.0 | FTB |
| P1B | 110.0 | FTB |
| P2A | 115.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 114.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 119.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 105.0 | FTB |
| P5B | 112.0 | FTB |
| Average | 111.0 | *FTB - Film Tear Bond |
| Standard Deviation | 4.1 | |
| Maximum | 119.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S3
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 166.0 | Elongation |
| S2 | 167.0 | Elongation |
| S3 | 139.0 | Elongation |
| S4 | 171.0 | Elongation |
| S5 | 172.0 | Elongation |
| Average | 163.0 | *FTB - Film Tear Bond |
| Standard Deviation | 12.2 | |
| Maximum | 172.0 | |
| Minimum | 139.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 118.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 135.0 | FTB |
| P2B | 125.0 | FTB |
| P3A | 109.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 137.0 | FTB |
| P4B | 101.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 120.0 | FTB |
| Average | 122.4 | *FTB - Film Tear Bond |
| Standard Deviation | 11.0 | |
| Maximum | 137.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S4
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 160.0 | Elongation |
| S2 | 164.0 | Elongation |
| S3 | 164.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 162.0 | Elongation |
| Average | 163.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.7 | |
| Maximum | 168.0 | |
| Minimum | 160.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 105.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 112.0 | FTB |
| P2B | 116.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 124.0 | FTB |
| P4B | 119.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 116.1 | *FTB - Film Tear Bond |
| Standard Deviation | 4.7 | |
| Maximum | 124.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S5
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 169.0 | Elongation |
| S2 | 158.0 | Elongation |
| S3 | 164.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 174.0 | Elongation |
| Average | 166.6 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 174.0 | |
| Minimum | 158.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 111.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 107.0 | FTB |
| P2B | 118.0 | FTB |
| P3A | 114.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 120.0 | FTB |
| Average | 117.1 | *FTB - Film Tear Bond |
| Standard Deviation | 6.2 | |
| Maximum | 127.0 | |
| Minimum | 107.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S6
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 165.0 | Elongation |
| S2 | 179.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 182.0 | Elongation |
| S5 | 181.0 | Elongation |
| Average | 176.2 | *FTB - Film Tear Bond |
| Standard Deviation | 6.2 | |
| Maximum | 182.0 | |
| Minimum | 165.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 132.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 133.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 119.0 | FTB |
| P4B | 121.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 125.3 | *FTB - Film Tear Bond |
| Standard Deviation | 4.9 | |
| Maximum | 133.0 | |
| Minimum | 119.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S7
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 181.0 | Elongation |
| S2 | 176.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 180.0 | Elongation |
| S5 | 186.0 | Elongation |
| Average | 180.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.5 | |
| Maximum | 186.0 | |
| Minimum | 176.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 123.0 | FTB |
| P2A | 133.0 | FTB |
| P2B | 127.0 | FTB |
| P3A | 132.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 133.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 128.0 | FTB |
| Average | 128.9 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 133.0 | |
| Minimum | 123.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S8
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 187.0 | Elongation |
| S2 | 185.0 | Elongation |
| S3 | 184.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 183.0 | Elongation |
| Average | 184.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.5 | |
| Maximum | 187.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 128.0 | FTB |
| P1B | 134.0 | FTB |
| P2A | 128.0 | FTB |
| P2B | 142.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 138.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 130.0 | FTB |
| Average | 131.7 | *FTB - Film Tear Bond |
| Standard Deviation | 5.2 | |
| Maximum | 142.0 | |
| Minimum | 123.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S9
Tested by: William Harrison
Date Tested: 07/21/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 166.0 | Elongation |
| S2 | 164.0 | Elongation |
| S3 | 164.0 | Elongation |
| S4 | 165.0 | Elongation |
| S5 | 166.0 | Elongation |
| Average | 165.0 | *FTB - Film Tear Bond |
| Standard Deviation | 0.9 | |
| Maximum | 166.0 | |
| Minimum | 164.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 114.0 | FTB |
| P1B | 106.0 | FTB |
| P2A | 113.0 | FTB |
| P2B | 110.0 | FTB |
| P3A | 105.0 | FTB |
| P3B | 115.0 | FTB |
| P4A | 108.0 | FTB |
| P4B | 124.0 | FTB |
| P5A | 109.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 112.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.5 | |
| Maximum | 124.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S10
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 181.0 | Elongation |
| S2 | 166.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 180.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 175.8 | *FTB - Film Tear Bond |
| Standard Deviation | 5.3 | |
| Maximum | 181.0 | |
| Minimum | 166.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 114.0 | FTB |
| P2A | 127.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 115.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 108.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 117.4 | *FTB - Film Tear Bond |
| Standard Deviation | 6.3 | |
| Maximum | 127.0 | |
| Minimum | 107.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S11
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 155.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 155.0 | Elongation |
| S5 | 161.0 | Elongation |
| Average | 163.6 | *FTB - Film Tear Bond |
| Standard Deviation | 8.7 | |
| Maximum | 177.0 | |
| Minimum | 155.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 123.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 125.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 125.0 | FTB |
| P4A | 132.0 | FTB |
| P4B | 131.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 104.0 | FTB |
| Average | 123.7 | *FTB - Film Tear Bond |
| Standard Deviation | 9.3 | |
| Maximum | 132.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S12
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 176.0 | Elongation |
| S2 | 173.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 161.0 | Elongation |
| S5 | 168.0 | Elongation |
| Average | 170.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 176.0 | |
| Minimum | 161.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 110.0 | FTB |
| P2B | 113.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 110.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 117.1 | *FTB - Film Tear Bond |
| Standard Deviation | 4.9 | |
| Maximum | 124.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S13
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 163.0 | Elongation |
| S2 | 163.0 | Elongation |
| S3 | 168.0 | Elongation |
| S4 | 165.0 | Elongation |
| S5 | 163.0 | Elongation |
| Average | 164.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 168.0 | |
| Minimum | 163.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 121.0 | FTB |
| P1B | 120.0 | FTB |
| P2A | 136.0 | FTB |
| P2B | 132.0 | FTB |
| P3A | 115.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 102.0 | FTB |
| P4B | 103.0 | FTB |
| P5A | 101.0 | FTB |
| P5B | 137.0 | FTB |
| Average | 119.6 | *FTB - Film Tear Bond |
| Standard Deviation | 13.3 | |
| Maximum | 137.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S14
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 163.0 | Elongation |
| S2 | 147.0 | Elongation |
| S3 | 162.0 | Elongation |
| S4 | 136.0 | Elongation |
| S5 | 165.0 | Elongation |
| Average | 154.6 | *FTB - Film Tear Bond |
| Standard Deviation | 11.3 | |
| Maximum | 165.0 | |
| Minimum | 136.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 122.0 | FTB |
| P1B | 126.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 121.0 | FTB |
| P3A | 122.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 134.0 | FTB |
| P4B | 131.0 | FTB |
| P5A | 127.0 | FTB |
| P5B | 136.0 | FTB |
| Average | 127.7 | *FTB - Film Tear Bond |
| Standard Deviation | 5.0 | |
| Maximum | 136.0 | |
| Minimum | 121.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S15
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 159.0 | Elongation |
| S2 | 158.0 | Elongation |
| S3 | 163.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 169.0 | Elongation |
| Average | 163.4 | *FTB - Film Tear Bond |
| Standard Deviation | 4.5 | |
| Maximum | 169.0 | |
| Minimum | 158.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 118.0 | FTB |
| P1B | 129.0 | FTB |
| P2A | 128.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 127.0 | FTB |
| P3B | 134.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 133.0 | FTB |
| P5A | 119.0 | FTB |
| P5B | 117.0 | FTB |
| Average | 125.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.8 | |
| Maximum | 134.0 | |
| Minimum | 117.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S16
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 164.0 | Elongation |
| S2 | 159.0 | Elongation |
| S3 | 165.0 | Elongation |
| S4 | 162.0 | Elongation |
| S5 | 164.0 | Elongation |
| Average | 162.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 165.0 | |
| Minimum | 159.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 125.0 | FTB |
| P1B | 105.0 | FTB |
| P2A | 109.0 | FTB |
| P2B | 124.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 119.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 117.3 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 125.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S17
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 151.0 | Elongation |
| S2 | 167.0 | Elongation |
| S3 | 162.0 | Elongation |
| S4 | 161.0 | Elongation |
| S5 | 162.0 | Elongation |
| Average | 160.6 | *FTB - Film Tear Bond |
| Standard Deviation | 5.2 | |
| Maximum | 167.0 | |
| Minimum | 151.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 118.0 | FTB |
| P1B | 1182.0 | FTB |
| P2A | 112.0 | FTB |
| P2B | 110.0 | FTB |
| P3A | 102.0 | FTB |
| P3B | 108.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 102.0 | FTB |
| Average | 219.7 | *FTB - Film Tear Bond |
| Standard Deviation | 320.9 | |
| Maximum | 1182.0 | |
| Minimum | 102.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S18
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 167.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 167.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 166.0 | Elongation |
| Average | 167.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 169.0 | |
| Minimum | 166.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 118.0 | FTB |
| P1B | 135.0 | FTB |
| P2A | 117.0 | FTB |
| P2B | 131.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 119.0 | FTB |
| P4A | 134.0 | FTB |
| P4B | 122.0 | FTB |
| P5A | 114.0 | FTB |
| P5B | 123.0 | FTB |
| Average | 124.4 | *FTB - Film Tear Bond |
| Standard Deviation | 7.3 | |
| Maximum | 135.0 | |
| Minimum | 114.0 | |
| Pass/Fail [1,2,3] | FAIL | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S19
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 156.0 | Elongation |
| S2 | 156.0 | Elongation |
| S3 | 160.0 | Elongation |
| S4 | 161.0 | Elongation |
| S5 | 160.0 | Elongation |
| Average | 158.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 161.0 | |
| Minimum | 156.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 111.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 108.0 | FTB |
| P2B | 116.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 135.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 120.9 | *FTB - Film Tear Bond |
| Standard Deviation | 8.5 | |
| Maximum | 135.0 | |
| Minimum | 108.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S20
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 153.0 | Elongation |
| S2 | 158.0 | Elongation |
| S3 | 160.0 | Elongation |
| S4 | 161.0 | Elongation |
| S5 | 156.0 | Elongation |
| Average | 157.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 161.0 | |
| Minimum | 153.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 113.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 113.0 | FTB |
| P4A | 109.0 | FTB |
| P4B | 132.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 123.0 | FTB |
| Average | 119.8 | *FTB - Film Tear Bond |
| Standard Deviation | 6.7 | |
| Maximum | 132.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S21
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 181.0 | Elongation |
| S2 | 181.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 179.0 | Elongation |
| Average | 178.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 181.0 | |
| Minimum | 173.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 124.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 137.0 | FTB |
| P5A | 126.0 | FTB |
| P5B | 132.0 | FTB |
| Average | 128.8 | *FTB - Film Tear Bond |
| Standard Deviation | 4.6 | |
| Maximum | 137.0 | |
| Minimum | 123.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S22
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 176.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 171.0 | Elongation |
| S4 | 168.0 | Elongation |
| S5 | 174.0 | Elongation |
| Average | 172.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.7 | |
| Maximum | 176.0 | |
| Minimum | 168.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 121.0 | FTB |
| P1B | 131.0 | FTB |
| P2A | 129.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 126.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 124.9 | *FTB - Film Tear Bond |
| Standard Deviation | 5.8 | |
| Maximum | 133.0 | |
| Minimum | 116.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S23
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 170.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 168.0 | Elongation |
| S4 | 166.0 | Elongation |
| S5 | 171.0 | Elongation |
| Average | 168.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 171.0 | |
| Minimum | 166.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 113.0 | FTB |
| P1B | 131.0 | FTB |
| P2A | 125.0 | FTB |
| P2B | 125.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 126.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 132.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 129.0 | FTB |
| Average | 122.6 | *FTB - Film Tear Bond |
| Standard Deviation | 7.3 | |
| Maximum | 132.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S24
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 170.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 171.0 | Elongation |
| S4 | 169.0 | Elongation |
| S5 | 167.0 | Elongation |
| Average | 169.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.3 | |
| Maximum | 171.0 | |
| Minimum | 167.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 122.0 | FTB |
| P2A | 121.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 114.0 | FTB |
| P3B | 127.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 121.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 116.0 | FTB |
| Average | 120.7 | *FTB - Film Tear Bond |
| Standard Deviation | 4.2 | |
| Maximum | 127.0 | |
| Minimum | 114.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S25
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 169.0 | Elongation |
| S4 | 167.0 | Elongation |
| S5 | 166.0 | Elongation |
| Average | 168.0 | *FTB - Film Tear Bond |
| Standard Deviation | 1.4 | |
| Maximum | 170.0 | |
| Minimum | 166.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 114.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 104.0 | FTB |
| P3A | 109.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 115.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 113.0 | FTB |
| Average | 117.0 | *FTB - Film Tear Bond |
| Standard Deviation | 7.0 | |
| Maximum | 127.0 | |
| Minimum | 104.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S26
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 165.0 | Elongation |
| S3 | 166.0 | Elongation |
| S4 | 165.0 | Elongation |
| S5 | 168.0 | Elongation |
| Average | 166.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.4 | |
| Maximum | 168.0 | |
| Minimum | 165.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 107.0 | FTB |
| P1B | 119.0 | FTB |
| P2A | 115.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 114.0 | FTB |
| P5A | 112.0 | FTB |
| P5B | 113.0 | FTB |
| Average | 116.7 | *FTB - Film Tear Bond |
| Standard Deviation | 6.6 | |
| Maximum | 132.0 | |
| Minimum | 107.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S27
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 172.0 | Elongation |
| S2 | 173.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 171.0 | Elongation |
| S5 | 173.0 | Elongation |
| Average | 172.4 | *FTB - Film Tear Bond |
| Standard Deviation | 0.8 | |
| Maximum | 173.0 | |
| Minimum | 171.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 159.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 141.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 111.0 | FTB |
| P3B | 137.0 | FTB |
| P4A | 147.0 | FTB |
| P4B | 103.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 128.0 | *FTB - Film Tear Bond |
| Standard Deviation | 17.3 | |
| Maximum | 159.0 | |
| Minimum | 103.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S28
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 179.0 | Elongation |
| S2 | 177.0 | Elongation |
| S3 | 178.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 177.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 179.0 | |
| Minimum | 176.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 129.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 132.0 | FTB |
| P2B | 133.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 142.0 | FTB |
| P4A | 133.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 131.5 | *FTB - Film Tear Bond |
| Standard Deviation | 4.3 | |
| Maximum | 142.0 | |
| Minimum | 125.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S29
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 182.0 | Elongation |
| S2 | 179.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 178.0 | Elongation |
| S5 | 180.0 | Elongation |
| Average | 179.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.3 | |
| Maximum | 182.0 | |
| Minimum | 178.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 144.0 | FTB |
| P1B | 137.0 | FTB |
| P2A | 142.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 125.0 | FTB |
| P3B | 136.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 148.0 | FTB |
| P5A | 137.0 | FTB |
| P5B | 136.0 | FTB |
| Average | 136.7 | *FTB - Film Tear Bond |
| Standard Deviation | 6.7 | |
| Maximum | 148.0 | |
| Minimum | 125.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S30
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 157.0 | Elongation |
| S2 | 155.0 | Elongation |
| S3 | 155.0 | Elongation |
| S4 | 152.0 | Elongation |
| S5 | 155.0 | Elongation |
| Average | 154.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.6 | |
| Maximum | 157.0 | |
| Minimum | 152.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 144.0 | FTB |
| P1B | 152.0 | FTB |
| P2A | 145.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 147.0 | FTB |
| P3B | 134.0 | FTB |
| P4A | 147.0 | FTB |
| P4B | 134.0 | FTB |
| P5A | 138.0 | FTB |
| P5B | 143.0 | FTB |
| Average | 139.5 | *FTB - Film Tear Bond |
| Standard Deviation | 11.0 | |
| Maximum | 152.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S31
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 146.0 | Elongation |
| S2 | 146.0 | Elongation |
| S3 | 150.0 | Elongation |
| S4 | 148.0 | Elongation |
| S5 | 149.0 | Elongation |
| Average | 147.8 | *FTB - Film Tear Bond |
| Standard Deviation | 1.6 | |
| Maximum | 150.0 | |
| Minimum | 146.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 141.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 131.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 134.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 133.0 | FTB |
| P4B | 97.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 125.0 | *FTB - Film Tear Bond |
| Standard Deviation | 11.7 | |
| Maximum | 141.0 | |
| Minimum | 97.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S32
Tested by: William Harrison
Date Tested: 07/24/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 166.0 | Elongation |
| S4 | 164.0 | Elongation |
| S5 | 167.0 | Elongation |
| Average | 167.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 170.0 | |
| Minimum | 164.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 118.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 120.0 | FTB |
| P4A | 119.0 | FTB |
| P4B | 113.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 120.0 | FTB |
| Average | 121.8 | *FTB - Film Tear Bond |
| Standard Deviation | 5.1 | |
| Maximum | 132.0 | |
| Minimum | 113.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S33
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 160.0 | Elongation |
| S2 | 156.0 | Elongation |
| S3 | 161.0 | Elongation |
| S4 | 159.0 | Elongation |
| S5 | 160.0 | Elongation |
| Average | 159.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 161.0 | |
| Minimum | 156.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 131.0 | FTB |
| P1B | 122.0 | FTB |
| P2A | 132.0 | FTB |
| P2B | 136.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 133.0 | FTB |
| P4A | 140.0 | FTB |
| P4B | 125.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 148.0 | FTB |
| Average | 133.0 | *FTB - Film Tear Bond |
| Standard Deviation | 6.9 | |
| Maximum | 148.0 | |
| Minimum | 122.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S34
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 171.0 | Elongation |
| S2 | 170.0 | Elongation |
| S3 | 172.0 | Elongation |
| S4 | 170.0 | Elongation |
| S5 | 173.0 | Elongation |
| Average | 171.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.2 | |
| Maximum | 173.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 122.0 | FTB |
| P1B | 122.0 | FTB |
| P2A | 121.0 | FTB |
| P2B | 106.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 122.1 | *FTB - Film Tear Bond |
| Standard Deviation | 7.0 | |
| Maximum | 131.0 | |
| Minimum | 106.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S35
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 180.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 177.0 | Elongation |
| Average | 179.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.2 | |
| Maximum | 180.0 | |
| Minimum | 177.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 120.0 | FTB |
| P1B | 134.0 | FTB |
| P2A | 117.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 136.0 | FTB |
| P4A | 132.0 | FTB |
| P4B | 118.0 | FTB |
| P5A | 112.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 125.0 | *FTB - Film Tear Bond |
| Standard Deviation | 8.4 | |
| Maximum | 136.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S36
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 185.0 | Elongation |
| S3 | 186.0 | Elongation |
| S4 | 187.0 | Elongation |
| S5 | 190.0 | Elongation |
| Average | 185.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 190.0 | |
| Minimum | 180.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 128.0 | FTB |
| P1B | 145.0 | FTB |
| P2A | 148.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 152.0 | FTB |
| P3B | 134.0 | FTB |
| P4A | 132.0 | FTB |
| P4B | 134.0 | FTB |
| P5A | 153.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 137.9 | *FTB - Film Tear Bond |
| Standard Deviation | 10.7 | |
| Maximum | 153.0 | |
| Minimum | 118.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S37
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 179.0 | Elongation |
| S2 | 178.0 | Elongation |
| S3 | 185.0 | Elongation |
| S4 | 175.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 179.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 185.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 125.0 | FTB |
| P2A | 130.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 132.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 126.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 146.0 | FTB |
| P5B | 145.0 | FTB |
| Average | 130.0 | *FTB - Film Tear Bond |
| Standard Deviation | 8.3 | |
| Maximum | 146.0 | |
| Minimum | 122.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S38
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 182.0 | Elongation |
| S2 | 178.0 | Elongation |
| S3 | 178.0 | Elongation |
| S4 | 178.0 | Elongation |
| S5 | 177.0 | Elongation |
| Average | 178.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 182.0 | |
| Minimum | 177.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 124.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 141.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 122.0 | FTB |
| P3B | 122.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 125.2 | *FTB - Film Tear Bond |
| Standard Deviation | 5.6 | |
| Maximum | 141.0 | |
| Minimum | 121.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S39
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 185.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 183.0 | Elongation |
| S4 | 185.0 | Elongation |
| S5 | 185.0 | Elongation |
| Average | 184.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.0 | |
| Maximum | 185.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 134.0 | FTB |
| P1B | 125.0 | FTB |
| P2A | 127.0 | FTB |
| P2B | 120.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 146.0 | FTB |
| P5A | 165.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 132.9 | *FTB - Film Tear Bond |
| Standard Deviation | 12.5 | |
| Maximum | 165.0 | |
| Minimum | 120.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S40
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 178.0 | Elongation |
| S2 | 173.0 | Elongation |
| S3 | 169.0 | Elongation |
| S4 | 172.0 | Elongation |
| S5 | 177.0 | Elongation |
| Average | 173.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 178.0 | |
| Minimum | 169.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 128.0 | FTB |
| P1B | 103.0 | FTB |
| P2A | 134.0 | FTB |
| P2B | 102.0 | FTB |
| P3A | 107.0 | FTB |
| P3B | 127.0 | FTB |
| P4A | 107.0 | FTB |
| P4B | 133.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 103.0 | FTB |
| Average | 117.2 | *FTB - Film Tear Bond |
| Standard Deviation | 13.1 | |
| Maximum | 134.0 | |
| Minimum | 102.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S41
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 174.0 | Elongation |
| S5 | 183.0 | Elongation |
| Average | 180.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 183.0 | |
| Minimum | 174.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 117.0 | FTB |
| P3B | 136.0 | FTB |
| P4A | 114.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 109.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 120.7 | *FTB - Film Tear Bond |
| Standard Deviation | 8.3 | |
| Maximum | 136.0 | |
| Minimum | 109.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S42
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 196.0 | Elongation |
| S2 | 194.0 | Elongation |
| S3 | 194.0 | Elongation |
| S4 | 193.0 | Elongation |
| S5 | 189.0 | Elongation |
| Average | 193.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.3 | |
| Maximum | 196.0 | |
| Minimum | 189.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 124.0 | FTB |
| P1B | 136.0 | FTB |
| P2A | 156.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 146.0 | FTB |
| P5A | 129.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 132.0 | *FTB - Film Tear Bond |
| Standard Deviation | 10.4 | |
| Maximum | 156.0 | |
| Minimum | 122.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: S43
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 168.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 167.0 | Elongation |
| S4 | 156.0 | Elongation |
| S5 | 170.0 | Elongation |
| Average | 166.0 | *FTB - Film Tear Bond |
| Standard Deviation | 5.1 | |
| Maximum | 170.0 | |
| Minimum | 156.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 123.0 | FTB |
| P1B | 139.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 153.0 | FTB |
| P3A | 150.0 | FTB |
| P3B | 119.0 | FTB |
| P4A | 130.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 115.0 | FTB |
| P5B | 146.0 | FTB |
| Average | 130.9 | *FTB - Film Tear Bond |
| Standard Deviation | 14.1 | |
| Maximum | 153.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Secondary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Extrusion
Sample: S44
Tested by: William Harrison
Date Tested: 07/26/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 182.0 | Elongation |
| S2 | 181.0 | Elongation |
| S3 | 182.0 | Elongation |
| S4 | 181.0 | Elongation |
| S5 | 181.0 | Elongation |
| Average | 181.4 | *FTB - Film Tear Bond |
| Standard Deviation | 0.5 | |
| Maximum | 182.0 | |
| Minimum | 181.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 115.0 | FTB |
| P1B | 0.0 | |
| P2A | 142.0 | FTB |
| P2B | 0.0 | |
| P3A | 120.0 | FTB |
| P3B | 0.0 | |
| P4A | 155.0 | FTB |
| P4B | 0.0 | |
| P5A | 122.0 | FTB |
| P5B | 0.0 | |
| Average | 65.4 | *FTB - Film Tear Bond |
| Standard Deviation | 66.3 | |
| Maximum | 155.0 | |
| Minimum | 0.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

# Cell 2 Secondary HDPE Geomembrane Defect Log

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 1 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 1 | S1 / CELL 1 | 7F WOEEOS | T | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 2 | S1 / CELL 1 | 32F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 3 | S1 / CELL 1 | 89F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 4 | S1 / CELL 1 | 163F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 5 | S1 / CELL 1 | 169F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 6 | S1 / CELL 1 | 174F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 7 | S1 / CELL 1 | 267F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 8 | S1 / CELL 1 | 302F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 9 | S1 / CELL 1 | 319F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 10 | S1 / CELL 1 | 324F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 11 | S1 / CELL 1 | 329F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 12 | S1 / CELL 1 | 340F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 13 | S1 / CELL 1 | 349F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 14 | S1 / CELL 1 | 369F WOEEOS | O | 7/20/2010 | BURNOUT | 7/21/2010 | WMH |
| 15 | S1 / CELL 1 | 400F WOEEOS | LDT | 7/20/2010 | LDT-1 | 7/21/2010 | WMH |
| 16 | S1 | 10F SOWAT | O | 7/20/2010 | | 7/21/2010 | WMH |
| 17 | S1/S2 | 200F EOWAT | LDT | 7/20/2010 | LDT-2 | 7/21/2010 | WMH |
| 18 | S2/S3 | 300F EOWAT | LDT | 7/20/2010 | LDT-3 | 7/21/2010 | WMH |
| 19 | S3/S4 | 400F EOWAT | LDT | 7/20/2010 | LDT-4 | 7/21/2010 | WMH |
| 20 | S4/S5 | 100F EOWAT | LDT | 7/20/2010 | LDT-5 | 7/21/2010 | WMH |
| 21 | S5/S6 | 470F EOWAT | LDT | 7/20/2010 | LDT-6 | 7/21/2010 | WMH |
| 22 | S6/S7 | 300 F EOWAT | LDT | 7/20/2010 | LDT-7 | 7/21/2010 | WMH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 2 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 23 | S7/S8 | 400F EOWAT | LDT | 7/20/2010 | LDT-8 | 7/21/2010 | WMH |
| 24 | S8/S9 | 100F EOWAT | LDT | 7/20/2010 | LDT-9 | 7/21/2010 | WMH |
| 25 | S5/S6 | 220F WOEEOS | O | 7/20/2010 | | 7/21/2010 | WMH |
| 26 | S5/S6 | 198F WOEEOS | O | 7/20/2010 | | 7/21/2010 | WMH |
| 27 | S5/S6 | 69F WOEEOS | O | 7/20/2010 | | 7/21/2010 | WMH |
| 28 | S5/S6 | 54F WOEEOS | O | 7/20/2010 | | 7/21/2010 | WMH |
| 29 | S9/S10 | 200F EOWAT | LDT | 7/20/2010 | LDT-10 | 7/22/2010 | WMH |
| 30 | S10/S11 | 300F EOWAT | LDT | 7/20/2010 | LDT-11 | 7/22/2010 | WMH |
| 31 | S11/S12 | 400F EOWAT | LDT | 7/20/2010 | LDT-12 | 7/22/2010 | WMH |
| 32 | S12/S13 | 100F EOWAT | LDT | 7/20/2010 | LDT-13 | 7/22/2010 | WMH |
| 33 | S13/S14 | 200F EOWAT | LDT | 7/20/2010 | LDT-14 | 7/22/2010 | WMH |
| 34 | S14/S15 | 300F EOWAT | LDT | 7/20/2010 | LDT-15 | 7/22/2010 | WMH |
| 35 | S15/S16 | 400F EOWAT | LDT | 7/20/2010 | LDT-16 | 7/22/2010 | WMH |
| 36 | S16/S17 | 100F EOWAT | LDT | 7/20/2010 | LDT-17 | 7/22/2010 | WMH |
| 37 | S17/S18 | 200F EOWAT | LDT | 7/20/2010 | LDT-18 | 7/22/2010 | WMH |
| 38 | S18/S19 | 300F EOWAT | LDT | 7/20/2010 | LDT-19 | 7/22/2010 | WMH |
| 39 | S19/S20 | 400F EOWAT | LDT | 7/20/2010 | LDT-20 | 7/22/2010 | WMH |
| 40 | S9 | 180F WOEEOS | O | 7/20/2010 | | 7/22/2010 | WMH |
| 41 | S5/S6 | WAT | O | 7/20/2010 | BURNOUT AT ANCHOR TRENCH | 7/21/2010 | WMH |
| 42 | S13/S14 | 6F EOWEOS | O | 7/20/2010 | | 7/22/2010 | WMH |
| 43 | S13/S14 | 13F EOWEOS | O | 7/20/2010 | | 7/22/2010 | WMH |
| 44 | S13/S14 | 21F EOWEOS | O | 7/20/2010 | | 7/22/2010 | WMH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 3 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 45 | S16 | 11F EOWAT 4F SONEO S15/S16 SEAM | O | 7/20/2010 | | 7/22/2010 | WMH |
| 46 | S16 | 11F EOWAT 8F SONEO S15/S16 SEAM | O | 7/20/2010 | | 7/22/2010 | WMH |
| 47 | S18/S19 | WAT | O | 7/20/2010 | | 7/22/2010 | WMH |
| 48 | S19/S20 | WAT | O | 7/20/2010 | | 7/22/2010 | WMH |
| 49 | S19/S20 | 6F EOWAT | O | 7/20/2010 | | 7/22/2010 | WMH |
| 50 | S1/S21/CELL 1 | T AT NEO S1/S21 SEAM | O | 7/20/2010 | | 7/23/2010 | WMH |
| 51 | S1/S21/S22/S2 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 52 | S2/S22/S3/S23 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 53 | S3/S23/S4/S24 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 54 | S4/S24 | 12 F SONEO S4/S24 SEAM | O | 7/20/2010 | | 7/23/2010 | WMH |
| 55 | S4/S24/S5/S25 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 56 | S5/S25/S6/S26 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 57 | S6/S26/S7/S27 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 58 | S7/S27/S8/S28 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 59 | S8/S28/S9/S29 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 60 | S27/S28 | 200F EOWEOS | O | 7/20/2010 | | 7/23/2010 | WMH |
| 61 | S21/CELL 1 | 150F EOWEOS | LDT | 7/20/2010 | LDT-21 | 7/23/2010 | WMH |
| 62 | S21/S22 | 350F EOWEOS | LDT | 7/20/2010 | LDT-22 | 7/23/2010 | WMH |
| 63 | S23/S24 | 15F EOWEOS | LDT | 7/20/2010 | LDT-23 | 7/23/2010 | WMH |
| 64 | S24/S25 | 90F WOEEOS | LDT | 7/20/2010 | LDT-24 | 7/23/2010 | WMH |
| 65 | S25/S26 | 170F EOWEOS | LDT | 7/20/2010 | LDT-25 | 7/23/2010 | WMH |
| 66 | S26/S27 | 250F WOEEOS | LDT | 7/20/2010 | LDT-26 | 7/23/2010 | WMH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 4 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 67 | S27/S28 | 330F EOWEOS | LDT | 7/20/2010 | LDT-27 | 7/23/2010 | WMH |
| 68 | S30/S31 | 34F EOWEOS | LDT | 7/20/2010 | LDT-28 | 7/23/2010 | WMH |
| 69 | S36/S37 | 10F EOWEOS | LDT | 7/20/2010 | LDT-29 | 7/23/2010 | WMH |
| 70 | S23/S35 | 10F SONEOS | LDT | 7/20/2010 | LDT-30 | 7/23/2010 | WMH |
| 71 | S2/S22 | 10F SONEOS | LDT | 7/20/2010 | LDT-31 | 7/23/2010 | WMH |
| 72 | S21/CELL 1/S37 | NEOS S21/S37 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 73 | S21/S37/S36/S22 | WEOS S36/S37 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 74 | S36/S35/S22/S23 | WEOS S35/S36 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 75 | S23/S24/S34/S35 | WEOS S34/S35 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 76 | S24/S25/S33/S34 | WEOS S33/S34 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 77 | S25/S26/S32/S33 | WEOS S32/S33 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 78 | S26/S27/S31/S32 | WEOS S31/S32 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 79 | S27/S28/S30/S31 | WEOS S30/S31 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 80 | S42/S30/S28 | SEOS S30/S28 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 81 | S42/S30/S41 | EEOS S42 | O | 7/20/2010 | | 7/23/2010 | WMH |
| 82 | S39/S10/S29/S9 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 83 | S40/S41/S29/S39 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 84 | S41/S42/S29/S28 | 5 PANEL PATCH | O | 7/20/2010 | | 7/23/2010 | WMH |
| 85 | S42/S28 | 11F EOWEOS | O | 7/20/2010 | | 7/23/2010 | WMH |
| 86 | S40/S39/S48/S58 | 4 PANEL CORNER | O | 7/20/2010 | | 7/23/2010 | WMH |
| 87 | S47/S48/S39 | 3 PANEL PATCH | O | 7/20/2010 | | 7/23/2010 | WMH |
| 88 | S46/S47/S39 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 5 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 89 | S46/S39 | 45F WOEEOS | O | 7/20/2010 | | 7/24/2010 | WMH |
| 90 | S45/S46/S39 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 91 | S44/S45/S39 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 92 | S43/S44/S39 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 93 | S10/S11/S43/S39 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 94 | S10/S39 | 6F NOSEOS | O | 7/20/2010 | | 7/24/2010 | WMH |
| 95 | S56/S57/S43/S12/S11 | 5 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 96 | S12/S56 | 15F SONEOS | O | 7/20/2010 | | 7/24/2010 | WMH |
| 97 | S13/S12/S55/S56 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 98 | S54/S55/S14/S13 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 99 | S15/S53/S54/S14 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 100 | S53/S15/S52/S16 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 101 | S16/S17/S52/S51 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 102 | S17/S18/S50/S51 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 103 | S49/S50/S18/S19 | 4 PANEL CORNER | O | 7/20/2010 | | 7/24/2010 | WMH |
| 104 | S19/S20/S49 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 105 | S39/S29 | 100F EOWEOS | LDT | 7/20/2010 | LDT-32 | 7/24/2010 | WMH |
| 106 | S47/S48 | 11F SONEOS | LDT | 7/20/2010 | LDT-33 | 7/24/2010 | WMH |
| 107 | S46/S39 | 30F WOEEOS | LDT | 7/20/2010 | LDT-34 | 7/24/2010 | WMH |
| 108 | S49/S50 | 30F EOWEOS | LDT | 7/20/2010 | LDT-35 | 7/24/2010 | WMH |
| 109 | S50/S51 | 100F EOWEOS | LDT | 7/20/2010 | LDT-36 | 7/24/2010 | WMH |
| 110 | S51/S52 | 150F EOWEOS | LDT | 7/20/2010 | LDT-37 | 7/24/2010 | WMH |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 6 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 111 | S52/S53 | 200F EOWEOS | LDT | 7/20/2010 | LDT-38 | 7/24/2010 | WMH |
| 112 | S53/S54 | 250F EOWEOS | LDT | 7/20/2010 | LDT-39 | 7/24/2010 | WMH |
| 113 | S54/S55 | 300F EOWEOS | LDT | 7/20/2010 | LDT-40 | 7/24/2010 | WMH |
| 114 | S55/S56 | 350F EOWEOS | LDT | 7/20/2010 | LDT-41 | 7/24/2010 | WMH |
| 115 | S56/S57 | 300F EOWEOS | LDT | 7/20/2010 | LDT-42 | 7/24/2010 | WMH |
| 116 | S45/S57 | 70F WOEEOS | LDT | 7/20/2010 | LDT-43 | 7/24/2010 | WMH |
| 117 | SR-95/S56 | SOUTH SIDE OF SR-95 PATCH | LDT | 7/20/2010 | LDT-44 | 7/24/2010 | WMH |
| 118 | S57/S43/S44 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 119 | S57/S44/S45 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 120 | S57/S45/S46 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 121 | S46/S47/S57 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 122 | S57/S47/S48 | 3 PANEL PATCH | O | 7/20/2010 | | 7/24/2010 | WMH |
| 123 | S57/S48/S58 | 3 PANEL PATCH | O | 7/20/2010 | | 7/23/2010 | WMH |
| 124 | S57/S58 | 56F WOEEOS | O | 7/20/2010 | | 7/24/2010 | WMH |
| 125 | S57/S58 | 47F WOEEOS | O | 7/20/2010 | | 7/24/2010 | WMH |
| 126 | S21/CELL 1 | 106F WOEEOS | O | 7/20/2010 | | 7/23/2010 | WMH |
| 127 | S38/S37/CELL 1 | 3 PANEL PATCH | O | 7/20/2010 | | 7/23/2010 | WMH |
| 128 | S38/CELL 1 | 88F WOEEOS | O | 7/20/2010 | | 7/23/2010 | WMH |
| 129 | S38/CELL 1 | EAT | O | 7/20/2010 | | 7/23/2010 | WMH |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** William M. Harrison

# Cell 2 Secondary HDPE Geomembrane Repair Testing Log

S&ME

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 1 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | P | 2 FT X 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 2 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 3 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 4 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 5 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 6 | G&W | 1 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 7 | P | 3 FT X 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 8 | G&W | 1 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 9 | G&W | 1 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 10 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 11 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 12 | G&W | 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 13 | G&W | 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 14 | G&W | 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 15 | P | 5 FT X 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 16 | G&W | 2 FT X 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 17 | G&W | 2 FT X 6" | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 18 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 19 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 20 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 21 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 22 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 2 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | P | 2 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 24 | P | 1.5 FT X 5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 25 | G&W | 2.5 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 26 | G&W | 3 FT X 2 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 27 | G&W | 1 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 28 | G&W | 1 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 29 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 30 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 31 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 32 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 33 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 34 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 35 | P | 5 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 36 | P | 5 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 37 | P | 4 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 38 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 39 | P | 2 FT X 5 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 40 | P | 2 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 41 | P | 2 FT X 6 FT | JT | WMH | 7/21/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 42 | P | 2 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 43 | P | 2 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 44 | P | 2 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 3 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | P | 4 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 46 | P | 4 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 47 | P | 2 FT X 10 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 48 | P | 3 FT X 4 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 49 | P | 2 FT X 2 FT | JT | WMH | 7/22/2010 | VB | SL | WMH | P | 7/22/2010 | |
| 50 | P | 5 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/22/2010 | |
| 51 | P | 2.5 FT X 7 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 52 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 53 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 54 | P | 1.5 FT X 1.5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 55 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 56 | P | 1.5 FT X 3.5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 57 | P | 4 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 58 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 59 | P | 3 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 60 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 61 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 62 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 63 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 64 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 65 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 66 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 4 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 68 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 69 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 70 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 71 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 72 | P | 2 FT X 3 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 73 | P | 2.5 FT X 7 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 74 | P | 2 FT X 6 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 75 | P | 3 FT X 6 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 76 | P | 2 FT X 6 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 77 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 78 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 79 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 80 | P | 2 FT X 3 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 81 | P | 2 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 82 | P | 8 FT X 4 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 83 | P | 2 FT X 2 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 84 | P | 3 FT X 6 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 85 | P | 2 FT X 3 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 86 | P | 3 FT X 4 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 87 | P | 2 FT X 2 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 88 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 5 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | P | 2 FT X 6 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 90 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 91 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 92 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 93 | P | 2 FT X 4 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 94 | P | 2 FT X 4 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 95 | P | 4 FT X 10 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 96 | P | 1 FT X 2.5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 97 | P | 2 FT X 3 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 98 | P | 2.5 FT X 2.5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 99 | P | 2 FT X 2.5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 100 | P | 1.5 FT X 4 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 101 | P | 2 FT X 3 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 102 | P | 2 FT X 9 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 103 | P | 2 FT X 3 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 104 | P | 2 FT X 8 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 105 | P | 2 FT X 8 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 106 | P | 2 FT X 6 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 107 | P | 2 FT X 8 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 108 | P | 2 FT X 5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 109 | P | 2 FT X 5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 110 | P | 2 FT X 5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2 Secondary
**Project Location:** Terrell, North Carolina
**Page:** 6 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | P | 2 FT X 5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 112 | P | 2 FT X 5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 113 | P | 2 FT X 5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 114 | P | 2 FT X 5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 115 | P | 2 FT X 4 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 116 | P | 2 FT X 5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 117 | P | 2 FT X 5 FT | JT | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 118 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 119 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 120 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 121 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 122 | P | 2 FT X 2 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 123 | P | 3 FT X 9 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 124 | P | 1.5 FT X 1.5 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 125 | P | 2 FT X 3 FT | MV | WMH | 7/24/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 126 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 127 | G&W | 6" X 6" | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 128 | P | 2 FT X 5 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| 129 | P | 3 FT X 8 FT | JT | WMH | 7/23/2010 | VB | CV | WMH | P | 7/24/2010 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** William M. Harrison

# APPENDIX II – GEOSYNTHETICS
# Section 8 – Cell 2 Primary HDPE Geomembrane CQA Forms

**Geomembrane Deployment Report**
**Geomembrane Trial Seam Log**
**Geomembrane Seam Log**
**Destructive Laboratory Test Results**
**Geomembrane Defect Log**
**Geomembrane Repair Testing Log**

# Cell 2 Primary HDPE Geomembrane Deployment Report

S&ME

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# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 7/29,7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 2

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Carry Over | ----- | ----- | | |
| P1 | 211794 | 500 | 22 | 11,000 | 0 | WMH | 7/29/10 |
| P2 | 211317 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P3 | 211320 | 501 | 22 | 11,022 | 0 | WMH | 7/29/10 |
| P4 | 211792 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P5 | 211672 | 499 | 22 | 10,978 | 0 | WMH | 7/29/10 |
| P6 | 218414 | 502 | 22 | 11,044 | 0 | WMH | 7/29/10 |
| P7 | 211799 | 502 | 22 | 11,044 | 0 | WMH | 7/29/10 |
| P8 | 218715 | 502 | 22 | 11,044 | 0 | WMH | 7/29/10 |
| P9 | 212103 | 501 | 22 | 11,022 | 0 | WMH | 7/29/10 |
| P10 | 211438 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P11 | 211562 | 505 | 22 | 11,110 | 0 | WMH | 7/29/10 |
| P12 | 211445 | 505 | 22 | 11,110 | 0 | WMH | 7/29/10 |
| P13 | 211787 | 504 | 22 | 11,088 | 0 | WMH | 7/29/10 |
| P14 | 211682 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P15 | 211789 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P16 | 211551 | 502 | 22 | 11,044 | 0 | WMH | 7/29/10 |
| P17 | 211793 | 503 | 22 | 11,066 | 0 | WMH | 7/29/10 |
| P18 | 211549 | 501 | 22 | 11,022 | 0 | WMH | 7/29/10 |
| P19 | 218718 | 60 | 2.5 | 150 | 0 | WMH | 7/29/10 |
| P20 | 218718 | 30 | 2.5 | 75 | 0 | WMH | 7/29/10 |
| P21 | 219221 | 114 | 22 | 2,508 | 0 | WMH | 7/29/10 |
| P22 | 219101 | 64 | 22 | 1,408 | 0 | WMH | 7/29/10 |
| P23 | 211439 | 70 | 22 | 1,540 | 0 | WMH | 7/29/10 |
| P24 | 211551 | 4 | 22 | 88 | 0 | WMH | 7/29/10 |
| P25 | 211793 | 10 | 22 | 220 | 0 | WMH | 7/29/10 |
| P26 | 215155 | 4 | 22 | 88 | 0 | WMH | 7/29/10 |
| P27 | 211322 | 501 | 22 | 11,022 | 0 | WMH | 7/29/10 |
| P28 | 211443 | 501 | 22 | 11,022 | 0 | WMH | 7/29/10 |
| P29 | 218717 | 502 | 22 | 11,044 | 0 | WMH | 7/29/10 |
| | | | **Sheet Total** | 238,089 | 0 | | |
| | | | **Total to Date** | 238,089 | 0 | | |

**CQA Personnel:** William M. Harrison / Jimmy Addis

S&ME

# GEOMEMBRANE DEPLOYMENT REPORT

| Material Description |
|---|
| Agru America: 60-mil HDPE Liner |

**Date:** 7/29,7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 2

| Panel No. | Roll Number | Length (ft) | Width (ft) | Approximate Area ($ft^2$) Textured | Approximate Area ($ft^2$) Smooth | CQA Initials | Remarks |
|---|---|---|---|---|---|---|---|
| | | | **Carry Over** | 238,089 | 0 | | |
| P30 | 211703 | 503 | 22 | 11,066 | 0 | WMH | 7/30/10 |
| P31 | 212105 | 502 | 22 | 11,044 | 0 | WMH | 7/30/10 |
| P32 | 212106 | 502 | 22 | 11,044 | 0 | WMH | 7/30/10 |
| P33 | 218730 | 502 | 22 | 11,044 | 0 | WMH | 7/30/10 |
| P34 | 218719 | 503 | 22 | 11,066 | 0 | WMH | 7/30/10 |
| P35 | 211796 | 504 | 22 | 11,088 | 0 | WMH | 7/30/10 |
| P36 | 211667 | 503 | 6 | 3,018 | 0 | WMH | 7/30/10 |
| P37 | 211442 | 503 | 22 | 11,066 | 0 | WMH | 7/30/10 |
| P38 | 212107 | 496 | 22 | 10,912 | 0 | JHA | 7/30/10 |
| P39 | 219120 | 489 | 22 | 10,758 | 0 | JHA | 7/30/10 |
| P40 | 219119 | 490 | 22 | 10,780 | 0 | JHA | 7/30/10 |
| P41 | 219117 | 485 | 22 | 10,670 | 0 | JHA | 7/30/10 |
| P42 | 211437 | 490 | 22 | 10,780 | 0 | JHA | 7/30/10 |
| P43 | 211414 | 490 | 22 | 10,780 | 0 | JHA | 7/30/10 |
| P44 | 218728 | 496 | 22 | 10,912 | 0 | JHA | 7/30/10 |
| P45 | 211676 | 482 | 22 | 10,604 | 0 | JHA | 7/30/10 |
| P46 | 211704 | 495 | 22 | 10,890 | 0 | JHA | 7/30/10 |
| P47 | 212110 | 495 | 11 | 5,445 | 0 | JHA | 7/30/10 |
| P48 | 211563 | 498 | 22 | 10,956 | 0 | JHA | 7/30/10 |
| | | | **Sheet Total** | 193,923 | 0 | | |
| | | | **Total to Date** | 432,012 | 0 | | |

**CQA Personnel:** William M. Harrison / Jimmy Addis

# Cell 2 Primary HDPE Geomembrane Trial Seam Log

S&ME

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# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| P1 | 714 | WT | 3211 | 78 | 30 | 860 | 110 | 112 | 105 | 112 | 106 | 110 | 122 | 125 | 126 | P | F | SS | WH | 07/29/2010 |
| P2 | 720 | BV | 1219 | 78 | 5 | 850 | 120 | 121 | 116 | 120 | 114 | 124 | 146 | 142 | 147 | P | F | ST | WH | 07/29/2010 |
| P3 | 725 | DC | 3210 | 78 | 27 | 860 | 116 | 111 | 109 | 104 | 114 | 101 | 149 | 154 | 154 | P | F | SS | WH | 07/29/2010 |
| P4 | 900 | BV | 1219 | 78 | 7 | 860 | 119 | 110 | 120 | 114 | 116 | 111 | 152 | 146 | 151 | P | F | SS | WH | 07/29/2010 |
| P5 | 905 | BV | 1219 | 78 | 5 | 860 | 111 | 114 | 110 | 107 | 116 | 121 | 156 | 149 | 152 | P | F | TT | WH | 07/29/2010 |
| P6 | 1333 | WT | 3211 | 92 | 30 | 860 | 101 | 119 | 97 | 117 | 91 | 116 | 152 | 148 | 140 | P | F | SS | WH | 07/29/2010 |
| P7 | 1350 | DC | 3210 | 92 | 30 | 860 | 99 | 102 | 97 | 108 | 101 | 105 | 143 | 141 | 148 | P | F | SS | WH | 07/29/2010 |
| P8 | 1335 | BV | 1219 | 92 | 5 | 860 | 115 | 106 | 118 | 121 | 111 | 103 | 146 | 151 | 148 | P | F | TT | WH | 07/29/2010 |
| P9 | 1335 | BV | 1219 | 92 | 5 | 860 | 117 | 121 | 114 | 123 | 110 | 117 | 143 | 148 | 145 | P | F | ST | WH | 07/29/2010 |
| P10 | 1338 | BV | 1219 | 92 | 7 | 860 | 116 | 122 | 114 | 110 | 106 | 108 | 142 | 146 | 143 | P | F | SS | WH | 07/29/2010 |
| P11 | 730 | JT | 5171 | 75 | 500 | 550 | 120 | 0 | 121 | 0 | 130 | 0 | 149 | 143 | 150 | P | Ex | TT | WH | 07/30/2010 |
| P12 | 730 | DC | 3210 | 75 | 30 | 860 | 109 | 99 | 99 | 94 | 110 | 93 | 163 | 170 | 165 | P | F | SS | WH | 07/30/2010 |
| P13 | 725 | WT | 3211 | 75 | 30 | 860 | 111 | 105 | 112 | 104 | 132 | 134 | 166 | 164 | 165 | P | F | SS | WH | 07/30/2010 |
| P14 | 1030 | BV | 1219 | 80 | 5 | 860 | 118 | 115 | 122 | 114 | 126 | 119 | 151 | 150 | 148 | P | F | TT | WH | 07/30/2010 |
| P15 | 1035 | BV | 1219 | 80 | 5 | 860 | 110 | 112 | 117 | 116 | 115 | 117 | 146 | 151 | 148 | P | F | SS | WH | 07/30/2010 |

Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** William Harrison

S&ME

# GEOMEMBRANE TRIAL SEAM LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 **of** 2

| | | | | | Machine Settings | | Peel Test Results | | | | | | Shear Test Results | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | Approx. Time | Tech. Init. | Mach. No. | Ambient Temp. | Preheat or Speed | Temp. Setting | 1 | | 2 | | 3 | | 1 | 2 | 3 | Pass/ Fail | Weld Type | Material | CQA Init. | Date |
| P16 | 1100 | WT | 3211 | 80 | 17 | 860 | 115 | 122 | 118 | 124 | 119 | 121 | 148 | 146 | 152 | P | F | ST | WH | 07/30/2010 |
| P17 | 1300 | JT | 5171 | 92 | 500 | 550 | 120 | 0 | 130 | 0 | 121 | 0 | 146 | 151 | 147 | P | Ex | TT | WH | 07/30/2010 |
| P18 | 1300 | BV | 1219 | 92 | 5 | 860 | 118 | 114 | 116 | 121 | 116 | 120 | 145 | 152 | 150 | P | F | TT | WH | 07/30/2010 |
| P19 | 1305 | MV | 5171 | 92 | 500 | 550 | 117 | 0 | 120 | 0 | 118 | 0 | 146 | 141 | 156 | P | Ex | TT | WH | 07/30/2010 |
| P20 | 1400 | DC | 249 | 92 | 500 | 550 | 119 | 0 | 124 | 0 | 111 | 0 | 140 | 137 | 146 | P | Ex | TT | WH | 07/30/2010 |
| | | | | | | | | | | | | | | | | | | | | |
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Weld Type: (**Ex**)trusion, (**F**)usion
Material: (**SS**) Smooth/Smooth - (**ST**) Smooth/Texture - (**TT**) Texture /Texture

**CQA Personnel:** William Harrison

# Cell 2 Primary HDPE Geomembrane Seam Log

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1 / P2 | EEOS / WAT | 7:32 | WT | 3211 | 494 | 2 | Air | 8:10 / 8:15 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P2 / P3 | EEOS / WAT | 7:35 | DC | 3210 | 493 | 3 | Air | 8:16 / 8:21 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P1 / Cell 1 | EEOS / WAT | 7:42 | BV | 1219 | 495 | 1 | Air | 8:55 / 9:00 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | Z2 8:52/8:57 30/30<br>Z3 8:49/8:54 30/30<br>Z4 9:01/9:06 30/29<br>Z5 9:07/9:12 30/29<br>Z6 9:04/9:09 30/29 |
| P4 / P5 | EEOS / WAT | 8:04 | DC | 3210 | 491 | 5 | Air | 9:25 / 9:30 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | Z2 9:20/9:25 30/30 |
| P3 / P4 | EEOS / WAT | 8:05 | WT | 3211 | 491 | 4 | Air | 8:45 / 8:50 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | Z2 8:47/8:52 30/30 |
| P5 / P6 | EEOS / WAT | 8:35 | DC | 3210 | 491 | 6 | Air | 9:10 / 9:15 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P6 / P7 | EEOS / WAT | 8:39 | WT | 3211 | 493 | 7 | Air | 9:14 / 9:19 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P7 / P8 | EEOS / WAT | 9:07 | WT | 3211 | 494 | 8 | Air | 9:35 / 9:40 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P8 / P9 | EEOS / WAT | 9:11 | DC | 3210 | 496 | 9 | Air | 9:41 / 9:46 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P10 / P19 | EEOS / WEOS | 9:52 | BV | 1219 | 62 | | Air | 9:04 / 9:09 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P10 / P11 | EAT / WEOS | 9:55 | WT | 3211 | 493 | 11 | Air | 10:49 / 10:54 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P11 / P12 | EAT / WEOS | 9:57 | DC | 3210 | 490 | 12 | Air | 10:50 / 10:55 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P10 / P20 | EEOS / WEOS | 10:00 | BV | 1219 | 30 | | Air | 9:08 / 9:13 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P20 / Cell 1 | WEOS / EEOS | 10:08 | BV | 1219 | 30 | | Air | 10:14 / 10:19 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P19 / Cell 1 | WEOS / EEOS | 10:12 | BV | 1219 | 62 | 20 | Air | 10:25 / 10:30 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| | | | | **Sheet Total** | 5,605 | | | | | | | | | |
| | | | | **Total to Date** | 5,605 | | | | | | | | | |

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P10 / Cell 1 | EEOS / WEOS | 10:23 | BV | 1219 | 406 | 10 | Air | 10:33 / 10:38 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | Z2 11:20/11:25 30/30<br>Z3 11:30/11:35 30/30 |
| P13 / P14 | EAT / WEOS | 10:32 | DC | 3210 | 491 | 14 | Air | 11:03 / 11:08 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P12 / P13 | EAT / WEOS | 10:34 | WT | 3211 | 495 | 13 | Air | 11:06 / 11:11 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P15 / P16 | EAT / WEOS | 11:00 | DC | 3210 | 495 | 16 | Air | 12:05 / 12:10 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P14 / P15 | EAT / WEOS | 11:15 | WT | 3211 | 496 | 15 | Air | 12:11 / 12:16 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P1 / P21 | NEOS / SEOS | 11:29 | BV | 1219 | 22 | | Air | 11:33 / 11:38 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P2 / P21 | NEOS / SEOS | 11:30 | BV | 1219 | 22 | | Air | 11:36 / 11:41 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P3 / P21 | NEOS / SEOS | 11:34 | BV | 1219 | 22 | | Air | 11:39 / 11:44 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P4 / P21 | NEOS / SEOS | 11:37 | BV | 1219 | 22 | | Air | 11:43 / 11:48 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P5 / P21 | NEOS / SEOS | 11:40 | BV | 1219 | 22 | | Air | 11:48 / 11:53 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P17 / P18 | EAT / WEOS | 11:45 | DC | 3210 | 479 | 18 | Air | 13:22 / 13:27 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P6 / P22 | NEOS / SEOS | 11:45 | BV | 1219 | 22 | | Air | 11:52 / 11:52 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P7 / P22 | NEOS / SEOS | 11:49 | BV | 1219 | 22 | | Air | 11:55 / 12:00 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P16 / P17 | EAT / WEOS | 11:50 | WT | 3211 | 485 | 17 | Air | 13:30 / 13:35 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P8 / P22 | NEOS / SEOS | 11:52 | BV | 1219 | 22 | | Air | 11:58 / 12:03 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| | | | | **Sheet Total** | 3,523 | | | | | | | | | |
| | | | | **Total to Date** | 9,128 | | | | | | | | | |

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P26 / P9 | NEOS / SEOS | 11:56 | BV | 1219 | 22 | | Air | 12:04 / 12:09 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P18 / P26 | NEOS / SEOS | 12:00 | BV | 1219 | 22 | | Air | 13:15 / 13:20 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P21 / P22 | WEOS / EEOS | 12:07 | BV | 1219 | 22 | 19 | Air | 13:18 / 13:23 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P25 / P23 | EEOS / WEOS | 13:36 | BV | 1219 | 6 | | Air | 13:38 / 13:43 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P13 / P25 | NEOS / SEOS | 13:38 | BV | 1219 | 23 | | Air | 13:50 / 13:55 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P14 / P25 | EEOS / SEOS | 13:41 | BV | 1219 | 6 | | Air | 13:44 / 13:49 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P10 / P24 | NEOS / SEOS | 13:43 | BV | 1219 | 22 | | Air | 14:11 / 14:16 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P24 / P23 | NEOS / SEOS | 13:48 | BV | 1219 | 22 | | Air | 14:05 / 14:10 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P23 / P11 | NEOS / SEOS | 13:51 | BV | 1219 | 22 | | Air | 14:08 / 14:13 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P23 / P12 | NEOS / SEOS | 13:54 | BV | 1219 | 24 | | Air | 13:58 / 14:03 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P23 / P13 | EEOS / WEOS | 13:57 | BV | 1219 | 10 | | Air | 14:01 / 14:06 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P28 / P29 | WAT / EEOS | 14:02 | DC | 3210 | 498 | 22 | Air | 15:03 / 15:08 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P21 / P23 | NEOS / SEOS | 14:03 | BV | 1219 | 70 | | Air | 14:14 / 14:19 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P25 / P21 | NEOS / SEOS | 14:11 | BV | 1219 | 22 | | Air | 14:16 / 14:21 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | Z2 14:15/14:30 30/29 |
| P14 / P21 | NEOS / SEOS | 14:13 | BV | 1219 | 12 | | Air | 14:17 / 14:22 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| | | | | **Sheet Total** | 803 | | | | | | | | | |
| | | | | **Total to Date** | 9,931 | | | | | | | | | |

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P15 / P22 | NEOS / SEOS | 14:17 | BV | 1219 | 22 | | Air | 14:24 / 14:29 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P27 / P28 | WAT / EEOS | 14:17 | WT | 3211 | 498 | 21 | Air | 15:00 / 15:05 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P16 / P22 | NEOS / SEOS | 14:19 | BV | 1219 | 22 | | Air | 14:25 / 14:30 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P17 / P22 | NEOS / SEOS | 14:22 | BV | 1219 | 23 | | Air | 14:28 / 14:33 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P18 / P22 | EEOS / WEOS | 14:25 | BV | 1219 | 15 | | Air | 14:30 / 14:35 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P29 / P30 | WAT / EEOS | 14:33 | DC | 3210 | 499 | 23 | Air | 15:10 / 15:15 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P23 / Cell 1 | WEOS / EEOS | 14:38 | BV | 1219 | 22 | | Air | 14:44 / 14:49 | 30 / 29 | RC | WMH | PASS | 7/29/2010 | |
| P21 / Cell 1 | EEOS / WEOS | 14:40 | BV | 1219 | 22 | | Air | 14:47 / 14:52 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P30 / P31 | WAT / EEOS | 14:49 | WT | 3211 | 497 | 24 | Air | 15:20 / 15:25 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P31 / P32 | WAT / EEOS | 15:04 | DC | 3210 | 498 | 25 | Air | 15:30 / 15:25 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P32 / P33 | WAT / EEOS | 15:23 | WT | 3211 | 498 | 26 | Air | 15:55 / 16:00 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P33 / P34 | WAT / EEOS | 15:46 | DC | 3210 | 498 | 27 | Air | 16:11 / 16:16 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P36 / P37 | WAT / EEOS | 15:50 | BV | 1219 | 498 | 29 | Air | 7:00 / 7:05 | 30 / 30 | RC | WMH | PASS | 7/30/2010 | |
| P34 / P35 | WAT / EEOS | 16:00 | WT | 3211 | 497 | 44 | Air | 16:25 / 16:30 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| P37 / P9 | EEOS / WAT | 16:10 | DC | 3210 | 498 | 30 | Air | 16:40 / 16:45 | 30 / 30 | RC | WMH | PASS | 7/29/2010 | |
| | | | | **Sheet Total** | 4,607 | | | | | | | | | |
| | | | | **Total to Date** | 14,538 | | | | | | | | | |

**CQA Personnel:** William M. Harrison

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | Pressure Start/ Finish | Tech. Init. | QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P35 / P36 | WAT / EEOS | 16:27 | WT | 3211 | 499 | 28 | Air | 7:10 / 7:15 | 30 / 30 | RC | WMH | PASS | 7/30/2010 | |
| P38 / P39 | WEOS / EAT | 8:14 | DC | 3210 | 493 | 31 | Air | 8:55 / 9:00 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P39 / P40 | WEOS / EAT | 8:24 | WT | 3211 | 486 | 32 | Air | 8:57 / 9:02 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P40 / P41 | WEOS / EAT | 8:45 | DC | 3210 | 482 | 33 | Air | 9:16 / 9:21 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P41 / P42 | WEOS / EAT | 8:56 | WT | 3211 | 482 | 34 | Air | 9:30 / 9:35 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P42 / P43 | WEOS / EAT | 9:25 | DC | 3210 | 466 | 35 | Air | 9:52 / 9:57 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P43 / P44 | WEOS / EAT | 9:34 | WT | 3211 | 472 | 36 | Air | 10:00 / 10:05 | 30 / 29 | RC | JHA | PASS | 7/30/2010 | |
| P44 / P45 | WEOS / EAT | 9:57 | DC | 3210 | 466 | 37 | Air | 10:25 / 10:30 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P45 / P46 | WEOS / EAT | 10:10 | WT | 3211 | 478 | 38 | Air | 10:40 / 10:45 | 30 / 29 | RC | JHA | PASS | 7/30/2010 | |
| P18 / P48 | EAT / WEOS | 10:34 | BV | 1219 | 488 | 41 | Air | 11:22 / 11:27 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | Z2 11:33/11:38 30/30 |
| P47 / P48 | WEOS / EAT | 10:55 | DC | 3210 | 476 | 40 | Air | 11:15 / 11:20 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | Z2 11:20/11:25 30/30 |
| P46 / P47 | WEOS / EAT | 11:04 | WT | 3211 | 479 | 39 | Air | 12:40 / 12:45 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P37 / P48 | NEOS / SEOS | 13:01 | BV | 1219 | 22 | | Air | 13:04 / 13:09 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | Z2 13:08/13:13 30/30 |
| P36 / P47 | NEOS / SEOS | 13:06 | BV | 1219 | 6 | | Air | 13:09 / 13:14 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P35 / P46 | NEOS / SEOS | 13:07 | BV | 1219 | 22 | | Air | 13:12 / 13:17 | 30 / 29 | RC | JHA | PASS | 7/30/2010 | |
| | | | | **Sheet Total** | 5,817 | | | | | | | | | |
| | | | | **Total to Date** | 20,355 | | | | | | | | | |

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE SEAM LOG

**Date:** 7/29/2010-7/30/2010
**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 6

| Seam Panels | Seam Start/Finish | Time | Tech. Init. | Mach. No. | Length Welded | Located Destr. Number | Test Type (Air / Vac.) | AIR PRESSURE TEST Time Start/ Finish | AIR PRESSURE TEST Pressure Start/ Finish | AIR PRESSURE TEST Tech. Init. | AIR PRESSURE TEST QC Init. | Pass /Fail | Date | Remarks (ZONE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P34 / P45 | NEOS / SEOS | 13:10 | BV | 1219 | 22 | | Air | 13:16 / 13:21 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P33 / P44 | NEOS / SEOS | 13:13 | BV | 1219 | 22 | | Air | 13:20 / 13:25 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P32 / P43 | NEOS / SEOS | 13:16 | BV | 1219 | 22 | | Air | 13:23 / 13:28 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P31 / P42 | NEOS / SEOS | 13:20 | BV | 1219 | 22 | 43 | Air | 13:28 / 13:33 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P30 / P41 | NEOS / SEOS | 13:24 | BV | 1219 | 22 | | Air | 13:32 / 13:37 | 30 / 29 | RC | JHA | PASS | 7/30/2010 | |
| P29 / P40 | NEOS / SEOS | 13:27 | BV | 1219 | 22 | | Air | 13:35 / 13:40 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P28 / P39 | NEOS / SEOS | 13:30 | BV | 1219 | 22 | | Air | 13:40 / 13:45 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
| P27 / P38 | NEOS / SAT | 13:34 | BV | 1219 | 18 | | Air | 13:44 / 13:49 | 30 / 30 | RC | JHA | PASS | 7/30/2010 | |
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|---|---|
| **Sheet Total** | 172 |
| **Total to Date** | 20,527 |

**CQA Personnel:** James Addis

# Cell 2 Primary HDPE Geomembrane Destructive Laboratory Test Results

DRAFT

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P1
Tested by: William Harrison
Date Tested: 07/30/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 164.0 | Elongation |
| S2 | 159.0 | Elongation |
| S3 | 159.0 | Elongation |
| S4 | 157.0 | Elongation |
| S5 | 160.0 | Elongation |
| Average | 159.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.3 | |
| Maximum | 164.0 | |
| Minimum | 157.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 116.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 136.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 112.0 | FTB |
| P4A | 147.0 | FTB |
| P4B | 122.0 | FTB |
| P5A | 127.0 | FTB |
| P5B | 143.0 | FTB |
| Average | 128.0 | *FTB - Film Tear Bond |
| Standard Deviation | 10.8 | |
| Maximum | 147.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P2
Tested by: William Harrison
Date Tested: 07/30/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 173.0 | Elongation |
| S2 | 171.0 | Elongation |
| S3 | 183.0 | Elongation |
| S4 | 182.0 | Elongation |
| S5 | 179.0 | Elongation |
| Average | 177.6 | *FTB - Film Tear Bond |
| Standard Deviation | 4.8 | |
| Maximum | 183.0 | |
| Minimum | 171.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 128.0 | FTB |
| P2A | 136.0 | FTB |
| P2B | 110.0 | FTB |
| P3A | 142.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 124.0 | FTB |
| P5A | 138.0 | FTB |
| P5B | 112.0 | FTB |
| Average | 127.2 | *FTB - Film Tear Bond |
| Standard Deviation | 10.0 | |
| Maximum | 142.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P3
Tested by: William Harrison
Date Tested: 07/30/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 186.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 175.0 | Elongation |
| S4 | 178.0 | Elongation |
| S5 | 190.0 | Elongation |
| Average | 182.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 190.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 138.0 | FTB |
| P1B | 124.0 | FTB |
| P2A | 130.0 | FTB |
| P2B | 137.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 139.0 | FTB |
| P4A | 133.0 | FTB |
| P4B | 137.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 142.0 | FTB |
| Average | 134.0 | *FTB - Film Tear Bond |
| Standard Deviation | 5.2 | |
| Maximum | 142.0 | |
| Minimum | 124.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P4
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 195.0 | Elongation |
| S2 | 188.0 | Elongation |
| S3 | 187.0 | Elongation |
| S4 | 190.0 | Elongation |
| S5 | 186.0 | Elongation |
| Average | 189.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 195.0 | |
| Minimum | 186.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 103.0 | FTB |
| P1B | 133.0 | FTB |
| P2A | 106.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 108.0 | FTB |
| P3B | 141.0 | FTB |
| P4A | 106.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 137.0 | FTB |
| Average | 119.5 | *FTB - Film Tear Bond |
| Standard Deviation | 13.2 | |
| Maximum | 141.0 | |
| Minimum | 103.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P5
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 188.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 186.0 | Elongation |
| S4 | 187.0 | Elongation |
| S5 | 184.0 | Elongation |
| Average | 185.6 | *FTB - Film Tear Bond |
| Standard Deviation | 1.9 | |
| Maximum | 188.0 | |
| Minimum | 183.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 128.0 | FTB |
| P1B | 134.0 | FTB |
| P2A | 135.0 | FTB |
| P2B | 123.0 | FTB |
| P3A | 132.0 | FTB |
| P3B | 141.0 | FTB |
| P4A | 117.0 | FTB |
| P4B | 122.0 | FTB |
| P5A | 132.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 128.5 | *FTB - Film Tear Bond |
| Standard Deviation | 7.2 | |
| Maximum | 141.0 | |
| Minimum | 117.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P6
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 182.0 | Elongation |
| S2 | 175.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 185.0 | Elongation |
| Average | 181.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 185.0 | |
| Minimum | 175.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 115.0 | FTB |
| P1B | 129.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 114.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 119.9 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 129.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P7
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 181.0 | Elongation |
| S2 | 182.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 185.0 | Elongation |
| Average | 182.2 | *FTB - Film Tear Bond |
| Standard Deviation | 1.7 | |
| Maximum | 185.0 | |
| Minimum | 180.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 133.0 | FTB |
| P1B | 117.0 | FTB |
| P2A | 125.0 | FTB |
| P2B | 118.0 | FTB |
| P3A | 134.0 | FTB |
| P3B | 121.0 | FTB |
| P4A | 126.0 | FTB |
| P4B | 124.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 124.6 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 134.0 | |
| Minimum | 117.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P8
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 178.0 | Elongation |
| S2 | 175.0 | Elongation |
| S3 | 179.0 | Elongation |
| S4 | 172.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 175.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.5 | |
| Maximum | 179.0 | |
| Minimum | 172.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 135.0 | FTB |
| P1B | 113.0 | FTB |
| P2A | 137.0 | |
| P2B | 100.0 | FTB |
| P3A | 112.0 | FTB |
| P3B | 138.0 | FTB |
| P4A | 118.0 | FTB |
| P4B | 144.0 | FTB |
| P5A | 137.0 | FTB |
| P5B | 113.0 | FTB |
| Average | 124.7 | *FTB - Film Tear Bond |
| Standard Deviation | 14.3 | |
| Maximum | 144.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P9
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

**SHEAR TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| S1 | 181.0 | Elongation |
| S2 | 178.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 177.0 | Elongation |
| S5 | 183.0 | Elongation |
| Average | 179.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 183.0 | |
| Minimum | 177.0 | |
| Pass/Fail [1,2,3] | PASS | |

**PEEL TESTING (ASTM D-6392)**

| Specimen No. | Load at Yield (lbs/in) | Failure Description |
|---|---|---|
| P1A | 132.0 | FTB |
| P1B | 106.0 | FTB |
| P2A | 131.0 | FTB |
| P2B | 109.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 139.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 110.0 | FTB |
| P5A | 127.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 120.9 | *FTB - Film Tear Bond |
| Standard Deviation | 10.6 | |
| Maximum | 139.0 | |
| Minimum | 106.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P10
Tested by: James Addis
Date Tested: 08/03/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 171.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 178.0 | Elongation |
| S5 | 175.0 | Elongation |
| Average | 176.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 180.0 | |
| Minimum | 171.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 140.0 | FTB |
| P1B | 154.0 | FTB |
| P2A | 141.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 139.0 | FTB |
| P4A | 138.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 143.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 137.9 | *FTB - Film Tear Bond |
| Standard Deviation | 7.2 | |
| Maximum | 154.0 | |
| Minimum | 127.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P11
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 190.0 | Elongation |
| S2 | 191.0 | Elongation |
| S3 | 191.0 | Elongation |
| S4 | 191.0 | Elongation |
| S5 | 189.0 | Elongation |
| Average | 190.4 | *FTB - Film Tear Bond |
| Standard Deviation | 0.8 | |
| Maximum | 191.0 | |
| Minimum | 189.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 140.0 | FTB |
| P1B | 140.0 | FTB |
| P2A | 136.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 134.0 | FTB |
| P3B | 139.0 | FTB |
| P4A | 136.0 | FTB |
| P4B | 135.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 133.0 | FTB |
| Average | 135.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 140.0 | |
| Minimum | 126.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P12
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 185.0 | Elongation |
| S2 | 186.0 | Elongation |
| S3 | 180.0 | Elongation |
| S4 | 187.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 184.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 187.0 | |
| Minimum | 180.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 135.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 131.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 132.0 | FTB |
| P4B | 136.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 136.0 | FTB |
| Average | 131.9 | *FTB - Film Tear Bond |
| Standard Deviation | 2.9 | |
| Maximum | 136.0 | |
| Minimum | 126.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P13
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 179.0 | Elongation |
| S2 | 179.0 | Elongation |
| S3 | 181.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 183.0 | Elongation |
| Average | 181.0 | *FTB - Film Tear Bond |
| Standard Deviation | 1.8 | |
| Maximum | 183.0 | |
| Minimum | 179.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 128.0 | FTB |
| P1B | 132.0 | FTB |
| P2A | 128.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 133.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 138.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 125.0 | FTB |
| P5B | 120.0 | FTB |
| Average | 129.8 | *FTB - Film Tear Bond |
| Standard Deviation | 4.8 | |
| Maximum | 138.0 | |
| Minimum | 120.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P14
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 185.0 | Elongation |
| S2 | 183.0 | Elongation |
| S3 | 182.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 185.0 | Elongation |
| Average | 182.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 185.0 | |
| Minimum | 179.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 140.0 | FTB |
| P1B | 148.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 136.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 134.0 | FTB |
| P4A | 134.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 131.0 | FTB |
| P5B | 122.0 | FTB |
| Average | 133.0 | *FTB - Film Tear Bond |
| Standard Deviation | 7.0 | |
| Maximum | 148.0 | |
| Minimum | 122.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P15
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 178.0 | Elongation |
| S2 | 174.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 181.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 177.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.3 | |
| Maximum | 181.0 | |
| Minimum | 174.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 125.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 118.0 | FTB |
| P3A | 116.0 | FTB |
| P3B | 114.0 | FTB |
| P4A | 112.0 | FTB |
| P4B | 114.0 | FTB |
| P5A | 126.0 | FTB |
| P5B | 115.0 | FTB |
| Average | 119.0 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 127.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P16
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 187.0 | Elongation |
| S2 | 186.0 | Elongation |
| S3 | 179.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 188.0 | Elongation |
| Average | 184.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 188.0 | |
| Minimum | 179.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 129.0 | FTB |
| P1B | 128.0 | FTB |
| P2A | 130.0 | FTB |
| P2B | 127.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 125.0 | FTB |
| Average | 127.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.8 | |
| Maximum | 132.0 | |
| Minimum | 122.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P17
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 174.0 | Elongation |
| S3 | 176.0 | Elongation |
| S4 | 176.0 | Elongation |
| S5 | 176.0 | Elongation |
| Average | 176.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 180.0 | |
| Minimum | 174.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 122.0 | FTB |
| P1B | 122.0 | FTB |
| P2A | 122.0 | FTB |
| P2B | 125.0 | FTB |
| P3A | 117.0 | FTB |
| P3B | 120.0 | FTB |
| P4A | 122.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 121.5 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 126.0 | |
| Minimum | 117.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P18
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 180.0 | Elongation |
| S2 | 180.0 | Elongation |
| S3 | 181.0 | Elongation |
| S4 | 181.0 | Elongation |
| S5 | 179.0 | Elongation |
| Average | 180.2 | *FTB - Film Tear Bond |
| Standard Deviation | 0.7 | |
| Maximum | 181.0 | |
| Minimum | 179.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 121.0 | FTB |
| P2A | 129.0 | FTB |
| P2B | 122.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 158.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 159.0 | FTB |
| P5B | 110.0 | FTB |
| Average | 129.9 | *FTB - Film Tear Bond |
| Standard Deviation | 15.3 | |
| Maximum | 159.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | FAIL | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P19
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 168.0 | Elongation |
| S2 | 164.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 170.0 | Elongation |
| S5 | 167.0 | Elongation |
| Average | 168.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.0 | |
| Maximum | 173.0 | |
| Minimum | 164.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 144.0 | FTB |
| P1B | 139.0 | FTB |
| P2A | 138.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 148.0 | FTB |
| P3B | 138.0 | FTB |
| P4A | 135.0 | FTB |
| P4B | 146.0 | FTB |
| P5A | 134.0 | FTB |
| P5B | 134.0 | FTB |
| Average | 138.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.8 | |
| Maximum | 148.0 | |
| Minimum | 128.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P20
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 160.0 | Elongation |
| S2 | 162.0 | Elongation |
| S3 | 170.0 | Elongation |
| S4 | 165.0 | Elongation |
| S5 | 169.0 | Elongation |
| Average | 165.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.9 | |
| Maximum | 170.0 | |
| Minimum | 160.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 123.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 121.0 | FTB |
| P4B | 113.0 | FTB |
| P5A | 126.0 | FTB |
| P5B | 115.0 | FTB |
| Average | 121.1 | *FTB - Film Tear Bond |
| Standard Deviation | 5.7 | |
| Maximum | 131.0 | |
| Minimum | 113.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P21
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 181.0 | Elongation |
| S2 | 187.0 | Elongation |
| S3 | 185.0 | Elongation |
| S4 | 184.0 | Elongation |
| S5 | 188.0 | Elongation |
| Average | 185.0 | *FTB - Film Tear Bond |
| Standard Deviation | 2.4 | |
| Maximum | 188.0 | |
| Minimum | 181.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 131.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 132.0 | FTB |
| P3A | 113.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 131.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 129.0 | FTB |
| Average | 125.6 | *FTB - Film Tear Bond |
| Standard Deviation | 6.5 | |
| Maximum | 132.0 | |
| Minimum | 113.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P22
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 183.0 | Elongation |
| S2 | 180.0 | Elongation |
| S3 | 171.0 | Elongation |
| S4 | 179.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 178.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 183.0 | |
| Minimum | 171.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 126.0 | FTB |
| P1B | 129.0 | FTB |
| P2A | 138.0 | FTB |
| P2B | 134.0 | FTB |
| P3A | 135.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 129.0 | FTB |
| P4B | 132.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 135.0 | FTB |
| Average | 131.8 | *FTB - Film Tear Bond |
| Standard Deviation | 3.5 | |
| Maximum | 138.0 | |
| Minimum | 126.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P23
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 173.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 172.0 | Elongation |
| S4 | 171.0 | Elongation |
| S5 | 172.0 | Elongation |
| Average | 171.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.4 | |
| Maximum | 173.0 | |
| Minimum | 169.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 138.0 | FTB |
| P1B | 135.0 | FTB |
| P2A | 111.0 | FTB |
| P2B | 112.0 | FTB |
| P3A | 114.0 | FTB |
| P3B | 114.0 | FTB |
| P4A | 138.0 | FTB |
| P4B | 135.0 | FTB |
| P5A | 135.0 | FTB |
| P5B | 111.0 | FTB |
| Average | 124.3 | *FTB - Film Tear Bond |
| Standard Deviation | 12.0 | |
| Maximum | 138.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P24
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 185.0 | Elongation |
| S2 | 184.0 | Elongation |
| S3 | 184.0 | Elongation |
| S4 | 164.0 | Elongation |
| S5 | 178.0 | Elongation |
| Average | 179.0 | *FTB - Film Tear Bond |
| Standard Deviation | 7.9 | |
| Maximum | 185.0 | |
| Minimum | 164.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 126.0 | FTB |
| P1B | 128.0 | FTB |
| P2A | 127.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 130.0 | FTB |
| P3B | 126.0 | FTB |
| P4A | 124.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 128.0 | FTB |
| P5B | 127.0 | FTB |
| Average | 127.1 | *FTB - Film Tear Bond |
| Standard Deviation | 1.5 | |
| Maximum | 130.0 | |
| Minimum | 124.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P25
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 183.0 | Elongation |
| S2 | 173.0 | Elongation |
| S3 | 183.0 | Elongation |
| S4 | 180.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 180.2 | *FTB - Film Tear Bond |
| Standard Deviation | 3.8 | |
| Maximum | 183.0 | |
| Minimum | 173.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 125.0 | FTB |
| P1B | 128.0 | FTB |
| P2A | 128.0 | FTB |
| P2B | 132.0 | FTB |
| P3A | 131.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 132.0 | FTB |
| P5B | 131.0 | FTB |
| Average | 128.9 | *FTB - Film Tear Bond |
| Standard Deviation | 2.4 | |
| Maximum | 132.0 | |
| Minimum | 125.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P26
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 172.0 | Elongation |
| S2 | 176.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 170.0 | Elongation |
| S5 | 172.0 | Elongation |
| Average | 172.6 | *FTB - Film Tear Bond |
| Standard Deviation | 2.0 | |
| Maximum | 176.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 132.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 119.0 | FTB |
| P2B | 121.0 | FTB |
| P3A | 127.0 | FTB |
| P3B | 116.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 112.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 114.0 | FTB |
| Average | 120.1 | *FTB - Film Tear Bond |
| Standard Deviation | 6.2 | |
| Maximum | 132.0 | |
| Minimum | 112.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P27
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 175.0 | Elongation |
| S2 | 172.0 | Elongation |
| S3 | 173.0 | Elongation |
| S4 | 172.0 | Elongation |
| S5 | 170.0 | Elongation |
| Average | 172.4 | *FTB - Film Tear Bond |
| Standard Deviation | 1.6 | |
| Maximum | 175.0 | |
| Minimum | 170.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 124.0 | FTB |
| P1B | 119.0 | FTB |
| P2A | 139.0 | FTB |
| P2B | 127.0 | FTB |
| P3A | 137.0 | FTB |
| P3B | 122.0 | FTB |
| P4A | 116.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 116.0 | FTB |
| P5B | 121.0 | FTB |
| Average | 124.9 | *FTB - Film Tear Bond |
| Standard Deviation | 7.6 | |
| Maximum | 139.0 | |
| Minimum | 116.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P28
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 169.0 | Elongation |
| S2 | 163.0 | Elongation |
| S3 | 168.0 | Elongation |
| S4 | 169.0 | Elongation |
| S5 | 163.0 | Elongation |
| Average | 166.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.8 | |
| Maximum | 169.0 | |
| Minimum | 163.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 139.0 | FTB |
| P1B | 136.0 | FTB |
| P2A | 131.0 | FTB |
| P2B | 135.0 | FTB |
| P3A | 135.0 | FTB |
| P3B | 132.0 | FTB |
| P4A | 130.0 | FTB |
| P4B | 126.0 | FTB |
| P5A | 131.0 | FTB |
| P5B | 128.0 | FTB |
| Average | 132.3 | *FTB - Film Tear Bond |
| Standard Deviation | 3.7 | |
| Maximum | 139.0 | |
| Minimum | 126.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P29
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 172.0 | Elongation |
| S2 | 169.0 | Elongation |
| S3 | 179.0 | Elongation |
| S4 | 173.0 | Elongation |
| S5 | 174.0 | Elongation |
| Average | 173.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 179.0 | |
| Minimum | 169.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 116.0 | FTB |
| P2A | 125.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 141.0 | FTB |
| P3B | 130.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 127.0 | FTB |
| P5A | 130.0 | FTB |
| P5B | 124.0 | FTB |
| Average | 127.6 | *FTB - Film Tear Bond |
| Standard Deviation | 5.9 | |
| Maximum | 141.0 | |
| Minimum | 116.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P30
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 215.0 | Elongation |
| S2 | 212.0 | Elongation |
| S3 | 218.0 | Elongation |
| S4 | 215.0 | Elongation |
| S5 | 212.0 | Elongation |
| Average | 214.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.2 | |
| Maximum | 218.0 | |
| Minimum | 212.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 138.0 | FTB |
| P1B | 125.0 | FTB |
| P2A | 132.0 | FTB |
| P2B | 126.0 | FTB |
| P3A | 128.0 | FTB |
| P3B | 129.0 | FTB |
| P4A | 127.0 | FTB |
| P4B | 134.0 | FTB |
| P5A | 124.0 | FTB |
| P5B | 118.0 | FTB |
| Average | 128.1 | *FTB - Film Tear Bond |
| Standard Deviation | 5.3 | |
| Maximum | 138.0 | |
| Minimum | 118.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P31
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 202.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 199.0 | Elongation |
| S4 | 207.0 | Elongation |
| S5 | 210.0 | Elongation |
| Average | 204.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.8 | |
| Maximum | 210.0 | |
| Minimum | 199.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 127.0 | FTB |
| P1B | 115.0 | FTB |
| P2A | 107.0 | FTB |
| P2B | 116.0 | FTB |
| P3A | 105.0 | FTB |
| P3B | 106.0 | FTB |
| P4A | 108.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 101.0 | FTB |
| P5B | 108.0 | FTB |
| Average | 110.9 | *FTB - Film Tear Bond |
| Standard Deviation | 7.2 | |
| Maximum | 127.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P32
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 203.0 | Elongation |
| S2 | 202.0 | Elongation |
| S3 | 206.0 | Elongation |
| S4 | 201.0 | Elongation |
| S5 | 200.0 | Elongation |
| Average | 202.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 206.0 | |
| Minimum | 200.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 101.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 105.0 | FTB |
| P3A | 115.0 | FTB |
| P3B | 102.0 | FTB |
| P4A | 101.0 | FTB |
| P4B | 116.0 | FTB |
| P5A | 111.0 | FTB |
| P5B | 104.0 | FTB |
| Average | 109.2 | *FTB - Film Tear Bond |
| Standard Deviation | 7.0 | |
| Maximum | 119.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P33
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 203.0 | Elongation |
| S2 | 206.0 | Elongation |
| S3 | 209.0 | Elongation |
| S4 | 204.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 205.4 | *FTB - Film Tear Bond |
| Standard Deviation | 2.1 | |
| Maximum | 209.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 117.0 | FTB |
| P1B | 112.0 | FTB |
| P2A | 114.0 | FTB |
| P2B | 111.0 | FTB |
| P3A | 120.0 | FTB |
| P3B | 109.0 | FTB |
| P4A | 103.0 | FTB |
| P4B | 111.0 | FTB |
| P5A | 110.0 | FTB |
| P5B | 101.0 | FTB |
| Average | 110.8 | *FTB - Film Tear Bond |
| Standard Deviation | 5.4 | |
| Maximum | 120.0 | |
| Minimum | 101.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P34
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 215.0 | Elongation |
| S2 | 211.0 | Elongation |
| S3 | 207.0 | Elongation |
| S4 | 212.0 | Elongation |
| S5 | 205.0 | Elongation |
| Average | 210.0 | *FTB - Film Tear Bond |
| Standard Deviation | 3.6 | |
| Maximum | 215.0 | |
| Minimum | 205.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 119.0 | FTB |
| P1B | 113.0 | FTB |
| P2A | 107.0 | FTB |
| P2B | 100.0 | FTB |
| P3A | 108.0 | FTB |
| P3B | 140.0 | FTB |
| P4A | 108.0 | FTB |
| P4B | 139.0 | FTB |
| P5A | 116.0 | FTB |
| P5B | 110.0 | FTB |
| Average | 116.0 | *FTB - Film Tear Bond |
| Standard Deviation | 12.7 | |
| Maximum | 140.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P35
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 222.0 | Elongation |
| S2 | 218.0 | Elongation |
| S3 | 212.0 | Elongation |
| S4 | 217.0 | Elongation |
| S5 | 218.0 | Elongation |
| Average | 217.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.2 | |
| Maximum | 222.0 | |
| Minimum | 212.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 125.0 | FTB |
| P1B | 134.0 | FTB |
| P2A | 95.0 | FTB |
| P2B | 119.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 118.0 | FTB |
| P4A | 140.0 | FTB |
| P4B | 120.0 | FTB |
| P5A | 119.0 | FTB |
| P5B | 115.0 | FTB |
| Average | 121.4 | *FTB - Film Tear Bond |
| Standard Deviation | 11.6 | |
| Maximum | 140.0 | |
| Minimum | 95.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P36
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 214.0 | Elongation |
| S2 | 204.0 | Elongation |
| S3 | 210.0 | Elongation |
| S4 | 217.0 | Elongation |
| S5 | 208.0 | Elongation |
| Average | 210.6 | *FTB - Film Tear Bond |
| Standard Deviation | 4.5 | |
| Maximum | 217.0 | |
| Minimum | 204.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 131.0 | FTB |
| P1B | 131.0 | FTB |
| P2A | 120.0 | FTB |
| P2B | 128.0 | FTB |
| P3A | 123.0 | FTB |
| P3B | 106.0 | FTB |
| P4A | 125.0 | FTB |
| P4B | 99.0 | FTB |
| P5A | 122.0 | FTB |
| P5B | 116.0 | FTB |
| Average | 120.1 | *FTB - Film Tear Bond |
| Standard Deviation | 10.0 | |
| Maximum | 131.0 | |
| Minimum | 99.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P37
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 204.0 | Elongation |
| S2 | 208.0 | Elongation |
| S3 | 203.0 | Elongation |
| S4 | 210.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 206.2 | *FTB - Film Tear Bond |
| Standard Deviation | 2.6 | |
| Maximum | 210.0 | |
| Minimum | 203.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 130.0 | FTB |
| P2A | 124.0 | FTB |
| P2B | 110.0 | FTB |
| P3A | 124.0 | FTB |
| P3B | 131.0 | FTB |
| P4A | 114.0 | FTB |
| P4B | 123.0 | FTB |
| P5A | 125.0 | FTB |
| P5B | 119.0 | FTB |
| Average | 123.0 | *FTB - Film Tear Bond |
| Standard Deviation | 6.6 | |
| Maximum | 131.0 | |
| Minimum | 110.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P38
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 218.0 | Elongation |
| S2 | 216.0 | Elongation |
| S3 | 213.0 | Elongation |
| S4 | 217.0 | Elongation |
| S5 | 209.0 | Elongation |
| Average | 214.6 | *FTB - Film Tear Bond |
| Standard Deviation | 3.3 | |
| Maximum | 218.0 | |
| Minimum | 209.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 123.0 | FTB |
| P1B | 127.0 | FTB |
| P2A | 133.0 | FTB |
| P2B | 131.0 | FTB |
| P3A | 154.0 | FTB |
| P3B | 162.0 | FTB |
| P4A | 111.0 | FTB |
| P4B | 115.0 | FTB |
| P5A | 117.0 | FTB |
| P5B | 146.0 | FTB |
| Average | 131.9 | *FTB - Film Tear Bond |
| Standard Deviation | 16.3 | |
| Maximum | 162.0 | |
| Minimum | 111.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P39
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 188.0 | Elongation |
| S2 | 198.0 | Elongation |
| S3 | 192.0 | Elongation |
| S4 | 199.0 | Elongation |
| S5 | 194.0 | Elongation |
| Average | 194.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 199.0 | |
| Minimum | 188.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 100.0 | FTB |
| P1B | 118.0 | FTB |
| P2A | 115.0 | FTB |
| P2B | 109.0 | FTB |
| P3A | 144.0 | FTB |
| P3B | 122.0 | FTB |
| P4A | 123.0 | FTB |
| P4B | 119.0 | FTB |
| P5A | 118.0 | FTB |
| P5B | 102.0 | FTB |
| Average | 117.0 | *FTB - Film Tear Bond |
| Standard Deviation | 11.7 | |
| Maximum | 144.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P40
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 225.0 | Elongation |
| S2 | 218.0 | Elongation |
| S3 | 210.0 | Elongation |
| S4 | 215.0 | Elongation |
| S5 | 214.0 | Elongation |
| Average | 216.4 | *FTB - Film Tear Bond |
| Standard Deviation | 5.0 | |
| Maximum | 225.0 | |
| Minimum | 210.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 130.0 | FTB |
| P1B | 129.0 | FTB |
| P2A | 126.0 | FTB |
| P2B | 108.0 | FTB |
| P3A | 129.0 | FTB |
| P3B | 124.0 | FTB |
| P4A | 109.0 | FTB |
| P4B | 100.0 | FTB |
| P5A | 120.0 | FTB |
| P5B | 117.0 | FTB |
| Average | 119.2 | *FTB - Film Tear Bond |
| Standard Deviation | 9.9 | |
| Maximum | 130.0 | |
| Minimum | 100.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P41
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 218.0 | Elongation |
| S2 | 212.0 | Elongation |
| S3 | 211.0 | Elongation |
| S4 | 215.0 | Elongation |
| S5 | 206.0 | Elongation |
| Average | 212.4 | *FTB - Film Tear Bond |
| Standard Deviation | 4.0 | |
| Maximum | 218.0 | |
| Minimum | 206.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 145.0 | FTB |
| P1B | 150.0 | FTB |
| P2A | 145.0 | FTB |
| P2B | 115.0 | FTB |
| P3A | 151.0 | FTB |
| P3B | 128.0 | FTB |
| P4A | 128.0 | FTB |
| P4B | 128.0 | FTB |
| P5A | 133.0 | FTB |
| P5B | 122.0 | FTB |
| Average | 134.5 | *FTB - Film Tear Bond |
| Standard Deviation | 11.8 | |
| Maximum | 151.0 | |
| Minimum | 115.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Extrusion
Sample: P42
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 185.0 | Elongation |
| S2 | 181.0 | Elongation |
| S3 | 188.0 | Elongation |
| S4 | 183.0 | Elongation |
| S5 | 182.0 | Elongation |
| Average | 183.8 | *FTB - Film Tear Bond |
| Standard Deviation | 2.5 | |
| Maximum | 188.0 | |
| Minimum | 181.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 158.0 | FTB |
| P1B | 0.0 | |
| P2A | 166.0 | FTB |
| P2B | 0.0 | |
| P3A | 144.0 | FTB |
| P3B | 0.0 | |
| P4A | 140.0 | FTB |
| P4B | 0.0 | |
| P5A | 147.0 | FTB |
| P5B | 0.0 | |
| Average | 75.5 | *FTB - Film Tear Bond |
| Standard Deviation | 75.8 | |
| Maximum | 166.0 | |
| Minimum | 0.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P43
Tested by: James Addis
Date Tested: 07/31/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 183.0 | Elongation |
| S2 | 180.0 | Elongation |
| S3 | 177.0 | Elongation |
| S4 | 187.0 | Elongation |
| S5 | 180.0 | Elongation |
| Average | 181.4 | *FTB - Film Tear Bond |
| Standard Deviation | 3.4 | |
| Maximum | 187.0 | |
| Minimum | 177.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 143.0 | FTB |
| P1B | 145.0 | FTB |
| P2A | 167.0 | FTB |
| P2B | 157.0 | FTB |
| P3A | 149.0 | FTB |
| P3B | 159.0 | FTB |
| P4A | 133.0 | FTB |
| P4B | 149.0 | FTB |
| P5A | 144.0 | FTB |
| P5B | 152.0 | FTB |
| Average | 149.8 | *FTB - Film Tear Bond |
| Standard Deviation | 9.1 | |
| Maximum | 167.0 | |
| Minimum | 133.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

**S&ME, Inc. - CHARLOTTE, NC**
Laboratory Destructive Test Result Summary

Project Name: MSSILF#1: Cell 2, Primary Geomembrane
S&ME Project No.: 1356-08-122
Material Description: 60-mil Textured HDPE Liner
Weld Type: Fusion
Sample: P44
Tested by: James Addis
Date Tested: 08/02/2010 Date of Summary: 11/15/2010

| SHEAR TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| S1 | 162.0 | Elongation |
| S2 | 171.0 | Elongation |
| S3 | 174.0 | Elongation |
| S4 | 174.0 | Elongation |
| S5 | 170.0 | Elongation |
| Average | 170.2 | *FTB - Film Tear Bond |
| Standard Deviation | 4.4 | |
| Maximum | 174.0 | |
| Minimum | 162.0 | |
| Pass/Fail [1,2,3] | PASS | |

| PEEL TESTING (ASTM D-6392) | | |
|---|---|---|
| Specimen No. | Load at Yield (lbs/in) | Failure Description |
| P1A | 110.0 | FTB |
| P1B | 109.0 | FTB |
| P2A | 118.0 | FTB |
| P2B | 117.0 | FTB |
| P3A | 119.0 | FTB |
| P3B | 123.0 | FTB |
| P4A | 105.0 | FTB |
| P4B | 109.0 | FTB |
| P5A | 121.0 | FTB |
| P5B | 105.0 | FTB |
| Average | 113.6 | *FTB - Film Tear Bond |
| Standard Deviation | 6.4 | |
| Maximum | 123.0 | |
| Minimum | 105.0 | |
| Pass/Fail [1,2,3] | PASS | |

[1] Fusion Weld Passing Values: Shear - 120 lb/in; Peel - 91 lb/in
[2] Extrusion Weld Passing Values: Shear - 120 lb/in; Peel - 78 lb/in
[3] Values are for 4 out of 5 specimens; 5th specimen can be 80% of listed value

# Cell 2 Primary HDPE Geomembrane Defect Log

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 1 | P1/CELL1 | 50F WOEEOS | LDT | 7/30/2010 | LDT-1 | 7/30/2010 | JHA |
| 2 | P1/P2 | 100F WOEEOS | LDT | 7/30/2010 | LDT-2 | 7/30/2010 | JHA |
| 3 | P2/P3 | 150F WOEEOS | LDT | 7/30/2010 | LDT-3 | 7/30/2010 | JHA |
| 4 | P3/P4 | 200F WOEEOS | LDT | 7/30/2010 | LDT-4 | 7/30/2010 | JHA |
| 5 | P4/P5 | 250F WOEEOS | LDT | 7/30/2010 | LDT-5 | 7/30/2010 | JHA |
| 6 | P5/P6 | 300F WOEEOS | LDT | 7/30/2010 | LDT-6 | 7/30/2010 | JHA |
| 7 | P6/P7 | 350F WOEEOS | LDT | 7/30/2010 | LDT-7 | 7/30/2010 | JHA |
| 8 | P7/P8 | 400 F WOEEOS | LDT | 7/30/2010 | LDT-8 | 7/30/2010 | JHA |
| 9 | P8/P9 | 450F WOEEOS | LDT | 7/30/2010 | LDT-9 | 7/30/2010 | JHA |
| 10 | P1/CELL1 | 403F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 11 | P1/CELL1 | 428F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 12 | P1/CELL1 | 451F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 13 | P1/CELL1 | 475F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 14 | P1/CELL1 | 483F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 15 | P4/P5 | 88F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 16 | P3/P4 | 337 F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 17 | P19/CELL1 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 18 | P19/P20/P10/CELL1 | PATCH OVER WEOS P19 | O | 7/30/2010 | | 7/30/2010 | JHA |
| 19 | P20/P10/CELL1 | PATCH OVER WEOS P20 | O | 7/30/2010 | | 7/30/2010 | JHA |
| 20 | P10/CELL1 | 44F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 21 | P10/CELL1 | 361F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 22 | P10/CELL1/P24/P23 | 406F WOEEOS | O | 7/30/2010 | | 7/30/2010 | JHA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

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# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 23 | P24/P10/P11/P23 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 24 | P11/P12/P23 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 25 | P12/P13/P23 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 26 | P13/P25/P23 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 27 | P25/P14/P13 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 28 | P14/P25/P21 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 29 | P25/P21/P23 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 30 | P14/P15/P21 | 3 PANEL TEE AND CAP | O | 7/30/2010 | | 7/30/2010 | JHA |
| 31 | P15/P16/P22 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 32 | P16/P17/P22 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 33 | P17/P22/P18 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 34 | P26/P22/P18/P9/P8 | 5 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 35 | P21/P23/CELL 1 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 36 | P1/P21/CELL 1 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 37 | P1/P2/P21 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 38 | P2/P3/P21 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 39 | P3/P4/P21 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 40 | P4/P5/P21 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 41 | P5/P6/P21/P22 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 42 | P6/P7/P22 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 43 | P7/P8/P22 | 3 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 44 | P10/CELL 1 | 50F WOEEOS | LDT | 7/30/2010 | LDT-10 | 7/30/2010 | JHA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

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# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 45 | P10/P11 | 200F WOEEOS | LDT | 7/30/2010 | LDT-11 | 7/30/2010 | JHA |
| 46 | P11/P12 | 250F WOEEOS | LDT | 7/30/2010 | LDT-12 | 7/30/2010 | JHA |
| 47 | P12/P13 | 300F WOEEOS | LDT | 7/30/2010 | LDT-13 | 7/30/2010 | JHA |
| 48 | P13/P14 | 350F WOEEOS | LDT | 7/30/2010 | LDT-14 | 7/30/2010 | JHA |
| 49 | P14/P15 | 400F WOEEOS | LDT | 7/30/2010 | LDT-15 | 7/30/2010 | JHA |
| 50 | P15/P16 | 450F WOEEOS | LDT | 7/30/2010 | LDT-16 | 7/30/2010 | JHA |
| 51 | P16/P17 | 400F WOEEOS | LDT | 7/30/2010 | LDT-17 | 7/30/2010 | JHA |
| 52 | P17/P18 | 350F WOEEOS | LDT | 7/30/2010 | LDT-18 | 7/30/2010 | JHA |
| 53 | P21/P22 | 11F EOWEOS | LDT | 7/30/2010 | LDT-19 | 7/30/2010 | JHA |
| 54 | P19/CELL1 | 33F WOEEOS | LDT | 7/30/2010 | LDT-20 | 7/30/2010 | JHA |
| 55 | P27/P28 | 50F WOEEOS | LDT | 7/30/2010 | LDT-21 | 7/30/2010 | JHA |
| 56 | P28/P29 | 100F WOEEOS | LDT | 7/30/2010 | LDT-22 | 7/30/2010 | JHA |
| 57 | P29/P30 | 150F WOEEOS | LDT | 7/30/2010 | LDT-23 | 7/30/2010 | JHA |
| 58 | P30/P31 | 200F WOEEOS | LDT | 7/30/2010 | LDT-24 | 7/30/2010 | JHA |
| 59 | P31/P32 | 250F WOEEOS | LDT | 7/30/2010 | LDT-25 | 7/30/2010 | JHA |
| 60 | P32/P33 | 300F WOEEOS | LDT | 7/30/2010 | LDT-26 | 7/30/2010 | JHA |
| 61 | P33/P34 | 350F WOEEOS | LDT | 7/30/2010 | LDT-27 | 7/30/2010 | JHA |
| 62 | P34/P35 | 400F WOEEOS | LDT | 7/30/2010 | LDT-44 | 7/30/2010 | JHA |
| 63 | P35/P36 | 450F WOEEOS | LDT | 7/30/2010 | LDT-28 | 7/30/2010 | JHA |
| 64 | P36/P37 | 400F WOEEOS | LDT | 7/30/2010 | LDT-29 | 7/30/2010 | JHA |
| 65 | P37/P9 | 350F WOEEOS | LDT | 7/30/2010 | LDT-30 | 7/30/2010 | JHA |
| 66 | P17/P18 | 250F WOEEOS | O | 7/30/2010 | BURNOUT | 7/30/2010 | JHA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 67 | P10/P11 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 68 | P11/P12 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 69 | P16/P17 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 70 | P25/P21 | 10F SONEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 71 | P4 | 25F EOWAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 72 | P4 | 15F EOWAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 73 | P4 | 5F EOWAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 74 | P5 | 10F EOWAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 75 | P4 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 76 | P33/P34 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 77 | P33 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 78 | P31/P30 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 79 | P28/P29 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 80 | P38/P39 | 25F WOEAT | LDT | 7/30/2010 | LDT-31 | 7/30/2010 | JHA |
| 81 | P39/P40 | 75F WOEAT | LDT | 7/30/2010 | LDT-32 | 7/30/2010 | JHA |
| 82 | P40/P41 | 125F WOEAT | LDT | 7/30/2010 | LDT-33 | 7/30/2010 | JHA |
| 83 | P41/P42 | 175F WOEAT | LDT | 7/30/2010 | LDT-34 | 7/30/2010 | JHA |
| 84 | P42/P43 | 225F WOEAT | LDT | 7/30/2010 | LDT-35 | 7/30/2010 | JHA |
| 85 | P43/P44 | 275F WOEAT | LDT | 7/30/2010 | LDT-36 | 7/30/2010 | JHA |
| 86 | P44/P45 | 325F WOEAT | LDT | 7/30/2010 | LDT-37 | 7/30/2010 | JHA |
| 87 | P45/P46 | 375F WOEAT | LDT | 7/30/2010 | LDT-38 | 7/30/2010 | JHA |
| 88 | P46/P47 | 425F WOEAT | LDT | 7/30/2010 | LDT-39 | 7/30/2010 | JHA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 89 | P47/P48 | 375F WOEAT | LDT | 7/30/2010 | LDT-40 | 7/30/2010 | JHA |
| 90 | P48/P18 | 325F WOEAT | LDT | 7/30/2010 | LDT-41 | 7/30/2010 | JHA |
| 91 | WEO PR30 | LDT ON PATCH | LDT | 7/30/2010 | LDT-42 | 7/30/2010 | JHA |
| 92 | P18/P48 | 165F WOEAT | O | 7/30/2010 | BURNOUT | 7/30/2010 | JHA |
| 93 | P31/P42 | 12F SONEOS | LDT | 7/30/2010 | LDT-43 | 7/30/2010 | JHA |
| 94 | P38/P27 | SAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 95 | P27/P28/P38/P39 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 96 | P28/P29/P39/P40 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 97 | P29/P30/P40/P41 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 98 | P30/P31/P41/P42 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 99 | P42/P43/P31/P32 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 100 | P32/P33/P43/P44 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 101 | P33/P34/P44/P45 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 102 | P34/P35/P45/P46 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 103 | P35/P36/P46/P47 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 104 | P36/P37/P47/P48 | 4 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 105 | P48/P37 | 12F SONEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 106 | P37/P9/P48/P18/P26 | 5 PANEL PATCH | O | 7/30/2010 | | 7/30/2010 | JHA |
| 107 | P47/P48 | 69F WOEAT | O | 7/30/2010 | PATCH AT WRINKLE | 7/30/2010 | JHA |
| 108 | LDS PIPES | EAT AT PIPE PENETRATION | O | 7/30/2010 | SKIRT AND TWO BOOTS | 7/30/2010 | JHA |
| 109 | P34 | WAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 110 | P38 | 12F W 10F N O SE CORNER OF PANEL | O | 7/30/2010 | | 7/30/2010 | JHA |

Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

S&ME

# GEOMEMBRANE DEFECT LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 6

| Defect Code | Defect Seam or Panel | Location of Defect | Defect Type | Log Date | Remarks | Repair Date | CQA Initial |
|---|---|---|---|---|---|---|---|
| 111 | P38 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 112 | P42 | EAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 113 | P44/P45 | EEOS | O | 7/30/2010 | | 7/30/2010 | JHA |
| 114 | P48 | 345F W 2F N OEEO PANEL | O | 7/30/2010 | | 7/30/2010 | JHA |
| 115 | P41 | 4F W 11F N OEEO PANEL | O | 7/30/2010 | | 7/30/2010 | JHA |
| 116 | P10 | 30F W 10F N OEAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 117 | P10 | 14F W 2F S OEAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 118 | P10 | 6F W 2FS OEAT | O | 7/30/2010 | | 7/30/2010 | JHA |
| 119 | P10 | 1F W 1F S OEAT | O | 7/30/2010 | | 7/30/2010 | JHA |
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Location: **NEOS** - north end of seam, **SEOS** - south end of seam, **EEOS** - east end of seam, **WEOS** - west end of seam, **INT SAME** - panel intersection, **R** - repair number

Defect Type: **LDT** - Laboratory Destructive Testing, **FDT** - Field Destructive Testing, **T** - T weld, **O** - Other

**CQA Personnel :** James Addis

# Cell 2 Primary HDPE Geomembrane Repair Testing Log

S&ME

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 1 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 2 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 3 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 4 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 5 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 6 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 7 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 8 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 9 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 10 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 11 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 12 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 13 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 14 | P | 2 FT X 3 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 15 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 16 | P | 2 FT X 5 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 17 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 18 | P | 2 FT X 3 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 19 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 20 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 21 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 22 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 2 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 24 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 25 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 26 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 27 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 28 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 29 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 30 | P | 3 FT X 17 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 31 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 32 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 33 | P | 2 FT X 3 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 34 | P | 3 FT X 11 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 35 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 36 | P | 3 FT X 4 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 37 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 38 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 39 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 40 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 41 | P | 2 FT X 4 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 42 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 43 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 44 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 3 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 46 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 47 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 48 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 49 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 50 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 51 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 52 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 53 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 54 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 55 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 56 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 57 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 58 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 59 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 60 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 61 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 62 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 63 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 64 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 65 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 66 | P | 2 FT X 17 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 4 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 68 | P | 2 FT X 3 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 69 | P | 2 FT X 4 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 70 | P | 2 FT X 3 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 71 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 72 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 73 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 74 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 75 | P | 2 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 76 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 77 | P | 2 FT X 10 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 78 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 79 | P | 2 FT X 3 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 80 | P | 2 FT X 5 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 81 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 82 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 83 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 84 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 85 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 86 | P | 2 FT X 6 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 87 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 88 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 5 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 90 | P | 2 FT X 5 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 91 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 92 | P | 2 FT X 6 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 93 | P | 2 FT X 6 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 94 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 95 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 96 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 97 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 98 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 99 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 100 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 101 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 102 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 103 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 104 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 105 | P | 2 FT X 5 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 106 | P | 3 FT X 8 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 107 | P | 3 FT X 3 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 108 | P | 10 FT X 10 FT | DC | JHA | 7/30/2010 | VB/SP | CV | JHA | P | 7/30/2010 | 2 BOOTS SPARK TESTED |
| 109 | P | 2 FT X 2 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/30/2010 | |
| 110 | P | 2 FT X 2 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |

Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

S&ME

# GEOMEMBRANE REPAIR TESTING LOG

**S&ME Project No.:** 1356-08-122
**Project Name:** MSSILF#1: Cell 2, Primary GM
**Project Location:** Terrell, North Carolina
**Page:** 6 of 6

| Defect Code | Repair Type | Approximate Dimensions | Tech. Initials | CQA Initials | Date | Test Type | Tech. Initials | CQA Initials | Pass / Fail | Date | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | P | 2 FT X 2 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 112 | P | 2 FT X 2 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 113 | P | 3 FT X 5 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 114 | P | 6 FT X 10 FT | MV | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 115 | P | 2 FT X 2 FT | DC | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 116 | P | 3 FT X 2 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 117 | P | 1 FT X 1 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 118 | P | 1 FT X 1 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
| 119 | P | 1 FT X 1 FT | JT | JHA | 7/30/2010 | VB | CV | JHA | P | 7/31/2010 | |
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Repair Type: **G&W** - Grind and Weld, **P**- Patch, **CAP** - Cap Strip

Testing Type: **SP** - Spark Test, **VB** - Vacuum Box Test

**CQA Personnel:** James Addis

# APPENDIX II – GEOSYNTHETICS
# Section 9 – Tensiometer Load Cell Calibrations

# Demtech Services, Inc.

Placerville, California, USA

## CALIBRATION CERTIFICATE

Customer Name: **S & ME Inc.**

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **209948**

Calibration Apparatus:

Reference load cell (S/N 204781)

A/D Module Model No: T-029

A/D Module Serial No: 4205209948

Channel No: N/A

| Dead Weight: | | Reference Cell: | |
|---|---|---|---|
| W1 | 2 | R1 | 2 |
| W2 | 152 | R2 | 152 |
| W3 | 302 | R3 | 302 |

Indicator reading with no load: 0

Offset: **6.866882** Scale: **3.872254**

| Applied Force lbs. | Cell Response: | Deviation Error: |
|---|---|---|
| 2 | 2 | 0.00 |
| 52 | 52 | 0.00 |
| 102 | 102 | 0.00 |
| 152 | 152 | 0.00 |
| 202 | 202 | 0.00 |
| 252 | 252 | 0.00 |
| 302 | 302 | 0.00 |

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Matt Roy

Date: 04/08/09

# Demtech Services, Inc.

Placerville, California, USA

## CALIBRATION CERTIFICATE

Customer Name: **S & ME Inc.**

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell

Range: 0 - 750 lbs. Tension

Model No: M2405-750#

Serial No: **206371**

Calibration Apparatus:

Reference load cell (S/N 204781)

A/D Module Model No: T-029

A/D Module Serial No: 4205206371

Channel No: N/A

| Dead Weight: | | Reference Cell: | |
|---|---|---|---|
| W1 | 2 | R1 | 2 |
| W2 | 152 | R2 | 152 |
| W3 | 302 | R3 | 302 |

Indicator reading with no load: 0

Offset: **6.030090** Scale: **5.010223**

| Applied Force lbs. | Cell Response: | Deviation Error: |
|---|---|---|
| 2 | 2 | 0.00 |
| 52 | 52 | 0.00 |
| 102 | 102 | 0.00 |
| 152 | 152 | 0.00 |
| 202 | 202 | 0.00 |
| 252 | 252 | 0.00 |
| 302 | 302 | 0.00 |

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F

Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: Matt Roy

Date: 04/05/09

# Demtech Services, Inc.

Placerville, California, USA

## CALIBRATION CERTIFICATE

Customer Name: S & ME Inc.

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 208671

Calibration Apparatus:
Reference load cell (S/N 204781)

A/D Module Model No: T-029
A/D Module Serial No: 2807208671
Channel No: N/A

| Dead Weight: | | Reference Cell: | |
|---|---|---|---|
| W1 | 2 | R1 | 2 |
| W2 | 152 | R2 | 152 |
| W3 | 302 | R3 | 302 |

Indicator reading with no load: 0

Offset: **3.649077** Scale: **4.179689**

| Applied Force lbs. | Cell Response: | Deviation Error: |
|---|---|---|
| 2 | 2 | 0.00 |
| 52 | 52 | 0.00 |
| 102 | 102 | 0.00 |
| 152 | 152 | 0.00 |
| 202 | 202 | 0.00 |
| 252 | 252 | 0.00 |
| 302 | 302 | 0.00 |

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable.

Calibration Technician: MWH

Date: 04/05/10

Matt Harrison

# Demtech Services, Inc.

Placerville, California, USA

## CALIBRATION CERTIFICATE

S & ME Inc.

Tensiometer Model: Pro-Tester T-0100

Device Calibrated: S-Type load cell
Range: 0 - 750 lbs. Tension
Model No: M2405-750#
Serial No: 240712

Calibration Apparatus:

Pro-Cal unit, model TC-0100/A

A/D Module Model No: T-029
A/D Module Serial No: 4309240712
Channel No: N/A

| Dead Weight: | | Reference Cell | |
|---|---|---|---|
| W1 | 2 | R1 | 2 |
| W2 | 152 | R2 | 152 |
| W3 | 302 | R3 | 302 |

Indicator reading with no load: 0

Offset: **3.800056** Scale: **5.048248**

| Applied Force lbs | Cell Response: | Deviation Error: |
|---|---|---|
| 2 | 2 | 0.00 |
| 52 | 52 | 0.00 |
| 102 | 102 | 0.00 |
| 152 | 152 | 0.00 |
| 202 | 202 | 0.00 |
| 252 | 252 | 0.00 |
| 302 | 302 | 0.00 |

Total Deviation Error (%): 0.00%

Temperature at time of calibration: 73 degrees F
Exitation Voltage: 5 V DC

This calibration conforms to the standards set by ASTM E4 and is traceable to NIST standards

Note: A/D Module and load cell above have been systems calibrated and are considered a matched pair. In general, calibrated A/D Modules and load cells are not interchangeable

MWH

Date: 04/05/10

Matt Harrison

# APPENDIX II – GEOSYNTHETICS
# Section 10 – Cell 1 Leachate Collection System and Leak Detection System Piping As-Built

Drawings Under Seperate Cover

# APPENDIX II – GEOSYNTHETICS
# Section 11 – Cell 2 Leachate Collection System and Leak Detection System Piping As-Built

# APPENDIX II – GEOSYNTHETICS
# Section 12 – Cells 1 and 2 LCS/LDS Camera Inspection

# JETCLEAN AMERICA

HIGH PRESSURE WATER JETTING
EXPLOSION-PROOF VIDEO-INSPECTION
NO DIG POINT REPAIRS
VACUUM TRUCK SERVICES

OFFICES IN FLORIDA & CAROLINAS
TEL: 800-226-8013
FAX 813-926-4616


# EARNHARDT GRADING, INC.
# DUKE ENERGY - MARSHALL STEAM STATION
# LEACHATE SYSTEM
# HIGH-PRESSURE WATER-JETTING & EXPLOSION-PROOF VIDEO-INSPECTION

**Work Conducted:**

October 2010 – November 2010

By Jetclean America

800-226-8013

# JETCLEAN AMERICA

HIGH-PRESSURE WATER-JETTING
EXPLOSION-PROOF PIPELINE INSPECTION
NO DIG POINT REPAIRS
VACUUM TRUCK SERVICES

OFFICES IN FLORIDA & CAROLINAS
TEL: 800-226-8013
FAX 813-926-4616

DATE : 11/29/2010
TO : Fred Brown – Earnhardt Grading, Inc.
FROM : Ralph Calistri (jetcleanamerica@yahoo.com)
SUBJECT : Duke Energy – Marshall Steam Station New Cells – 2010

Jetclean America completed the high-pressure water-jetting and explosion-proof video-inspection of the new Cell 1 & 2 leachate collection and detection piping on 11/17/2010. Included with this report are the applicable jetting logs, pipe graphic reports, and video-inspection footage in DVD format.

**High-pressure Water-jetting:**
As the below jetting log indicates, the new cell's leachate collection and detection piping was jetcleaned end-to-end from the available cleanout access utilizing a high-pressure water-jetting nozzle. The leachate collection system was blockage free upon completion.

## LEACHATE COLLECTION & DETECTION SYSTEM JETTING LOG OCTOBER 2010 – NOVEMBER 2010

| LOCATION | ACHIEVED DISTANCE (ft) | RESULT |
|---|---|---|
| 10 LDS Cell 1 | 1,065' | End of Pipe Reached |
| 10 LCS Cell 1 | 1,020' | End of Pipe Reached |
| 10 LDS Cell 2 | 950' | End of Pipe Reached |
| 10 LCS Cell 2 | 960' | End of Pipe Reached |

**Explosion-proof Video-inspection:**
After jetcleaning was completed, the above piping was video-inspected as far as possible from the available cleanout access (see summary chart below). All areas of the pipe viewed with the inspection camera appear to be in good condition, with no defects noted (see included pipe graphic reports and DVD inspection footage for more details).

| VIDEO SETUP | DESCRIPTION | VIDEO LENGTH | RESULT |
|---|---|---|---|
| 1 | 18 LDS Cell 2 | 82.9' | Pipe Is Clean and Defect Free |
| 2 | 18 LCS1 Cell 2 | 79.7' | Pipe Is Clean and Defect Free |
| 3 | 18 LCS2 Cell 2 | 80.8' | Pipe Is Clean and Defect Free |
| 4 | 18 LDS Cell 1 | 191.3' | Pipe Is Clean and Defect Free |
| 5 | 18 LCS1 Cell 1 | 199.2' | Pipe Is Clean and Defect Free |
| 6 | 18 LCS2 Cell 1 | 203.8' | Pipe Is Clean and Defect Free |
| 7 | 10 LCS Cell 1 | 986.6' | Pipe Is Clean and Defect Free |
| 8 | 10 LDS Cell 1 | 923.1' | Pipe Is Clean and Defect Free |

| | | | |
|---|---|---|---|
| 9 | 10 LCS Cell 2 | 815.2' | Pipe Is Clean and Defect Free |
| 10 | 10 LDS Cell 2 | 785.2' | Some Minor Gravel First 300', Pipe Is Defect Free |
| 11 | 10 LDS Cell 2 (RedoFirst 300' After Re-jetting) | 303.1' | Pipe Is Clean and Defect Free |

Based on both the jetcleaning and video-inspection data, the leachate collection system appears to flow and drain properly, and looks to be ready to deliver leachate.

Please call us with questions or concerns.

Regards,

Ralph Calistri – Jetclean America

## CCTV Surveys List for Earnhardt

Number of surveys in this list is 11 as of Thursday, November 18, 2010 Unit of measure: ft

| Setup | Date | Street | Start MH | Finish MH | Dir | Size inch | Pre Clean | Vid Cassette | Scheduled Length | Surveyed Length |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10/27/2010 | | 18 LDS | 18 LDSA | U | 18 | | 1 | | 82.9 |
| 2 | 10/27/2010 | Marshall Steam | 18 LCS1 CELL 2 | 18 LCS1A CELL2 | D | 18 | | 1 | | 79.7 |
| 3 | 10/27/2010 | Marshall Steam | 18 LCS2 CELL2 | 18 LCS2A CELL2 | D | 18 | | 1 | | 80.8 |
| 4 | 10/27/2010 | Marshall Steam | 18 LDS CELL1 | 18 LDSA CELL1 | D | 18 | | 1 | | 191.3 |
| 5 | 10/27/2010 | Marshall Steam | 18 LCS CELL1 | 18 LCS1 CELL1 | D | 18 | | 1 | | 199.2 |
| 6 | 10/27/2010 | Marshall Steam | 18 LCS2 CELL1 | 18 LCS21 CELL1 | D | 18 | | 1 | | 203.8 |
| 7 | 10/27/2010 | Marshall Steam | 10 LCS CELL 1 | 10 LCS CELL1A | U | 10 | Y | 1 | | 986.6 |
| 8 | 10/27/2010 | Marshall Steam | 10 LDS CELL1 | 10 LDS CELL1A | U | 10 | Y | 1 | | 923.1 |
| 9 | 10/27/2010 | Marshall Steam | 10 LCS CELL 2 | 10 LCS CELL 2A | U | 10 | Y | 1 | | 815.2 |
| 10 | 10/27/2010 | Marshall Steam | 10 LDS CELL2 | 10 LDS CELL2A | U | 10 | Y | 1 | | 785.2 |
| 11 | 10/27/2010 | Marshall Steam | 10 LDS CELL2 | 10 LDS CELL2A | U | 10 | Y | 1 | | 303.1 |
| | | | | | | | | **Total Scheduled Length** | 0.0 | |
| | | | | | | | | **Total Length Surveyed** | | 4,650.9 |

**Pipe Graphic Report of PLR** 18 LDSA X **for** Earnhardt

| | | | |
|---|---|---|---|
| ***Work Order*** | ***Contract*** | ***Video*** 1 | ***Setup*** 1 |
| ***Facility*** | ***Operator*** David | ***Van Ref*** NC-1 | ***Surveyed On*** 10/27/2010 |

***Street Name*** ***City***

***Location type*** LANDFILL

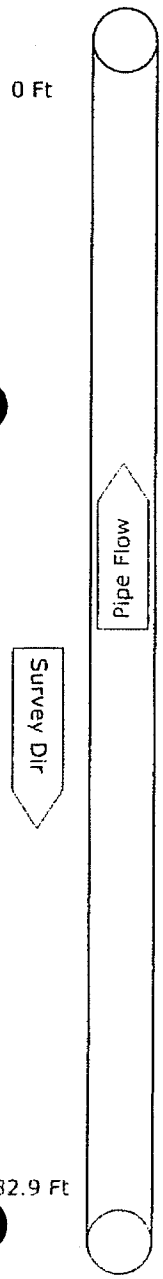
***Surface***

***Survey purpose*** Pre-acceptance - normally new sewers for adoption or private line goin ***Weather*** Light rainfall

| | | | | | |
|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** 18 LDS | ***Depth*** Ft |
| ***Shape*** | Circular | ***Size*** 18 ***by*** | ins | ***To*** 18 LDSA | ***Depth*** Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** Upstream | |
| ***Lining*** | | ***Year laid*** 2010 | | ***Pre-clean*** | ***Last cleaned*** |

***General note***

***Location note***




| | |
|---|---|
| | Start of Survey |
| 0.0 Ft | Manhole/Node [18 LDS] |
| | Water level 0 |
| 82.9 Ft | Survey abandoned [END] |

**Pipe Graphic Report of PLR** 18 LCS1 CELL 2 X **for** Earnhardt

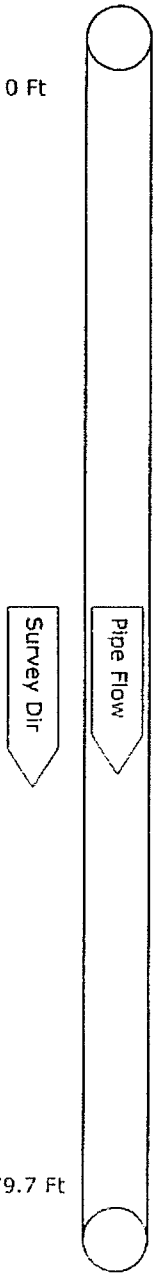
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 2 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 18 LCS1 CELL 2 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 18 | ***by*** ins | ***To*** | 18 LCS1A CELL2 | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Downstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | | ***Last cleaned*** | |

***General note***

***Location note***




| | |
|---|---|
| | Start of Survey |
| 0.0 Ft | Manhole/Node [18 LCS1 CELL 2] |
| | Water level 0 |
| 79.7 Ft | Survey abandoned [END CAP] |

**Pipe Graphic Report of PLR** 18 LCS2 CELL2 X **for** Earnhardt

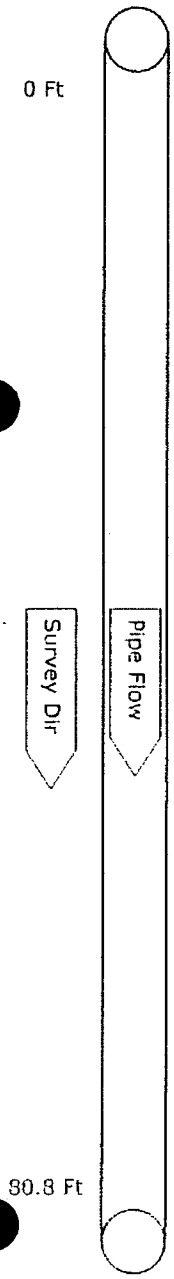
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 3 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 18 LCS2 CELL2 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 18 | ***by*** ins | ***To*** | 18 LCS2A CELL2 | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Downstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | | ***Last cleaned*** | |

***General note***

***Location note***




| | |
|---|---|
| | Start of Survey |
| 0.0 Ft | Manhole/Node [18 LCS2 CELL2] |
| | Water level 0 |
| 80.8 Ft | Survey abandoned [END CAP] |

## Pipe Graphic Report of PLR 18 LDS CELL1 X for Earnhardt

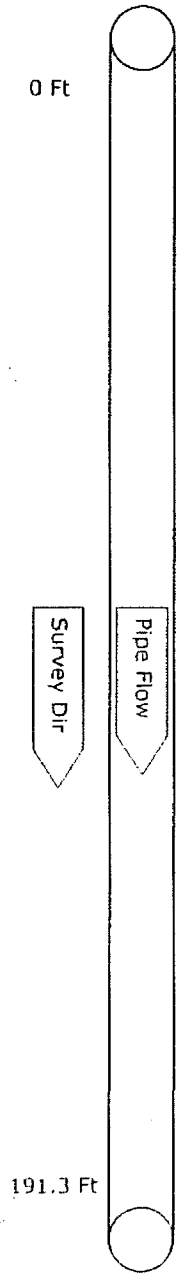
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 4 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 18 LDS CELL1 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 18 | ***by*** ins | ***To*** | 18 LDSA CELL1 | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Downstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | | ***Last cleaned*** | |

***General note***

***Location note***




| | |
|---|---|
| | Start of Survey |
| 0.0 Ft | Manhole/Node [18 LDS CELL1] |
| | Water level 0 |
| 191.3 Ft | Survey abandoned [END CAP] |

**Pipe Graphic Report of PLR** 18 LCS CELL1 X **for** Earnhardt

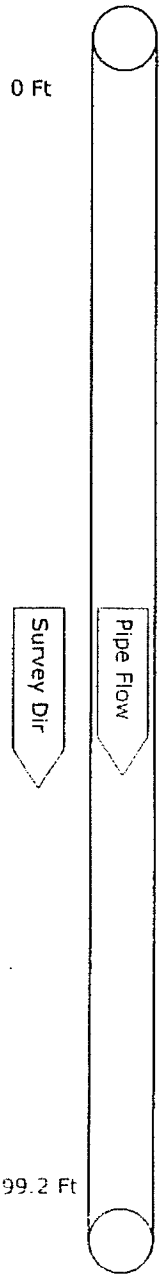
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 5 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 18 LCS CELL1 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 18 | ***by*** ins | ***To*** | 18 LCS1 CELL1 | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Downstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | | ***Last cleaned*** | |

***General note***

***Location note***




0.0 Ft Start of Survey
Manhole/Node [18 LCS CELL1]
Water level 0

199.2 Ft Survey abandoned [END CAP]

**Pipe Graphic Report of PLR** 18 LCS2 CELL1 X **for** Earnhardt

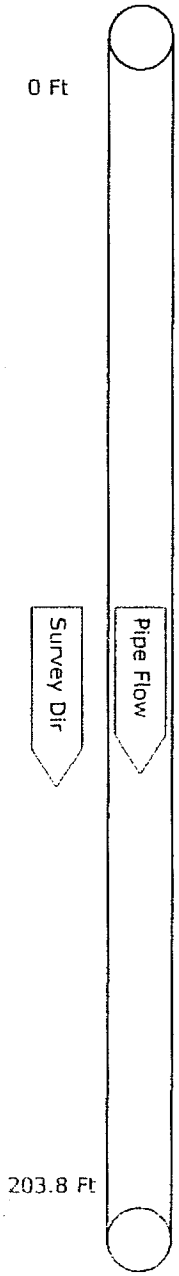
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 6 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 18 LCS2 CELL1 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 18 | ***by*** ins | ***To*** | 18 LCS21 CELL1 | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Downstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | | ***Last cleaned*** | |

***General note***

***Location note***




| | |
|---|---|
| | Start of Survey |
| 0.0 Ft | Manhole/Node [18 LCS2 CELL1] |
| | Water level 0 |
| 203.8 Ft | Survey abandoned [END CAP] |

**Pipe Graphic Report of PLR** 10 LCS CELL1A S **for** Earnhardt

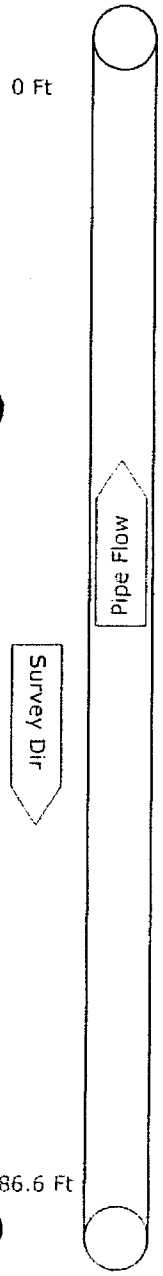
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 7 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 10 LCS CELL 1 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 10 | ***by*** ins | ***To*** | 10 LCS CELL1A | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Upstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | Y | ***Last cleaned*** | 11/18/2010 |

***General note***

***Location note***




0.0 Ft Manhole/Node [10 LCS CELL 1]
Water level 0

171.0 Ft Camera Submerged Begin [WATER]

241.0 Ft Camera Submerged End [WATER]

986.6 Ft Survey abandoned [CABLE RESISTANCE]

**Pipe Graphic Report of PLR** 10 LDS CELL1A T **for** Earnhardt

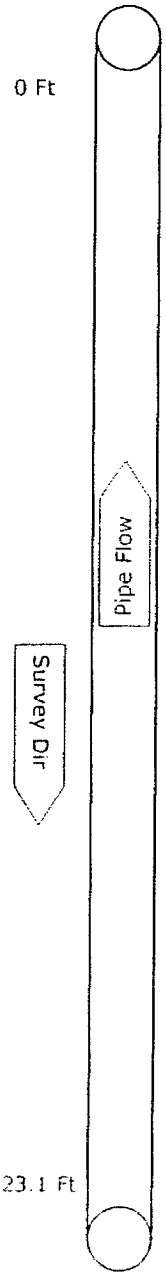
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 8 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 10 LDS CELL1 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 10 | ***by*** ins | ***To*** | 10 LDS CELL1A | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Upstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | Y | ***Last cleaned*** | |

***General note***

***Location note***




0.0 Ft Manhole/Node [10 LDS CELL1]
Water level 0

164.8 Ft Camera Submerged Begin [WATER]

221.1 Ft Camera Submerged End [WATER]

923.1 Ft Survey abandoned [CABLE RESISTANCE]

**Pipe Graphic Report of PLR** 10 LCS CELL 2A T **for** Earnhardt

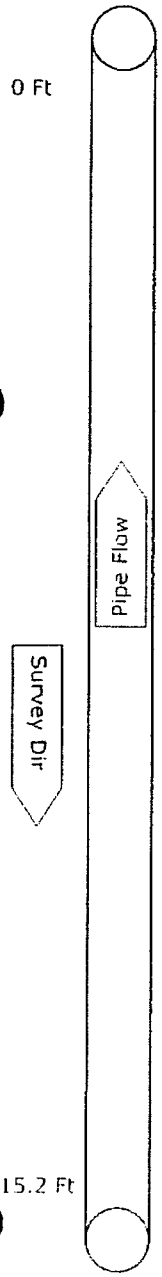
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 9 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 10 LCS CELL 2 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 10 | ***by*** ins | ***To*** | 10 LCS CELL 2A | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Upstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | Y | ***Last cleaned*** | 11/18/2010 |

***General note***

***Location note***




0.0 Ft Manhole/Node [10 LCS CELL 2]
Water level 0

69.8 Ft Camera Submerged Begin [WATER]

103.4 Ft Camera Submerged End [WATER]

815.2 Ft Survey abandoned [CABLE RESISTANCE]

**Pipe Graphic Report of PLR** 10 LDS CELL2A B **for** Earnhardt

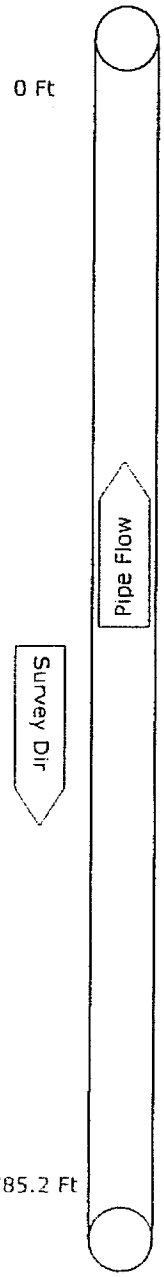
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 10 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 10 LDS CELL2 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 10 | ***by*** ins | ***To*** | 10 LDS CELL2A | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Upstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | Y | ***Last cleaned*** | 11/18/2010 |

***General note***

***Location note***




0.0 Ft Manhole/Node [10 LDS CELL2]
Water level 0

71.1 Ft Camera Submerged Begin [WATER]

87.2 Ft Camera Submerged End [WATER]

785.2 Ft Survey abandoned [CABLE RESISTANCE]

**Pipe Graphic Report of PLR** 10 LDS CELL2A C **for** Earnhardt

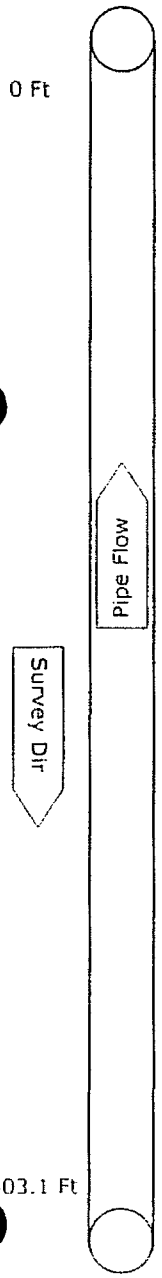
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Work Order*** | | ***Contract*** | | ***Video*** | 1 | ***Setup*** | 11 |
| ***Facility*** | | ***Operator*** | David | ***Van Ref*** | NC-1 | ***Surveyed On*** | 10/27/2010 |

| | | | |
|---|---|---|---|
| ***Street Name*** | Marshall Steam | ***City*** | |
| ***Location type*** | LANDFILL | | |
| ***Surface*** | | | |
| ***Survey purpose*** | Pre-acceptance - normally new sewers for adoption or private line goin | ***Weather*** | Light rainfall |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Pipe Use*** | LEACHATE | ***Schedule length*** | Ft | ***From*** | 10 LDS CELL2 | ***Depth*** | Ft |
| ***Shape*** | Circular | ***Size*** 10 | ***by*** ins | ***To*** | 10 LDS CELL2A | ***Depth*** | Ft |
| ***Material*** | hdpe | ***Joint spacing*** | Ft | ***Direction*** | Upstream | | |
| ***Lining*** | | ***Year laid*** | 2010 | ***Pre-clean*** | Y | ***Last cleaned*** | 11/18/2010 |

***General note***

***Location note*** Revideo first 200 feet




0.0 Ft Start of Survey
Manhole/Node [10 LDS CELL2]
Water level 0

303.1 Ft Survey abandoned [RE JET]

# APPENDIX III – ANCILLARY FACILITIES

**Section 1 – Pump Submittal**
**Section 2 – Electrical/Mechanical Drawing Set**
**Section 3 – Fencing Plan**
**Section 4 – Visual Screening Plan and Zoning Compliance Certificate**

# APPENDIX III – ANCILLARY FACILITIES
## Section 1 – Pump Submittal

**GunnCo**

Pump & Control, Inc.
P.O. Box 3022 Cumming, GA 30028
515 Industrial Way, Cumming, GA 30040
Phone: 770-889-7114 Fax: 770-889-2754

# TRANSMITTAL

**Date**: 09/16/10
**Project**: Marshall Steam Station
**GunnCo Job # 2950: Leachate Pump Systems**

**TO:** Crowder Construction Company
1990 New Cut Road
Spartanburg, SC 29303

Attention: Mr. Jeff Leopard

Attached is one PDF set of GunnCo Sidesloper™ leachate pumping system engineering submittals for the Marshall Steam Station Project for your review.

Please return approved cover and any notes/changes.

I trust you will find the submittal in order and urge you to give me a call with any questions or if you need additional information.

Best regards,

Andre Steyn
GunnCo Pump & Control, Inc.

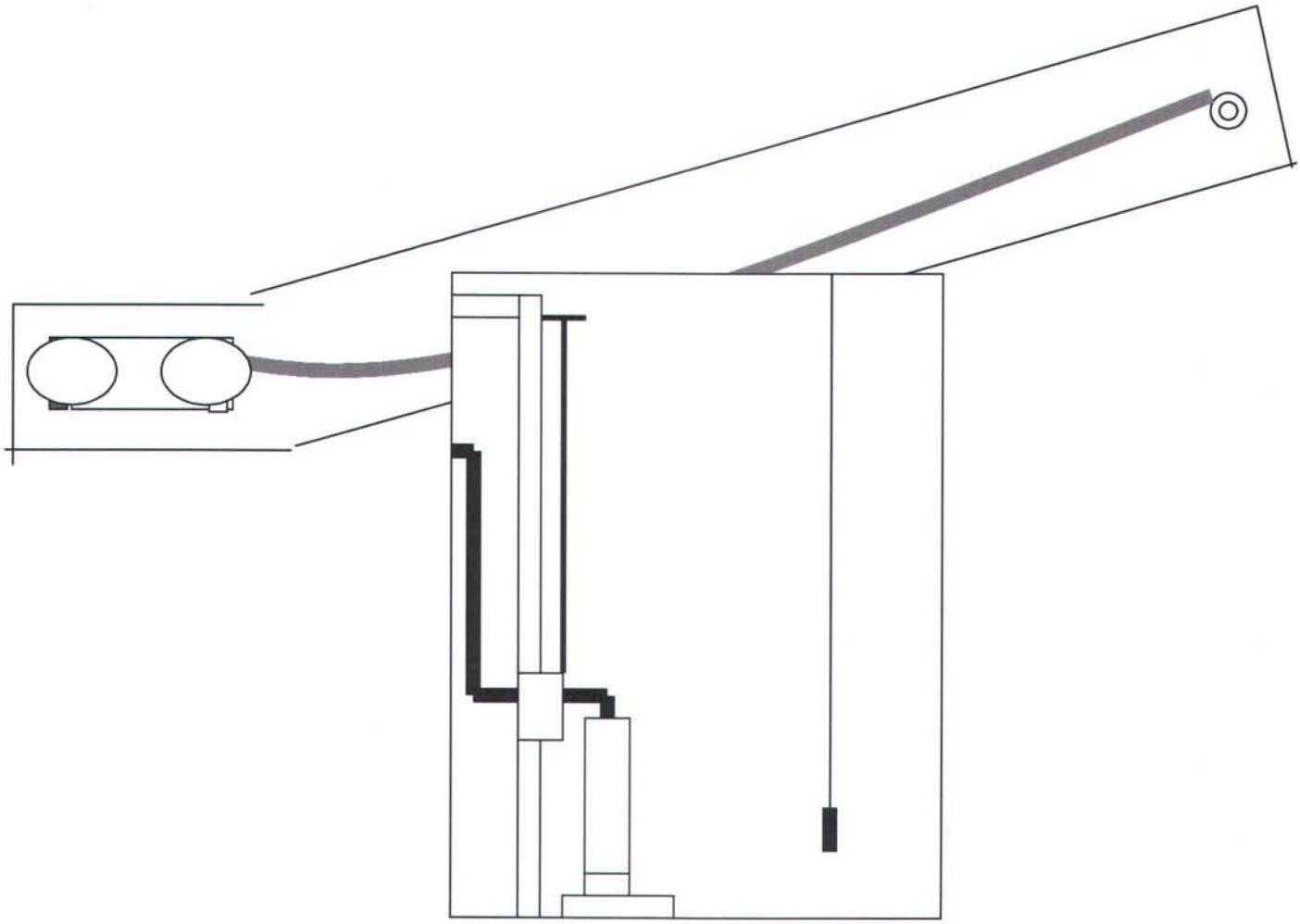
# GunnCo Pump & Control, Inc.

## Sidesloper™ Pump

Submittals

Marshall Steam Station
Contractor – Crowder Construction Company

GunnCo Reference # 2950 Leachate Pump



# GunnCo Pump & Control Inc.

## *Sidesloper*™ Leachate Pumping System

**Project: Marshall Steam Station**
**Contractor: Crowder Construction Company**

**GunnCo Project Reference Leachate Pumps**

**Submittal INDEX**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# *GunnCo Pump & Control Inc.*

## *Sideslopper*™ Leachate Pumping System

**Contact Information**
**For technical questions, replacement parts, or service contact GunnCo.**


Mailing address: P.O. Box 2789
Cumming, GA 30028

Shipping address: 515 Industrial Way
Cumming, GA 30040

Phone: 770-889-7114
Fax # : 770-889-2754
e-mail: andre@gunnco.com
Emergency #: 404-316-3131

www.gunnco.com www.landfillpumps.com

# GunnCo *Sidesloper* Leachate Pumping System

Project Equipment List

## Marshall Steam Station

## Submersible Leachate Pumps

**Main Leachate Pump System:**

One (1) GunnCo submersible "sidesloper" pump model P2K385-1 in stainless steel construction Teflon fitted with 7.5 hp, 3/460V motor, mounted in a stainless steel wheeled carrier with 100 feet power cable, stainless steel pull cable.
One (1) set 3" HDPE discharge pipe and fittings terminating with a 3" exit nipple at the top of the riser.
One (1) GunnCo submersible "sidesloper" pump model P2K40-2 in stainless steel construction Teflon fitted with 1.0 hp, 3/460V motor, mounted in a stainless steel wheeled carrier with 100 feet power cable, stainless steel pull cable.
One (1) set 2" HDPE discharge pipe and fittings terminating with a 2" exit nipple at the top of the riser.
One (1) GunnCo Duplex control panel in NEMA 4X enclosure for manual or automatic control of the leachate pumps. Panel set for 1 hp pump to start first with second pump running if the first pump does not keep up.
GunnCo O & M manuals

**Groundwater Detection Pump:**

One (1) GunnCo submersible "sidesloper" pump model P2K40-2 in stainless steel construction Teflon fitted with 1.0 hp, 3/460V motor, mounted in a stainless steel wheeled carrier with 100 feet power cable, stainless steel pull cable.
One (1) set 2" HDPE discharge pipe and fittings terminating with a 2" exit nipple at the top of the riser.
One (1) GunnCo Simplex control panel in NEMA 4X enclosure for manual or automatic control of the groundwater pump.
GunnCo O & M manuals

System start-up, installation supervision and training.

# GunnCo *Sidesloper* Leachate Pumping System

Engineering Comments

## EXCEPTIONS

1) We are not supplying, electrical work, riser pipes, discharge pipe from exit fitting in our scope. These items to be provided by general contractor.

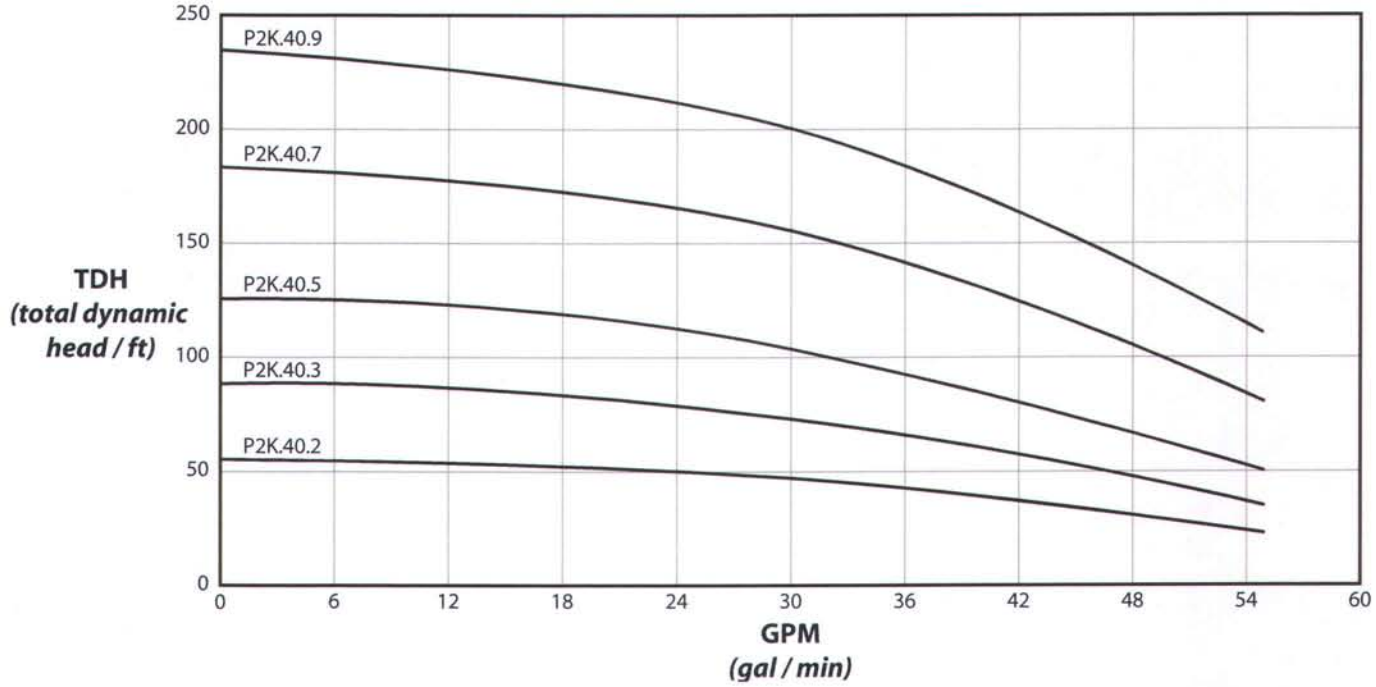
2) Control panel and breakout boxes mounting to be completed by others.

3) An "AS BUILT" dimension should be provided prior to the installation of the pumping system.

4) The riser pipe, wet well and collection system should be inspected prior to final closure/welding to ensure that no HDPE shavings, mud, rock, or debris is present in the system. Pipe shavings from construction is a frequent cause of pump problems in new cells. Pumps are designed to pump clear leachate. Failure due to debris in pump is not covered under warranty.

5) GunnCo supply terminates at exit nipple. Connection from this point to force main by general contractor

## Model P2K.40 Series Performance Curves




### 30-55 GPM Operating Range

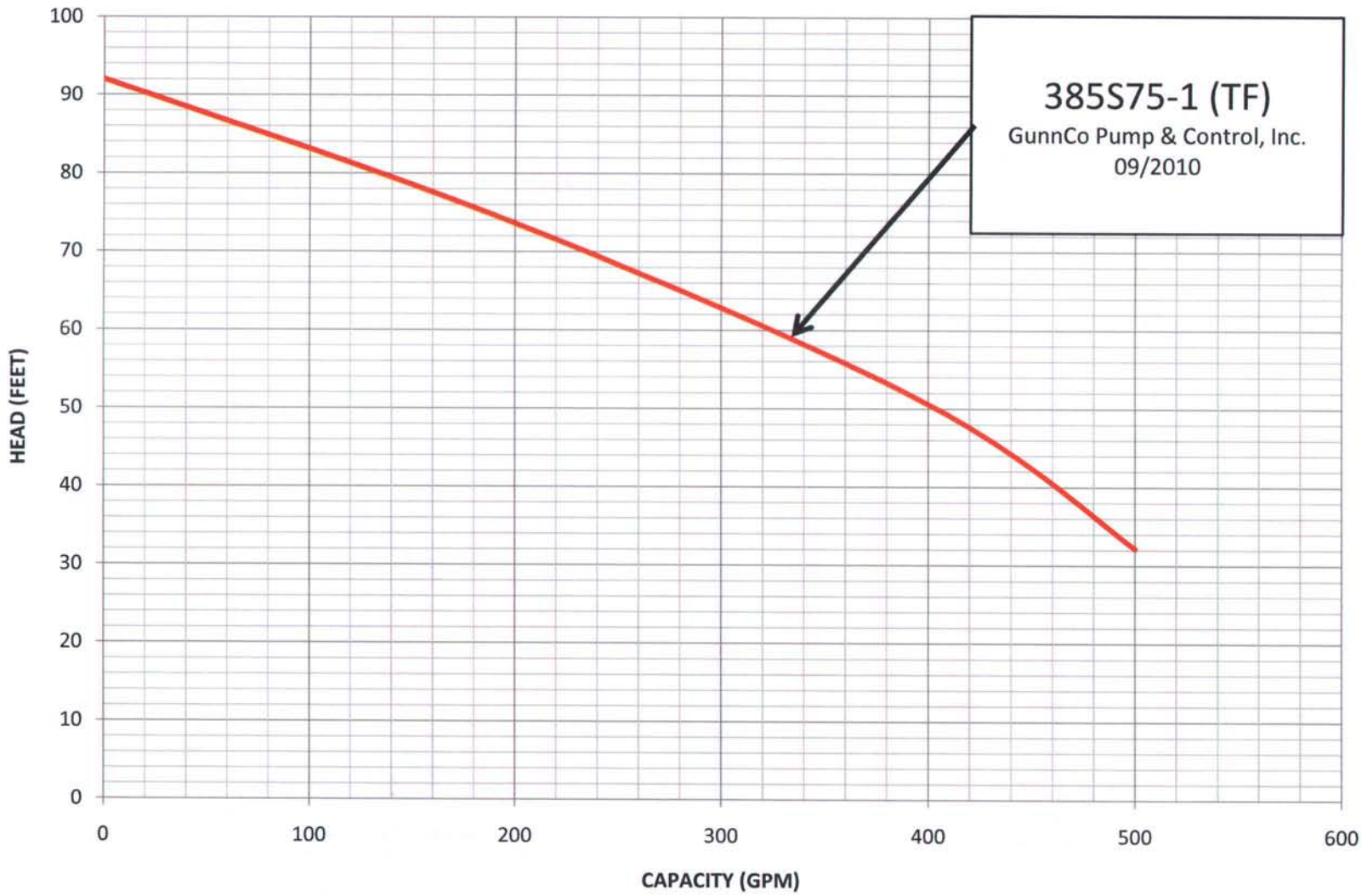
| Model | Max H.P. | Max Length (Standard Carrier) | Estimated Weight | Pull Cable | Breaking Strength Rating | Discharge | Riser Recommendation |
|---|---|---|---|---|---|---|---|
| 40.2 | 1.0 | 34 | 55 | 3/16″ | 3700# | 2.0″ | 18″ |
| 40.3* | 1.0 | 34 | 56 | 3/16″ | 3700# | 2.0″ | 18″ |
| 40.5* | 1.5 | 38 | 60 | 3/16″ | 3700# | 2.0″ | 18″ |
| 40.7* | 2.0 | 42 | 70 | 3/16″ | 3700# | 2.0″ | 18″ |
| 40.9* | 3.0 | 48 | 82 | 3/16″ | 3700# | 2.0″ | 18″ |

* Preferred Model

Higher head pumps available.

# GunnCo Pump and Control, Inc.

515 Industrial Way
Cumming, GA 30040
770-889-7114
www.gunnco.com




Pump Performance Test Curve

# MATERIALS OF CONSTRUCTION

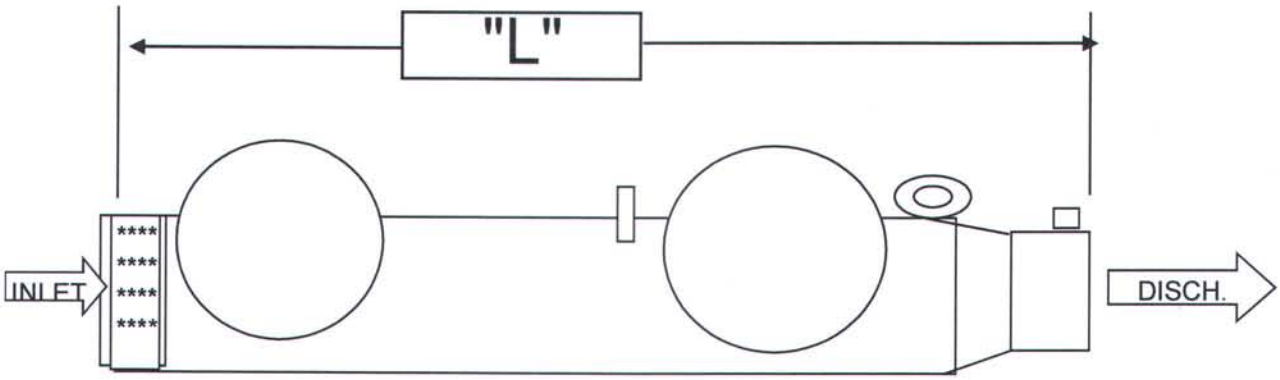
## Leachate Pump

## Pump Model P2K

| | |
|---|---|
| Check Valve Housing | 304 Stainless Steel |
| Check Valve | 304 Stainless Steel |
| Diffuser Chamber | 304 Stainless Steel |
| Impeller | 304 Stainless Steel |
| Suction Interconnector | 304 Stainless Steel |
| Inlet Screen | 304 Stainless Steel |
| Pump Shaft | 431 Stainless Steel |
| Straps | 304 Stainless Steel |
| Priming Inducer | 304 Stainless Steel |
| Coupling | 329/431 Stainless Steel |
| Check Valve Seat | Teflon/304 Stainless Steel |
| Top Bearing | Teflon |
| Impeller Seal Ring | Teflon |
| Intermediate Bearings | Teflon |
| Shaft Washer | LCP (Vectra®) |
| Split Cone | 304 Stainless Steel |
| Split Cone Nut | 304 Stainless Steel |

# GunnCo.....*Sidesloper*™ Pump

## *Dimensional Data and Weights* *P2K Models*




| Pump Model | "L" Max. | Discharge Size | Est. Weight | Pull Cable | |
|---|---|---|---|---|---|
| P2K-10 (ALL) | 24" | *1.25" | 50 pounds max. | 1/8" | 18" RISER |
| P2K-25 (ALL) | 24" | 1.5" | 50 pounds max. | 1/8" | |
| P2K-40-1/2/3 | 24" | 2.0" | 50 pounds max. | 1/8" | |
| P2K-40-4/5 | 36" | 2.0" | 60 pound max. | 1/8" | |
| P2K-40-6/7 | 42" | 2.0" | 60 pound max. | 1/8" | |
| P2K-60-1/2/3/4 | 36" | 2.0" | 60 pound max. | 1/8" | |
| P2K-60-5 | 42" | 2.0" | 90 pound max. | 3/16 | |
| P2K-60-6 & 7 | 58" | 2.0" | 100 pound max. | 3/16" | |
| P2K-60-8 & 9 | 63" | 2.0" | 100 pound max. | 3/16 | |
| P2K-75-1/2/3 | 36" | 2.0" | 60 pound max. | 3/16 | |
| P2K-75-4/5 | 42" | 2.0" | 90 pound max. | 3/16 | |
| P2K-85-1 | 36" | 3.0" | 75 pound max. | 3/16" | 24" RISER |
| P2K-85-2 | 46" | 3.0" | 100 pound max. | 3/16" | |
| P2K-85-3/4 | 55" | 3.0" | 130 pound max. | 3/16" | |
| P2K-150-1 | 36" | 3.0" | 90 pound max. | 3/16" | |
| P2K-150-2 | 55" | 3.0" | 110 pound max. | 3/16" | |
| P2K-150-3 | 60" | 3.0" | 140 pound max. | 3/16" | |
| P2K-230-1 | 55" | 3.0" | 100 pound max. | 3/16" | |
| P2K-230-2 | 60" | 3.0" | 160 pound max. | 3/16" | |
| P2K-230-3 | 55" | 3.0" | 200 pound max. | 3/16" | |
| P2K-385-1 | 60" | 4.0" | 160 Pounds Max. | 1/4" | |

* Select 1.5" Discharge Hose.

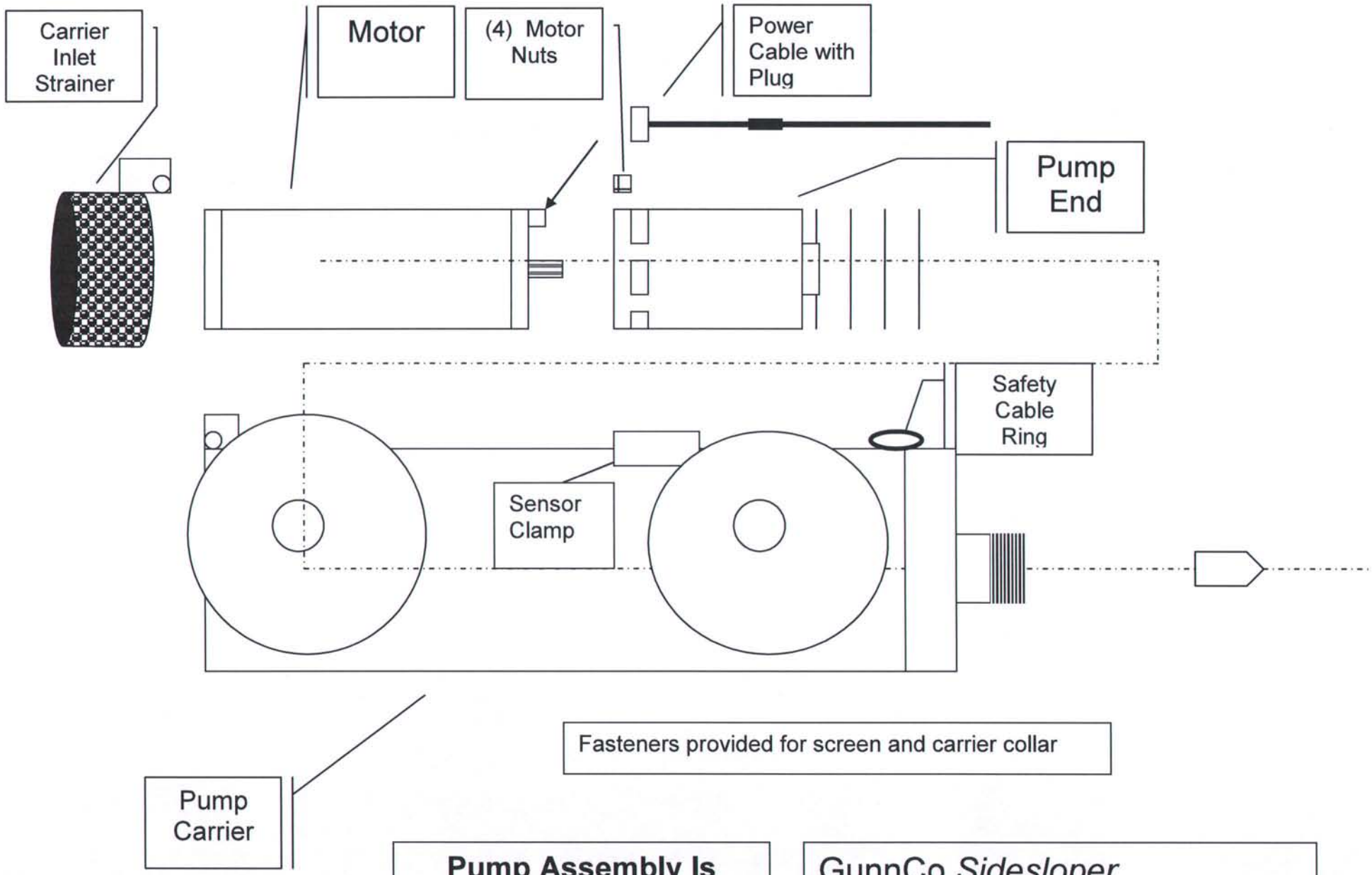
"L" Dimensions are maximum and may vary depending upon voltage and project requirements.

1/8" Pull Cable has 1760# breaking strength rating.

3/16" Pull Cable has 3700# breaking strength rating.

Optional 1/4" Pull Cable with 6400# breaking strength rating available.

Data Subject To Change




**Pump Assembly Is Shipped Pre-Assembled**

GunnCo *Sidesloper*
Model P2K Pump Assembly
Protected by U.S. Patent MBG 1.5.2K

# GunnCo *Sidesloper*™

## MODEL P2K MOTOR DATA 1.0 HP, 3/460V/60

| | | |
|---|---|---|
| **HORSE POWER** | : | **1.0 hp** |
| **PHASE** | : | **3** |
| **VOLTS** | : | **460 volts** |
| **FREQUENCY** | : | **60 Hz** |
| **SERVICE FACTOR** | : | **1.4** |
| **FULL LOAD AMPS** | : | **2.0 amps** |
| **AMPS @ SF** | : | **2.4 amps** |

| | | |
|---|---|---|
| **Line to line Resistance** | : | **19.9 – 23.0 Ohms** |
| **Locked rotor amps** | : | **13.5 amps** |

## Applications

These motors are built for dependable operation in 4" diameter or larger water wells.

## Basic Features

- Corrosion-resistant Stainless Steel Exterior
- Stainless Steel Splined Shaft
- Hermetically-sealed Windings
- Anti-track Self-healing Resin System
- Filter Check Valve
- Water Lubrication
- Kingsbury-type Thrust Bearing
- Pressure-equalizing Diaphragm
- Built-in Lightning Arrestors (All Single-phase; 200 & 230 V Three-Phase)
- Removable Water Bloc Lead
- Franklin-manufactured Control Boxes Available for Single-Phase Motors
- UL 778 Recognized (North American Voltages)
- CSA Certified
- ANSI/NSF 61 Certified
- Industry Standard NEMA Mounting Dimensions

## Special Features

- No flow inducer sleeve required in water up to 86°F (30°C) for motors through 2 Hp.
- Two-wire motors are split-phase designs with integral starting components and do not require a control box. They feature Franklin's patented 2-wire BIAC starting switch which provides Reverse Impact Torque to aid starting in adverse environments and prevents extreme fast cycling (e.g. water logged tank).
- Three-wire motors through 1 Hp use Franklin's exclusive 3-wire QD (Quick Disconnect) Control Box with the patented QD Relay. This relay provides the ultimate in operational life.
- Single-phase motors can be used with Pumptec products to protect against dry-run and other installation conditions that can damage motors and/or pumps. See Single-phase Protection Devices for details.

## Constant Pressure Options

- Use Franklin's MonoDrive controller with 1 1/2 Hp three-wire single-phase motors to provide constant water pressure.
- Three-phase motors can be used with SubDrive controllers to provide constant water pressure.

## Pollution Recovery Option

- Pollution Recovery motors are equipped for use in monitoring and recovery wells in which hydrocarbons and other chemicals may be present.
- Special Viton® rubber parts and other chemical resistant materials as listed in Construction Materials chart.

## 4-Inch Super Stainless Motor Specifications

| Hz | Ph | Hp Range | kW Range | Poles | RPM | Max. Ambient Temp. | Duty Rating | Rotation |
|---|---|---|---|---|---|---|---|---|
| 60 | 2-Wire | 1/3 - 1.5 | 0.25 - 1.1 | 2 | 3450 | 86°F / 30°C | Continuous | CCW Facing Shaft End |
| 50 | 2-Wire | 1/2 - 1.5 | 0.37 - 1.1 | 2 | 2875 | 86°F / 30°C | Continuous | |
| 60 | 3-Wire | 1/3 - 3 | 0.25 - 2.2 | 2 | 3450 | 86°F / 30°C | Continuous* | |
| 50 | 3-Wire | 1/3 - 3 | 0.25 - 2.2 | 2 | 2875 | 86°F / 30°C | Continuous* | |
| 60 | 3-Phase | 1/2 - 3 | 0.37 - 2.2 | 2 | 3450 | 86°F / 30°C | Continuous* | Electrically Reversible |
| 50 | 3-Phase | 1/2 - 3 | 0.37 - 2.2 | 2 | 2875 | 86°F / 30°C | Continuous* | |

## 4-Inch Pollution Recovery Motor Specifications

| Hz | Ph | Hp Range | kW Range | Poles | RPM | Max. Ambient Temp. | Duty Rating | Rotation |
|---|---|---|---|---|---|---|---|---|
| 60 | 2-Wire | 1/3 - 1.5 | 0.25 - 1.1 | 2 | 3450 | 86°F / 30°C | Continuous | CCW Facing Shaft End |
| 50 | 2-Wire | 1/2 - 1.5 | 0.37 - 1.1 | 2 | 2875 | 86°F / 30°C | Continuous | |
| 60 | 3-Wire | 1/3 - 2 | 0.25 - 1.5 | 2 | 3450 | 86°F / 30°C | Continuous | |
| 50 | 3-Wire | 1/3 - 2 | 0.25 - 1.5 | 2 | 2875 | 86°F / 30°C | Continuous | |
| 60 | 3-Phase | 1/2 - 2 | 0.37 - 1.5 | 2 | 3450 | 86°F / 30°C | Continuous | Electrically Reversible |
| 50 | 3-Phase | 1/2 - 2 | 0.37 - 1.5 | 2 | 2875 | 86°F / 30°C | Continuous | |

*3 Hp motors require 0.25 ft/sec flow past motor.

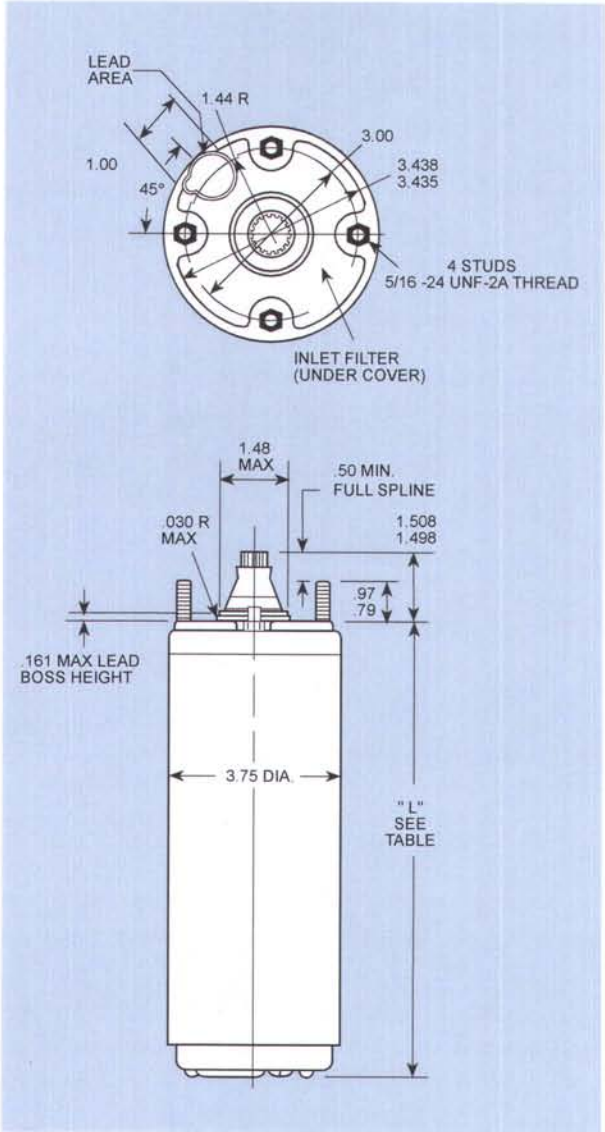
## 4-Inch Construction Materials

| | Construction Type | |
|---|---|---|
| Component | Standard Water Well | Pollution Recovery |
| End Bells | 304 SS over Iron | 304 SS over Iron |
| Stator Shell | 301 SS | 301 SS |
| Shaft Extension | 17-4 SS | 17-4 SS |
| Fasteners | 300 Series SS | 316 SS |
| Seal Cover | Acetal | Tefzel® |
| Seal | Nitrile Rubber Lip | Viton® |
| Diaphragm | Nitrile Rubber | Viton® |
| Slinger | Nitrile Rubber | Viton® |
| Lead Wire (or Cable) | XLPE | Lead not furnished with motor |
| Lead Potting | Epoxy | Lead not furnished with motor |
| Lead Jam Nut | 300 Series SS | Lead not furnished with motor |

Specifications subject to change without notice. Contact Franklin Electric if current material types are required for bid specifications.

*Viton® is a registered trademark of DuPont Dow Elastomers.*
*Tefzel® is a registered trademark of E.I. du Pont Nemours and Company.*

## 4-Inch Dimensions and Weights




### Single-phase Motors - 2-wire

| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 1/3 | 0.25 | 8.76 | 16 | 7.3 | 4 x 4.375 x 16 |
| 1/2 | 0.37 | 9.51 | 18 | 8.2 | 4 x 4.375 x 16 |
| 3/4 | 0.55 | 10.64 | 21 | 9.5 | 4 x 4.375 x 19 |
| 1 | 0.75 | 11.73 | 24 | 10.9 | 4 x 4.375 x 19 |
| 1.5 | 1.1 | 15.10 | 31 | 14.1 | 4 x 4.375 x 21 |

### Single-phase Motors - 3-wire

| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 1/3 | 0.25 | 8.76 | 17 | 7.7 | 4 x 4.375 x 16 |
| 1/2 | 0.37 | 9.51 | 19 | 8.6 | 4 x 4.375 x 16 |
| 3/4 | 0.55 | 10.64 | 21 | 9.5 | 4 x 4.375 x 19 |
| 1 | 0.75 | 11.73 | 24 | 10.9 | 4 x 4.375 x 19 |
| 1.5 | 1.1 | 13.60 | 28 | 12.7 | 4 x 4.375 x 21 |
| 2 | 1.5 | 15.10 | 33 | 15.0 | 4 x 4.375 x 21 |
| 3 | 2.2 | 19.04 | 41 | 18.6 | 6 x 6 x 25 |

### Three-phase Motors

| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 1/2 | 0.37 | 9.51 | 18 | 8.2 | 4 x 4.375 x 16 |
| 3/4 | 0.55 | 10.64 | 21 | 9.5 | 4 x 4.375 x 16 |
| 1 | 0.75 | 11.73 | 24 | 10.9 | 4 x 4.375 x 19 |
| 1.5 | 1.1 | 11.73 | 24 | 10.9 | 4 x 4.375 x 19 |
| 2 | 1.5 | 13.60 | 28 | 12.7 | 4 x 4.375 x 21 |
| 3 | 2.2 | 16.04 | 35 | 15.9 | 6 x 6 x 22 |

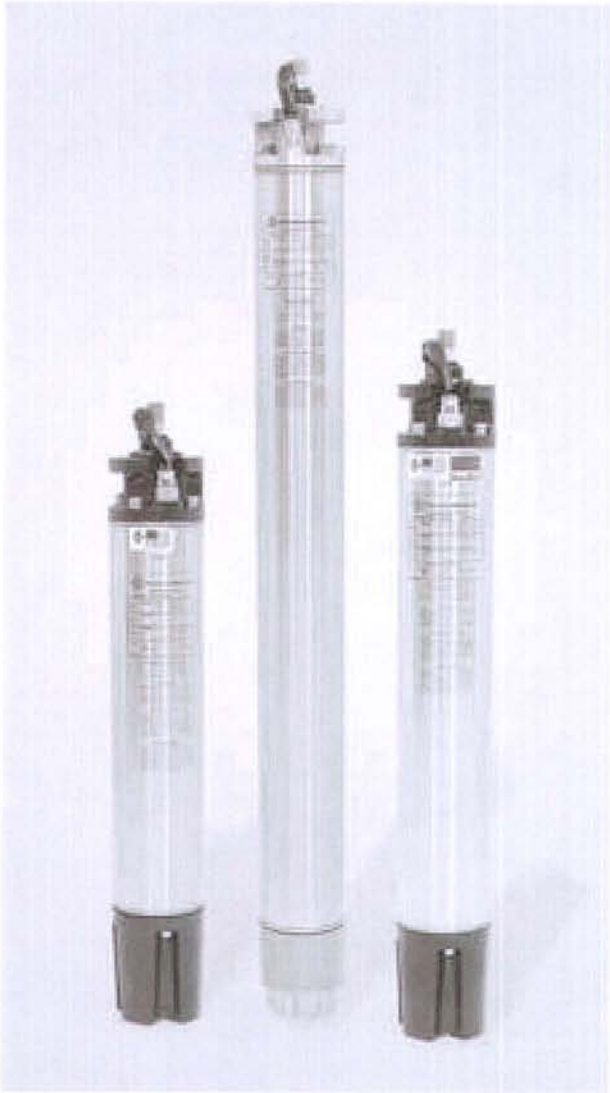
All dimensions listed above are for models supplied with lead. Consult factory for other models.

# GunnCo *Sidesloper*™

## MODEL P2K MOTOR DATA 7.5 HP, 3/460V/60

| | | |
|---|---|---|
| **HORSE POWER** | : | **7.5 hp** |
| **PHASE** | : | **3** |
| **VOLTS** | : | **460 volts** |
| **FREQUENCY** | : | **60 Hz** |
| **SERVICE FACTOR** | : | **1.15** |
| **FULL LOAD AMPS** | : | **10.9 amps** |
| **AMPS @ SF** | : | **12.3 amps** |

| | | |
|---|---|---|
| **Line to line Resistance** | : | **2.4 – 2.9 Ohms** |
| **Locked rotor amps** | : | **65 amps** |



## Applications

These motors are built for dependable operation in 6" diameter or larger water wells.

## Basic Features

- Full 3450 RPM, 60 Hz Design Point
- Maximum Temperature Winding Wire NEMA Class 200
- Double Flange Design
- Stainless Steel Splined Shaft
- Hermetically-sealed Stator
- Resin Encapsulated Windings
- Stainless Steel Shell
- Epoxy Coated End Frames
- Filter Check Valve
- Kingsbury-type Water-lubricated Thrust Bearing
- Pressure-equalizing Diaphragm
- 3-Lead & 6-Lead (Wye-delta) Configurations
- Pre-filled with Temperature-resistant Fill Solution
- Sand Fighting Slinger
- Removable Water Bloc™ Lead
- Copper Bar Rotor
- Carbon Ceramic Rotating Face Seal
- Franklin-manufactured Control Boxes Available for Single-Phase Motors
- Worldwide Availability

## Special Options

- Sand Fighter Models with special Silicon Carbide based sealing system available for applications with sand or other abrasives.
- 316 SS Construction available. All 316 SS motors include Sand Fighter sealing system and Subtrol Heat Sensor for use with SubMonitor protective devices.
- NiResist Construction available. All NiResist motors include a Sand Fighter sealing system and Subtrol Heat Sensor for use with SubMonitor protective devices.
- SubMonitor Motor Protection — A field proven and contractor friendly premium motor protection system. It protects the motor against overload, underload, overheating, and rapid cycling. The use of SubMonitor can also extend the motor warranty (see SubMonitor literature for details).

**NOTE:** Motor must be manufactured with Subtrol Heat Sensor.

## Standard 6-Inch Motor Specifications

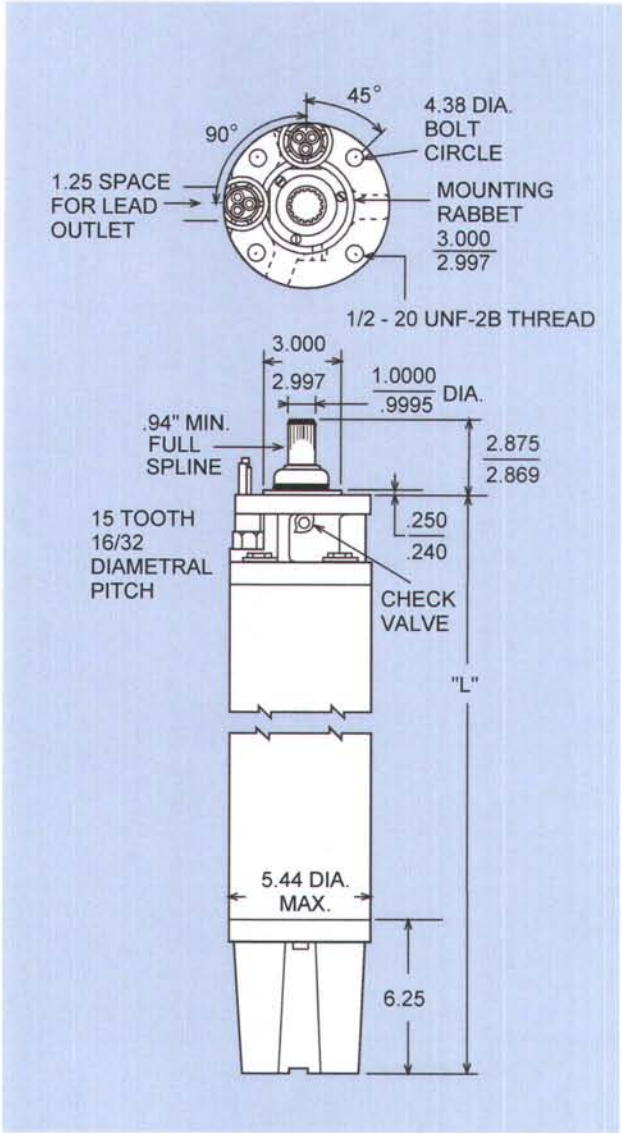
| Hz | Ph | Hp Range | kW Range | Poles | RPM | Max. Ambient Temp. | Duty Rating |
|---|---|---|---|---|---|---|---|
| 60 | 1 | 5 - 15 | 3.7 - 11 | 2 | 3450 | 86°F / 30°C | Continuous at 0.5 ft/sec flow past motor |
| 60 | 3 | 5 - 60 | 3.7 - 45 | 2 | 3450 | 86°F / 30°C | Continuous at 0.5 ft/sec flow past motor |
| 50 | 1 | 5 - 15 | 3.7 - 11 | 2 | 2875 | 86°F / 30°C | Continuous at 0.5 ft/sec flow past motor |
| 50 | 3 | 5 - 60 | 3.7 - 45 | 2 | 2875 | 86°F / 30°C | Continuous at 0.5 ft/sec flow past motor |

## 6-Inch Construction Materials

| Component | Construction Type | | | |
|---|---|---|---|---|
| | Standard Water Well | Sand Fighter™ | Ni-Resist | Corrosion Resistant (316 SS) |
| Castings | Gray Iron | Gray Iron | Ni-Resist Type 1B | 316 SS |
| Stator Shell | 301 SS | 301 SS | 316 SS | 316 SS |
| Stator Ends | Low Carbon Steel | Low Carbon Steel | 316 SS | 316 SS |
| Shaft Extension | 303 SS (5-30 Hp), 17-4 SS (40-60 Hp) | 303 SS (5-30 Hp), 17-4 SS (40-60 Hp) | 17-4 SS | 17-4 SS |
| Fasteners | 300 & 400 Series SS | 300 & 400 Series SS | 316 SS | 316 SS |
| Seal Cover | 304 SS & Sintered Bronze | 304 SS & Sintered Bronze | 316 SS | 316 SS |
| Seal | Carbon Ceramic Face | Sand Fighter™ SiC/SiC Seal System | Sand Fighter™ SiC/SiC Seal System | Sand Fighter™ SiC/SiC Seal System |
| Diaphragm | Nitrile | Nitrile | Nitrile | Nitrile |
| Diaphragm Plate | 304 SS | 304 SS | 316 SS | 316 SS |
| Diaphragm Spring | 302 SS | 302 SS | 17-7 SS | 17-7 SS |
| Slinger | Nitrile | Nitrile | Type 100 Hydrin | Type 100 Hydrin |
| Lead Wire (or Cable) | XLPE 125°C | XLPE 125°C | XLPE 125°C | XLPE 125°C |
| Lead Potting | Epoxy | Epoxy | Epoxy | Epoxy |
| Filter | Delrin & Polyester | Delrin & Polyester | 316 SS Plug | 316 SS Plug |
| Insulation | Class F | Class F | Class F | Class F |

Specifications subject to change without notice. Contact Franklin Electric if current material types are required for bid specifications.

## 6-Inch Dimensions and Weights




### 3-Lead Single-phase Motors

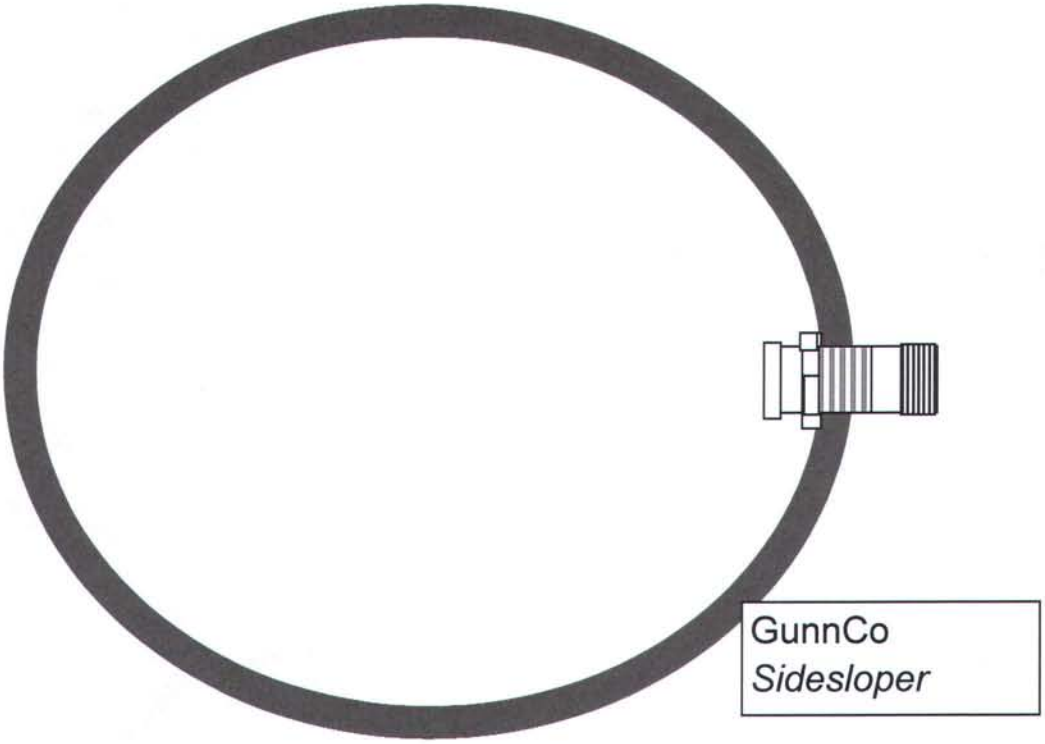
| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 5 | 3.7 | 25.4 | 110 | 50 | 7.5 x 10.75 x 34.5 |
| 7.5 | 5.5 | 28.0 | 123 | 56 | 7.5 x 10.75 x 34.5 |
| 10 | 7.5 | 30.6 | 141 | 64 | 7.5 x 10.75 x 37 |
| 15 | 11 | 33.1 | 154 | 70 | 7.5 x 10.75 x 42.25 |

### 3-Lead Three-phase Motors

| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 5 | 3.7 | 22.9 | 101 | 46 | 7.5 x 10.75 x 34.5 |
| 7.5 | 5.5 | 24.2 | 108 | 49 | 7.5 x 10.75 x 34.5 |
| 10 | 7.5 | 25.4 | 116 | 53 | 7.5 x 10.75 x 34.5 |
| 15 | 11 | 28.0 | 129 | 59 | 7.5 x 10.75 x 34.5 |
| 20 | 15 | 30.6 | 145 | 66 | 7.5 x 10.75 x 37 |
| 25 | 18.5 | 33.1 | 156 | 71 | 7.5 x 10.75 x 42.25 |
| 30 | 22 | 35.7 | 174 | 79 | 7.5 x 10.75 x 42.25 |
| 40 | 30 | 40.8 | 202 | 92 | 7.5 x 10.75 x 47.25 |
| 50 | 37 | 55.3 | 300 | 136 | 8.75 x 10.5 x 71.75 |
| 60 | 45 | 61.3 | 330 | 150 | 8.75 x 10.5 x 71.75 |

### 6-Lead Three-phase Motors

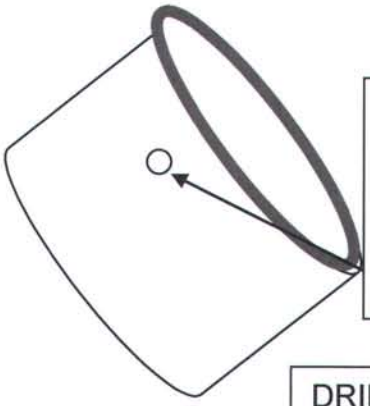
| HP | KW | "L" (inches) | SHIPPING WEIGHT LBS | SHIPPING WEIGHT KG | MOTOR CARTON SIZE (in inches) |
|---|---|---|---|---|---|
| 5 | 3.7 | 22.9 | 103 | 47 | 7.5 x 10.75 x 34.5 |
| 7.5 | 5.5 | 24.2 | 110 | 50 | 7.5 x 10.75 x 34.5 |
| 10 | 7.5 | 25.4 | 118 | 54 | 7.5 x 10.75 x 34.5 |
| 15 | 11 | 28.0 | 131 | 60 | 7.5 x 10.75 x 34.5 |
| 20 | 15 | 30.6 | 147 | 67 | 7.5 x 10.75 x 37 |
| 25 | 18.5 | 33.1 | 158 | 72 | 7.5 x 10.75 x 42.25 |
| 30 | 22 | 35.7 | 176 | 80 | 7.5 x 10.75 x 42.25 |
| 40 | 30 | 40.8 | 206 | 94 | 7.5 x 10.75 x 47.25 |
| 50 | 37 | 55.3 | 304 | 138 | 8.75 x 10.5 x 71.75 |
| 60 | 45 | 61.3 | 334 | 152 | 8.75 x 10.5 x 71.75 |




# Exit Nipple Installation

1) Drill hole to correct size at desired location.
2) Thread exit nipple into drilled hole. Hold at non-threaded boss area or attach end cap to turn. Extend into riser approximately 2".
3) Attach male cam & groove fitting- use thread paste.
4) Back up nipple until sholder of cam & groove fitting is against inside of riser pipe wall.

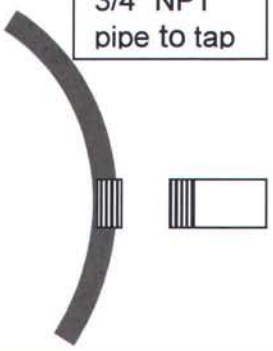
GunnCo *Sidesloper Pumps* *mbg1/2K*



Drill hole to correct size at desired location in upper part of sump.

DRILL (1) 3/4" & (1) 15/16" HOLE

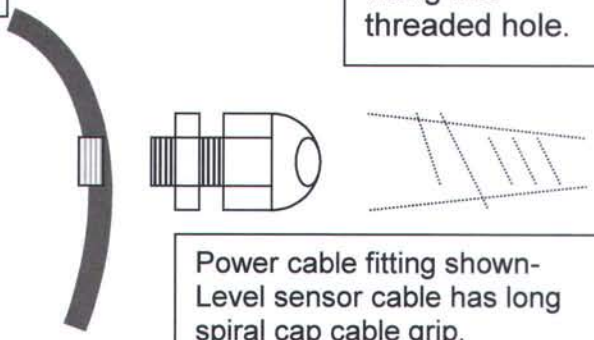
2



USE 1/2" & 3/4" NPT pipe to tap

Thread drilled hole to approx. 1/2" to 3/4" depth. This may be accomplished using a threaded pipe nipple-3-6" long. (thread into clean hole about 2/3 of threaded end of pipe).

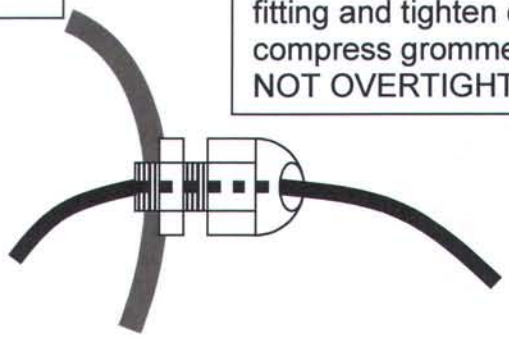
3



Install cable fitting into threaded hole.

Power cable fitting shown- Level sensor cable has long spiral cap cable grip.

4

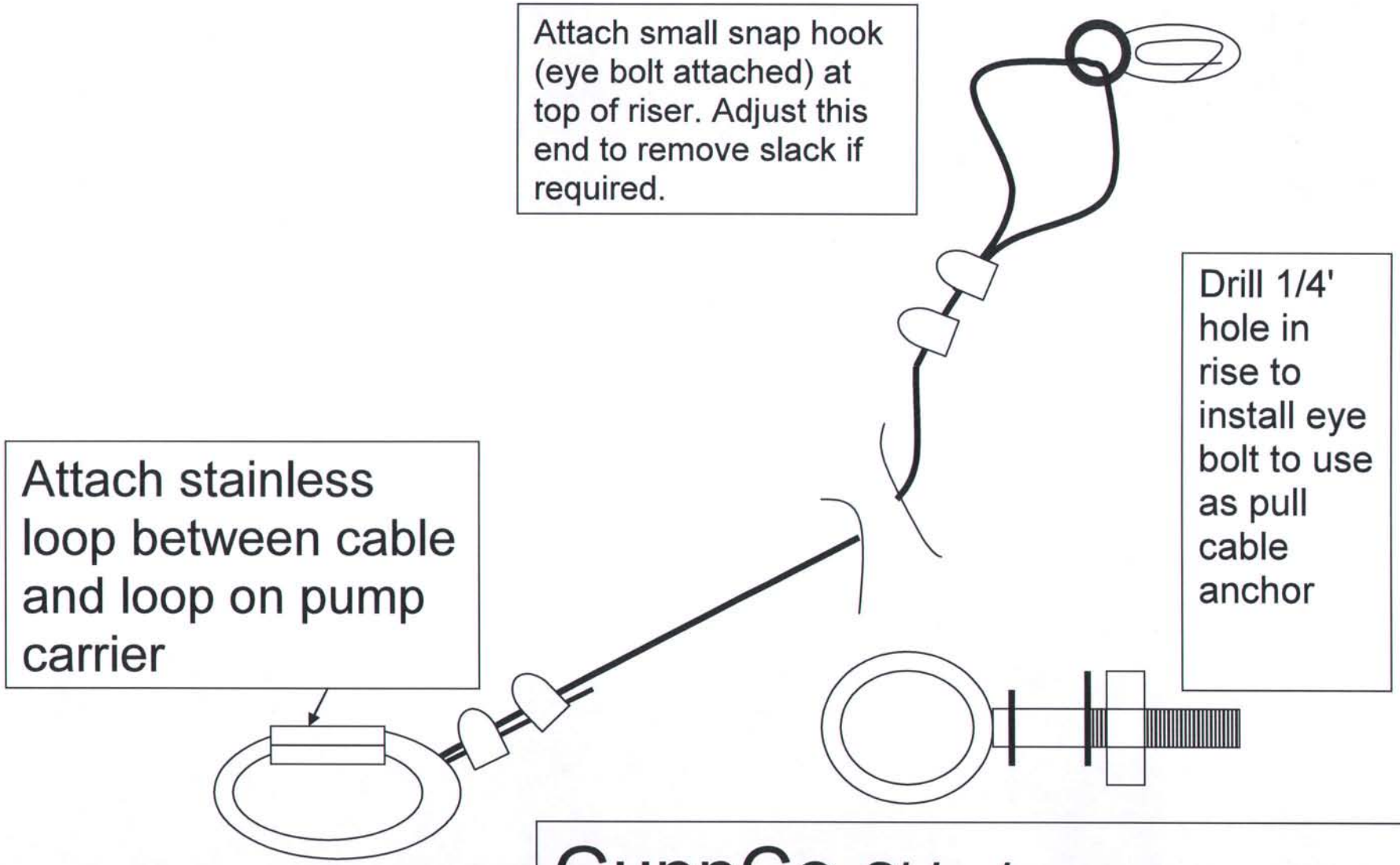


Pull cable through cable fitting and tighten cap to compress grommet. DO NOT OVERTIGHTEN

# Cable Fitting Installation

The GunnCo *Sidesloper* pumping system is provided with riser pipe cable exit fittings to provide a neat and gas tight seals and allow cables to exit from the side wall of the riser pipe. The fittings allow the cables to be easily disconnected and removed if required and prevents gas from the riser pipe from migrating through conduit into the control panel where it will corrode and damage electrical components. The fittings are non-metallic and will not corrode and swell. Level

A matching set of cable fittings may be provided for the cables to enter conduit junction or control box. This leaves a short section of cable exposed but ensures the gas does not enter the control panel. An alternate version of this sealing system is to install the cable fittings on the inside of the riser and threaded conduit fittings on the outside of the riser-call to request details.




GunnCo *Sidesloper* Pumping System

Pull Cable Attachment mbg 1/2000

# T202AA -150 PSI EPDM
# Multi-Purpose Water Suction Hose

**APPLICATION**
Suction and delivery of non-corrosive liquids for irrigation, construction, fertilizers and lasso acid solutions.

**COVER**
Black weather and ozone-resistant EPDM rubber.

**REINFORCEMENT**
Spiralled high tensile textile cords and ***4*** highly flexible steel helix wires.

**TUBE**
Black EPDM rubber.

**TEMPERATURE RANGE**
-__°F to 176°F

**STANDARD LENGTH**
100 feet: 1" through 6" _0, 50 feet: 5" _0, _5, 50 feet: 6" _0, _5 feet: 8"

**BRANDING**
ALFAGOMMA – ITALY – T_0_ 10 BAR (150 PSI) GENERAL PURPOSE EPDM (in green letters)

## Specifications

| SERIES NO. | NOMINAL ID | | NOMINAL OD | | APPROX. WT. lbs./100 ft. | MAX. REC. WP (PSI) | MIN. BEND RADIUS (in.) |
|---|---|---|---|---|---|---|---|
| | (in.) | (mm) | (in.) | (mm) | | | |
| T202AA100 | 1 | 25 | 1.38 | 35 | 54 | 150 | 4 |
| T202AA125 | 1 1/4 | 32 | 1.65 | 42 | 65 | 150 | 5 |
| T202AA150 | 1 1/2 | 38 | 1.89 | 48 | 75 | 150 | 6 |
| T202AA200 | 2 | 51 | 2.40 | 61 | 97 | 150 | 8 |
| T202AA250 | 2 1/2 | 63 | 2.95 | 75 | 129 | 150 | 10 |
| T202AA300 | 3 | 76 | 3.46 | 88 | 154 | 150 | 12 |
| T202AA350 | 3 1/2 | 90 | 4.02 | 102 | 190 | 150 | 14 |
| T202AA400 | 4 | 102 | 4.49 | 114 | 213 | 150 | 16 |
| T202AA500 | 5 | 127 | 5.55 | 141 | 334 | 150 | 25 |
| T202AA600 | 6 | 152 | 6.54 | 166 | 417 | 150 | 30 |

**COUPLING SUGGESTIONS** **Cam and groove, pin lug, short shank couplings or combination nipples attached with single bolt, double bolt, wire or band type clamps.**

# *Sidesloper*™ PUMPING SYSTEM CONTROL
## OPERATION-SIMPLEX "GC" Series" 101 Panel

The controller should provide automatic operation. Under normal conditions the pump should operate with the H-O-A switches in the A or automatic position.

### EXTERIOR MOUNTED COMPONENTS:

**Top Alarm Light**-(optional) Indicates HIGH liquid level condition. See individual indicators for cause.

**Duplex Receptacle**-(optional) Provides up to 5 amp 120v electrical service.

### INTERIOR DOOR MOUNTED OPERATOR CONTROLS:

**Main Breaker Disconnect Handle**-The main turns power off to the controller. This switch must be turned to the OFF position to open the interior door.

**H-O-A Switch** – The H-O-A switch should remain in the "A" setting for automatic operation. The "H" setting or hand is for testing only.

**Indicating Controller**-This device displays the level in the sump in inches and provides the pump ON/OFF and high-level ON/OFF operation. Check current setting or re-adjust set points as follows:

1) PUMP OFF-Turn center knob of the left to A-Reset. The current PUMP OFF set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
2) PUMP ON- Turn center knob of the left to A-Set. The current PUMP ON set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed. PLEASE NOTE: The pump will not start in the "A" position unless the level has surpassed the ON setting.
3) HIGH ALARM OFF-Turn center knob of the right to B-Reset. The current HIGH LEVEL OFF set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
4) HIGH ALARM ON-Turn center knob of the right to B-Set. The current HIGH LEVEL ON set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.

LED is provided to indicate that the A or B relays are ON when lit. The level display will also flash during a high level condition. Pump ON and OFF settings should be sufficient difference to prevent pump rapid cycle-pump should not restart for 10 minutes or more (typically hours) after pump shuts off.

**Flow Meter** (OPTION)-The digital flow meter provides rate of flow (GPM-gallons per minute) on the upper/larger digits, and total accumulated flow (gallons) on the lower digits. Total may accumulate to 99999999 if the decimal point is eliminated. The right side arrow button resets the total to "0" when pressed. See flow meter instructions.

**RUN Light**-indicates pump is called to operate.

**PHASE or VOLTAGE FAULT/FAIL Light**-Indicates a phase loss, improper voltage, reversed phase (three phase only), blown sensor fuses damaged, or damaged voltage or phase sensor. Sensor is adjustable and should be set to actual operating voltage at the time of start-up.

**OVERLOAD Light**-Indicates a motor starter overload has occurred.

**HIGH LEVEL Light** (OPTION) Indicates a high level condition exists. Under this condition the level indicating display will flash.

**TANK FULL Light** (OPTION) –Indicates that the pump will not operate in the "A" mode because the panel is receiving a signal via a pair of wires that the remote storage tank or sump is full. Under this condition the pump will operate in the "H" mode.

**OVERLOAD Reset Button**-Reset the motor starter overload.

**ETM**-elapsed run time meters indicate hours of pump operation (to 1/10$^{th}$). Under normal conditions hours of operation should be similar for each pump. This information can be recorded to determine estimated flows for the system.

**Breakers**-The motor, control, (and optional receptacle) breakers are accessible from the interior door. A tripped breaker typically indicates a short circuit. Please note that there are also fuses in the interior for the transformer or control power or optional receptacle. See additional information in interior components section.

**INTERIOR COMPONENTS**: Should be serviced with power off or by a qualified service personnel. NOTE: Power will be present in the incoming wiring to the main disconnect.
**----------ELECTRICAL HAZARD EXISTS!----------**

**Motor Breaker**-Three pole circuit breaker-typically located on upper far right is provided for the short circuit protection and allow service of the system. If a breaker trips check for a short circuit and reset. If the breaker trips again there may be an electrical problem which should be checked by a qualified electrician. Motor breaker switches off primary voltage to the motor starter contactors and pump.

**Control Breaker**-Single pole control circuit breaker-Typically located left position of the motor breaker is provided for the short circuit protection and allow service of the system. If a breaker trips check for a short circuit and reset. If the breaker trips again there may be an electrical problem which should be checked by a qualified electrician. There is also a fuse between the breaker and the control circuit. at the transformer which Control breaker switches off 120v control power to operator control components.

**Receptacle Breaker** (OPTION) -Single pole circuit breaker-Typically located far left position of the motor breaker is provided for the short circuit protection and protection of the system. There is also a fuse between the breaker and the receptacle which typically may blow due to overloaded circuit (limit usage to 5 amp service).

**Transformer and Fuses** (if applicable) – The transformer provides low 120 volt power for the control operations. There are three fuses mounted on top of the transformers, The upper two are the incoming power (230/460 volt) and the lower fuse is the control circuit power (120 volt). When replacing fuses use the identical type and rating as originally provided.

**Relays** ("ICE CUBE" relays)-These are plug in style relays which work between the level controller/H-O-A switch and the motor starter coil (and where applicable the high level lights) which minimizes the wear of the level controller contacts. Coil voltage is 120v.

**Motor Starter/Overload relay** -Contains overload protection and magnetic coil to energizes to allow power to the pump. Red bar resets overloads. Coil voltage is 120v.

**Voltage/Phase Monitor**- Plug in style device monitor incoming power and detects and protects motor from high or low voltage, loss of phase, or reversed phase (on three phase models). A led light indicates proper operation and adjustable knob allows for setting the unit to the normal operating voltage range. If the range exceeds approximately 10% of the set point the pump will be prevented from operating (motor starter coil will not pull in) until the problem is corrected. If the LED will not come on with adjustment check voltage and the associated fuses. High voltage surges may damage monitor. GunnCo normally stocks replacement units. At start-up the operating voltage should be set. Voltage must be within the range of the monitor. On three phase systems, if the unit will not energize at start-up after adjustment of range setting, the phases may need to be reversed at the monitor-to accomplish switch any two legs.

**ISB**-Intrinsically Safe Barrier-This devices provides a safety for the level control voltage and must be used to ensure safe operation where the sensor is in a hazardous location. The barrier contain two replaceable fuses.

**24VDC Power Supply** (OPTION)-Supplies power to the voltage meter. Plugs into socket.

**Lock Out Relay** (OPTION) –Provides sensing of a closed contact (float switch or relay) up to 5000' away through a pair of wires and provides panel pump lock out circuit function. Plugs into socket.

**Motor Saver (OPTION**)-Monitors motor load and provides protection for pump dry run, "dead head", and a variety of voltage and phase protection when the panel is in the "A" mode. A fault CODE is provided after a fault event is detected. May be programmed for specific protection category and ranges including short cycle (delay start), phase unbalance, high/low voltage, delay period before restart, and number of restarts after a fault. Typically programmed to provide backup overload and voltage protection. See instructions for programming and fault codes.

**Heater & Thermostat**-An enclosure heater is provided to minimize the formation of condensate within the enclosure to help ensure electrical components maintain minimum operating temperatures. The thermostat is adjustable but should typically be set around 90 for effective operation. If condensate continues to exist increase thermostat setting to 100 and/or check for sources of liquid into the enclosure.

**Bellows-**The panel is equipped with a bellow breather device which connects to the transducer breather to provide a closed venting loop to allow the transducer diaphragm to adjust.

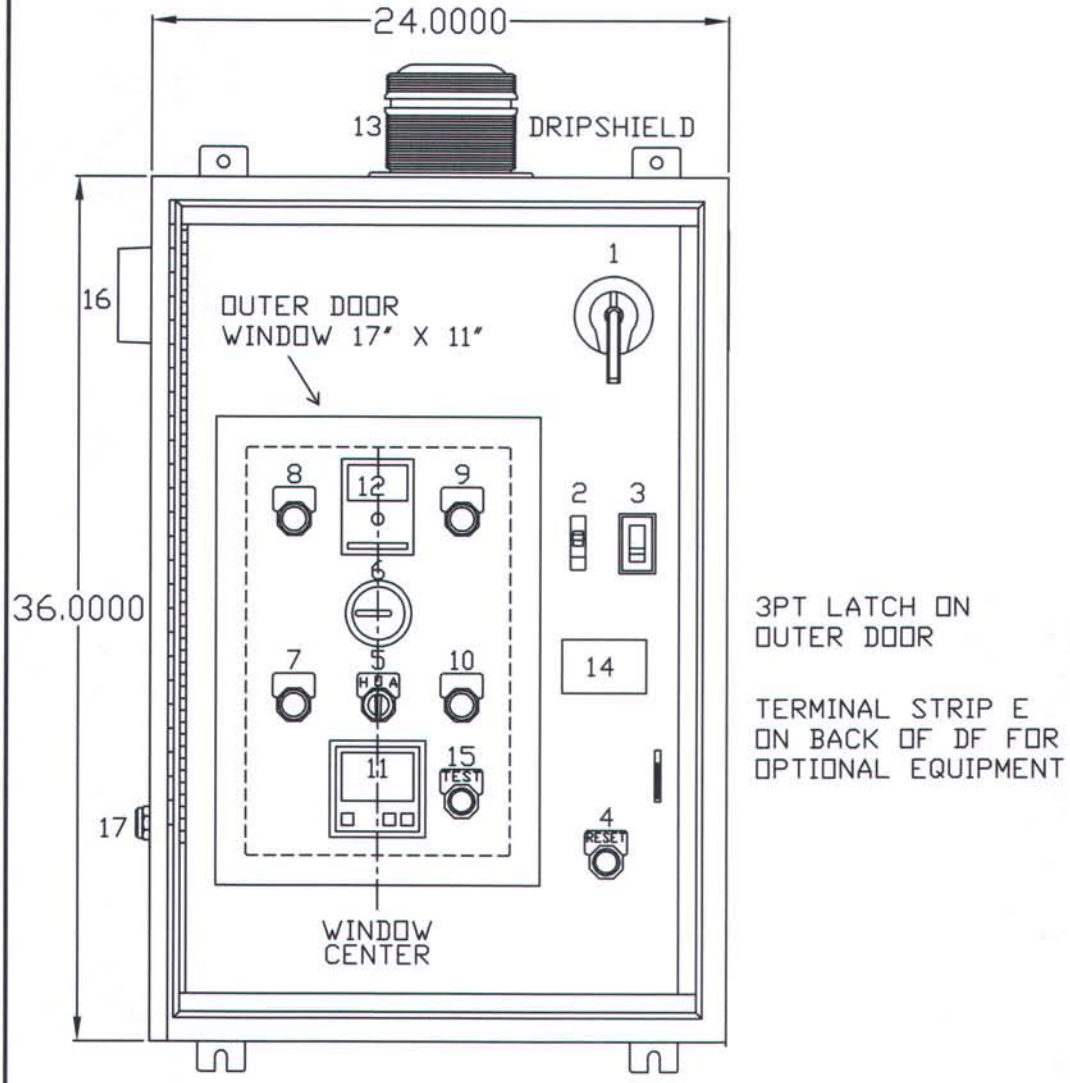
**Surge Suppressor** (110 Volt control circuit)-provides protection to the control circuit if a surge condition occurs. An indicating light is on when operating properly.

**Surge Suppressor** (24V/4-20Ma)-provide protection from surges entering panel from level sensor-Note that level sensor is also surge protected with an integral surge suppressor which is contained within the level sensor. If device damaged the signal between the sensor and the level indicating controller may will be lost and result in a negative level display of approximately –34.6. Also see ISB below.

**TVSS Transient Voltage Surge Suppressor Lightning Arrestor**-Square or rectangular device absorbs power line surges to protect the system. If the green LED light does not energize with power to the panel the unit may be no longer functional and replacement is required.

**Lightning Capacitor**-Cylinder Device mounted on the right of the enclosure. This device worked in conjunction to the Lightning Arrestor and is a "one shot" device, which absorbs high amperage line surges to protect the system. If a severe event occurs damage may be visual. If damaged the device should be immediate replaced. If damaged do not touch any exposed parts or wires.

Call GunnCo for assistance in operating and trouble shooting problems and for replacement parts or sources.
Our phone number is 770-889-7114.




OUTER DOOR HAS BEEN REMOVED FOR CLARITY

1 - MAIN BREAKER
2 - CONTROL BREAKER
3 - MOTOR BREAKER
4 - OVERLOAD RESET
5 - PUMP HAND-OFF-AUTO
6 - ELAPSE TIME METER
7 - RL1 PUMP RUN
8 - PL1 PHASE FAIL
9 - PL2 OVERLOAD
10 - PL3 PUMP LOCKOUT (OPTIONAL)
11 - FLOWMETER (OPTIONAL)
12 - PUMP CONTROLLER
13 - STROBE LIGHT
14 - PUMP SAVER CUTOUT (OPTIONAL)
15 - ALARM TEST
16 - AH ALARM HORN
17 - ASB ALARM SILENCE BUTTON

| | |
|---|---|
| SIDESLOPER PUMPING SYSTEMS | |
| MODEL NO: | GCD-1-2.4-AACAB |
| PROJECT: | MARSHALL STEAM PLANT |
| DATE: 9/8/2010 | REVISION: A |

GUNNCO PUMP & CONTROL
515 INDUSTRIAL WAY
CUMMING, GA 30040
TEL. 770-889-7114

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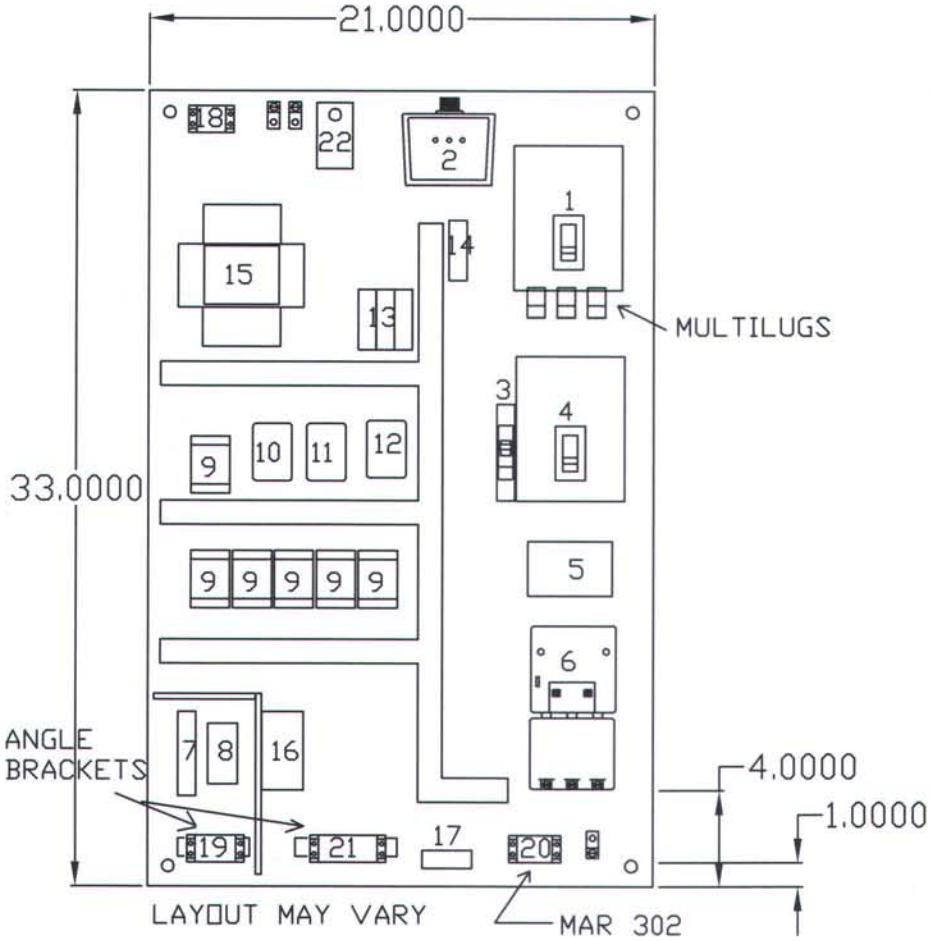


1 - MCB MAIN CIRCUIT BREAKER
2 - SA1 SURGE ARRESTOR 120V
3 - CCB CONTROL CIRCUIT BREAKER
4 - MB1 MOTOR BREAKER 1
5 - MOTOR SAVER (OPTIONAL)
6 - MS1 MOTOR STARTER 1
7 - ISB INTRINSCIALLY SAFE BARRIER
8 - SA2 SURGE ARRESTOR 4-20MA
9 - R1-6 CONTROL RELAY
10 - WAR LEVEL RELAY (OPTIONAL)
11 - PS POWER SUPPLY (OPTIONAL)
12 - PM PHASE MONITOR
13 - FUSE BLOCK
14 - TH THERMOSTAT
15 - CPT CONTROL POWER TRANSFORMER
16 - TRANSDUCER BREATHER
17 - HT HEATER STRIP
18 - TSA TERMINAL STRIP A
19 - TSB TERMINAL STRIP B
20 - TSC TERMINAL STRIP C
21 - TSD TERMINAL STRIP D
22 - N NEUTRAL BLOCK

| | | |
|---|---|---|
| SIDESLOPER PUMPING SYSTEMS | | |
| MODEL NO: | GCD-1-2.4-AACACAB | |
| PROJECT: | MARSHALL STEAM PLANT | |
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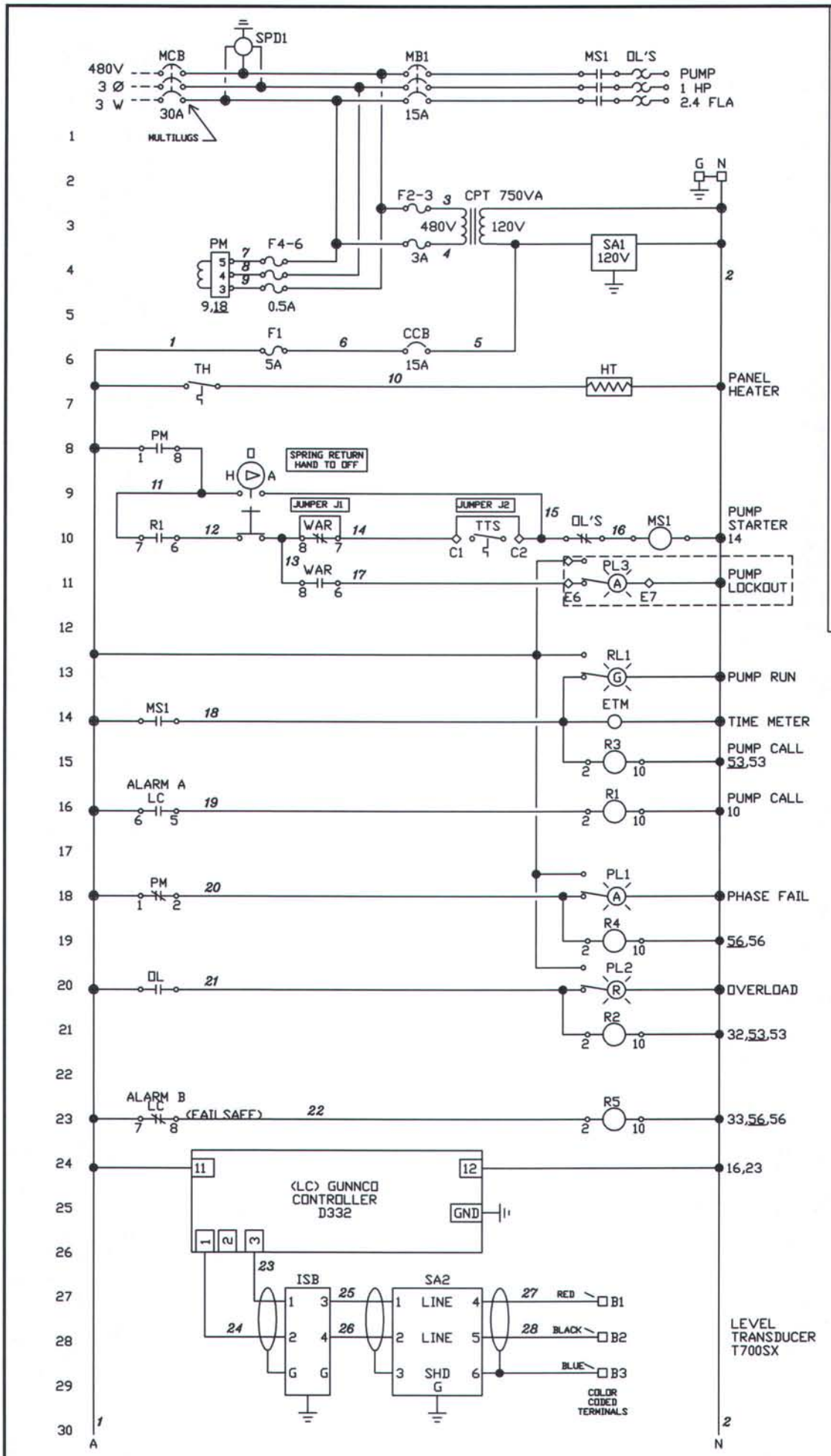


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|---|---|
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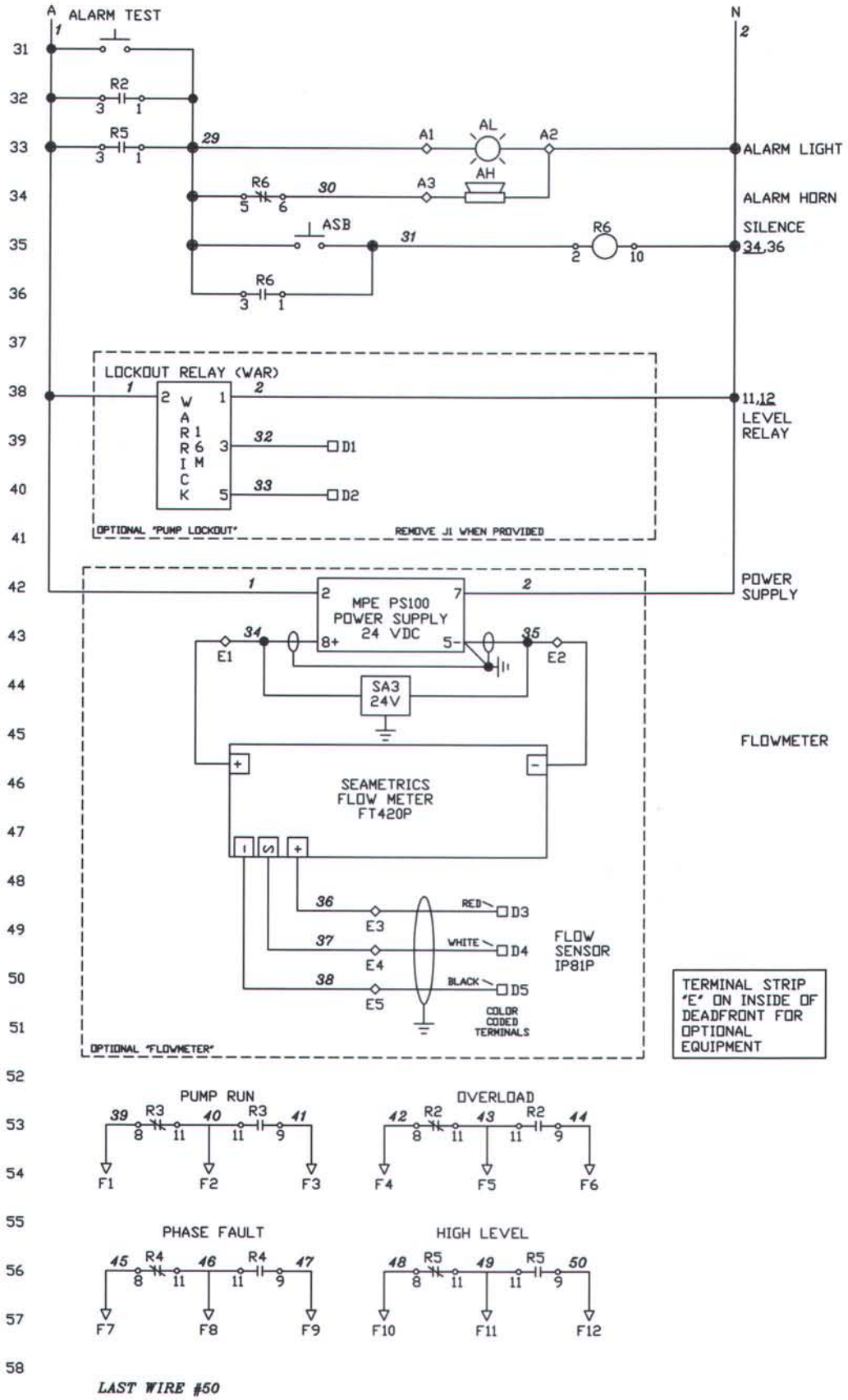


SIDESLOPER PUMPING SYSTEMS

MODEL NO: GCD-1-2.4-AACACB

PROJECT: MARSHALL STEAM PLANT

DATE: 9/8/2010

REVISION: A

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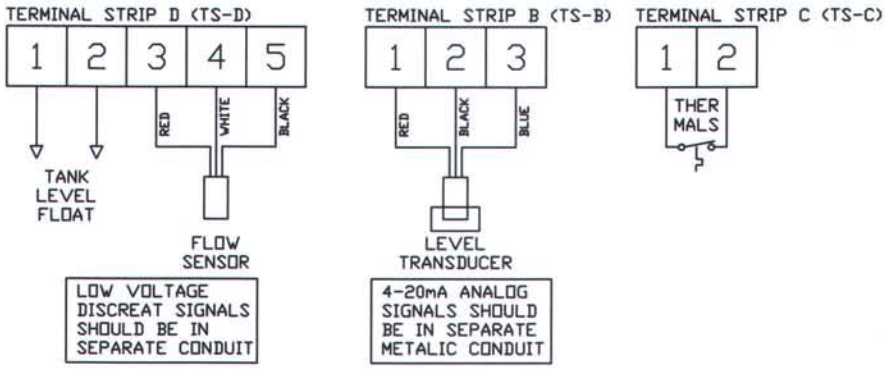


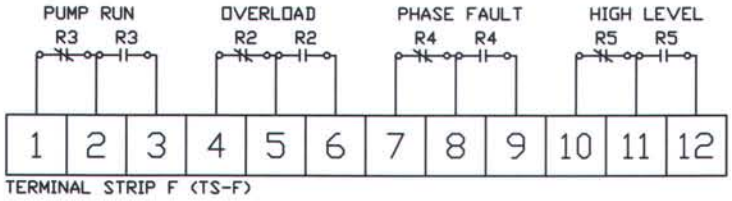


| *SQD Ground Busbar PK7GTA, PK12GTA, PK15GTA* | |
|---|---|
| Wire Range AWG CU-AL | Torque lb-in. |
| 14-10 CU, 12-10 AL | 20 |
| 8 | 25 |
| 6-4 | 35 |
| Two 14 or 12 CU, Two 12 or 10 AL | 25 |

| *SQD Terminal Block GK6 + GR6* | |
|---|---|
| Wire Range AWG CU | Torque lb-in. |
| (Type GK6) 22-10 | 11-12 |
| (Type GR6) 22-8 | 18-20 |

| *Panduit Ground Lug One-Barrel* | |
|---|---|
| Wire Range AWG CU | Torque lb-in. |
| (LAMA2-14-QY) 12-14 | 15 |
| 6-10 | 40 |
| 2-4 | 50 |
| (LAMA1/0-14-QY) 10-14 | 35 |
| 8 | 40 |
| 4-6 | 45 |
| 2/0-3 | 50 |
| (LAMA250-56-QY) 2-6 | 275 |
| 250-1 | 375 |
| (LAMA350-38-QY) 2-6 | 275 |
| 350-1 | 375 |
| (LAMA600-38-6Y) 600-4 | 500 |
| *Two-Barrel* | |
| (LAM2A1/0-14-6Y) 10-14 | 35 |
| 8 | 40 |
| 4-6 | 45 |

CUSTOMER -
JOB NAME MARSHALL STEAM PLANT
ENCLOSURE UL TYPE RATING: UL TYPE 1
VOLTAGE 480V PHASE 3 HZ 60
H.P. #1 1 #2 X #3 X #4 X
F.L.A. 2.4A X X X
TOTAL F.L.A. 3.96A
SERIAL # 10- DATE:
SCCR: 5KA SYMMETRICAL RMS,480V. MAX.
MANUFACTURED BY:
STA CON INC 2525 S. OBT APOPKA FL 32703

SIDESLOPER PUMPING SYSTEMS

MODEL NO: GCD-1-2.4-AACACAB

PROJECT: MARSHALL STEAM PLANT

DATE: 9/8/2010 REVISION: A

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TNT

70236AA

# GUNNCO PUMP & CONTROL, INC

| BILL OF MATERIAL | | | BY: TNT |
|---|---|---|---|
| QUOTE NO. | 70236AA | Date: 9/8/2010 | Rev: A |
| JOB NAME | MARSHALL STEAM PLANT | SN: | |
| CUSTOMER | | PO: | |

| QTY | LEGEND | DESCRIPTION | MFG. | PART # | Check Off |
|---|---|---|---|---|---|
| 1 | | ENCLOSURE (4X SS) 36x24x10 | HOFFMAN | A36H2410SSLP | [ ] |
| 1 | | SUB PANEL | HOFFMAN * | A-36P24 | [ ] |
| 1 | | 3 POINT LATCH (36"-48") | HOFFMAN | A-L36CR | [ ] |
| 1 | | WINDOW KIT (STAINLESS) | HOFFMAN | APWK1711NFSS | [ ] |
| 1 | N | ISOLATED NEUTRAL BLOCK 175 A. Line [2/0 to 14] – Load [4 to 14] | BUSSMANN | 16321-1 | [ ] |
| 2 | G | GROUND BUSS (#8-1) | SQD | PK7GTA | [ ] |
| 1 | MCB | MAIN CIRCUIT BREAKER | SQD | HDL36030 | [ ] |
| 1 | | MULTI-LUG KITS (6-#14-#6) | SQD | **PDC6HD6** | [ ] |
| 1 | OP M | OPERATOR MECHANISM | SQD | 9421LZ250H43 | [ ] |
| 1 | MB | MOTOR BREAKER | SQD | HDL36015 | [ ] |
| 1 | CCB | CONTROL BREAKER | SQD | QOU115 | [ ] |
| 1 | MS | MOTOR STARTER (SIZE 0) | SQD | 8536-SBO2V02S | [ ] |
| 1 | | JUMPER STRAP KIT | SQD | 9998-SO31 | [ ] |
| 3 | OL | OVERLOAD HEATERS | SQD | B 3.70 | [ ] |
| 1 | | OL AUXILIARY CONTACTS (NC, NO) | SQD | 9999-SO4 | [ ] |
| 1 | OL R | OVERLOAD RESET | SQD | 9066-RA1 | [ ] |
| 1 | CPT | CONTROL POWER TRANSFORMER | SQD | 9070-TF750D1 | [ ] |
| 1 | AL | ALARM LIGHT (STROBE) | INGRAM | SBN120AC | [ ] |
| 1 | AH | ALARM HORN W/TRIM RING (4X, 120VAC) | FEDERAL SIGNAL | 350TR-120 | [ ] |
| **2** | | **ANGLE BRACKET KIT** | **SQD** | **9080MH82** | **[ ]** |
| **19** | **TS** | **TERMINAL STRIP (NATURAL)** | **SQD** | **9080-GK6** | **[ ]** |
| **2** | **TS** | **TERMINAL STRIP (RED)** | **SQD** | **9080-GKR6** | **[ ]** |
| **2** | **TS** | **TERMINAL STRIP (BLACK)** | **SQD** | **9080-GKB6** | **[ ]** |
| **1** | **TS** | **TERMINAL STRIP (BLUE)** | **SQD** | **9080-GKL6** | **[ ]** |
| **1** | **TS** | **TERMINAL STRIP (GREEN)** | **SQD** | **9080-GKG6** | **[ ]** |
| **3** | **TS** | **TERMINAL STRIP END BARRIER** | **SQD** | **9080-GK6B** | **[ ]** |
| 1 | TSA | TERMINAL STRIP | MARATHON | SERIES 200 | [ ] |
| 1 | * F1 | FUSE | BUSSMANN | KTK-R –5 /600V | [ ] |
| 2 | * F2-3 | FUSE (750VA) (TIME DELAY AC-DC) | BUSSMANN | FNQ-R –3 /600V | [ ] |
| 3 | F | FUSE (PHASE/VOLTAGE MONITOR) | BUSSMANN | KTK-R-1/2 / 600V | [ ] |
| **1** | **HOA** | **HAND-OFF-AUTO SELECTOR** | **SQD** | **9001SKS63B** | **[ ]** |
| 1 | | (NO, NC) CONTACT | SQD | 9001-KA1 | [ ] |
| 1 | RL1 | RUN LIGHT (GREEN) (120VAC, PTT) | SQD | 9001SKT38LG | [ ] |
| 2 | PL1 | PILOT LIGHT (YELLOW) (120VAC, PTT) | SQD | 9001SKT38LY | [ ] |
| 1 | PL2 | PILOT LIGHT (RED) (120VAC, PTT) | SQD | 9001SKT38LR | [ ] |
| 2 | P/B | PUSH BUTTON | SQD | 9001-SKR1U | [ ] |
| 2 | | (NO) CONTACT | SQD | 9001-KA2 | [ ] |
| 1 | ETM | ELAPSED TIME METER | REDINGTON | 710-0002 | [ ] |
| 5 | R1-5 | CONTROL RELAY (120VAC W/PL) | SQD | 8501KP13P14V20 | [ ] |
| 5 | | 11 PIN SOCKET | IDEC | SR3P-05 | [ ] |

| | | | | | |
|---|---|---|---|---|---|
| 2 | | 8 PIN SOCKET 600V | CUSTOM CONN | RB08-PC | [ ] |
| 1 | | 12 PIN SOCKET | CUSTOM CONN | SD12-PC | [ ] |
| 1 | TH | THERMOSTAT | BILBEE | B-200 | [ ] |
| 1 | HT | HEATER | HEATRON | HEATFLEX | [ ] |
| 1 | SPD | SURGE PROTECTION DEVICE 480Y/277V | APT | S50A277V3Y | [ ] |

**NOTES:** *** OR EQUAL**

**@ PROVIDED BY PUMP REP**

# PACKING LIST

| **Quote#: 70236AA** | **Date: 9/8/2010** | **Rev: A** |
|---|---|---|

**SPARE PARTS**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | F | FUSE | BUSSMANN | KTK-R-5/600V | [ ] |
| 2 | F2-3 | FUSE (750VA) (TIME DELAY AC-DC) | BUSSMANN | KLDR –3 /600V | [ ] |
| 2 | F | FUSE | BUSSMANN | KTK-R-1/2 /600V | [ ] |
| 1 | | LIGHT BULB (6.3V) for SQD 120V PL | CANDELA CORP | 755 | [ ] |

**@ PARTS PROVIDED FOR PANEL INSTALLATION**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | LC | LEVEL CONTROLLER | GUNNCO | D332 | [ ] |
| 1 | | BREATHER | PRESSURE SYSTEMS | A-815 | [ ] |
| 1 | PS | POWER SUPPLY | MPE | PS-100 | [ ] |
| 1 | PM | PHASE MONITOR | MPE | 001-440-118 | [ ] |
| 1 | ISB | INTRINSICALLY SAFE BARRIER (XD) | STAHL | 9002/13-280-110-01 | [ ] |
| 1 | SA1 | SURGE ARRESTOR | CITEL | DS40-120 | [ ] |
| 1 | SA2 | SURGE ARRESTOR | CITEL | DLA-24D3 | [ ] |
| 1 | SA3 | SURGE ARRESTOR | CITEL | DS210-24DC | [ ] |

**@ PARTS PROVIDED LOOSE**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | | LEVEL TRANSDUCER | KPSI | T700SX100 | [ ] |

# *Sidesloper*™ PUMPING SYSTEM CONTROL
## OPERATION-DUPLEX "GC" Series" 202 Panel

The controller should provide automatic operation. Under normal conditions the pump should operate with the H-O-A switches in the A or automatic position.

### EXTERIOR MOUNTED COMPONENTS:

**Top Alarm Light**-(optional) Indicates HIGH liquid level condition. See individual indicators for cause.

**Duplex Receptacle**-(optional) Provides up to 5 amp 120v electrical service.

### INTERIOR DOOR MOUNTED OPERATOR CONTROLS:

**Main Breaker Disconnect Handle**-The main turns power off to the controller. This switch must be turned to the OFF position to open the interior door.

**H-O-A Switch** – The H-O-A switch should remain in the "A" setting for automatic operation. The "H" setting or hand is for testing only.

**Indicating Controller**-This device displays the level in the sump in inches and provides the pump ON/OFF and high-level ON/OFF operation. Check current setting or re-adjust set points as follows:

1) PUMP 1 OFF-Turn center knob of the left to A-Reset. The current PUMP OFF set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
2) PUMP 1 ON- Turn center knob of the left to A-Set. The current PUMP ON set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
3) PUMP 2 OFF-Turn center knob of the left to B-Reset. The current PUMP OFF set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
4) PUMP 2 ON- Turn center knob of the left to B-Set. The current PUMP ON set point will be displayed. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed. PLEASE NOTE: The pump will not start in the "A" position unless the level has surpassed the ON setting.
5) HIGH ALARM OFF: Loop powered alarm set off. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.
6) HIGH ALARM ON : Loop powered alarm set on. To re-adjust use a small screw driver and turn the associated screw or "pot" until the desired set point is displayed.

LED is provided to indicate that the A or B relays are ON when lit. The level display will also flash during a high level condition. Pump ON and OFF settings should be sufficient difference to prevent pump rapid cycle-pump should not restart for 10 minutes or more (typically hours) after pump shuts off.

**Flow Meter** (OPTION)-The digital flow meter provides rate of flow (GPM-gallons per minute) on the upper/larger digits, and total accumulated flow (gallons) on the lower digits. Total may accumulate to 99999999 if the decimal point is eliminated. The right side arrow button resets the total to "0" when pressed. See flow meter instructions.

**RUN Light**-indicates pump is called to operate.

**PHASE or VOLTAGE FAULT/FAIL Light**-Indicates a phase loss, improper voltage, reversed phase (three phase only), blown sensor fuses damaged, or damaged voltage or phase sensor. Sensor is adjustable and should be set to actual operating voltage at the time of start-up.

**OVERLOAD Light**-Indicates a motor starter overload has occurred.

**HIGH LEVEL Light** (OPTION) Indicates a high level condition exists. Under this condition the level indicating display will flash.

**TANK FULL Light** (OPTION) –Indicates that the pump will not operate in the "A" mode because the panel is receiving a signal via a pair of wires that the remote storage tank or sump is full. Under this condition the pump will operate in the "H" mode.

**OVERLOAD Reset Button**-Reset the motor starter overload.

**ETM**-elapsed run time meters indicate hours of pump operation (to 1/10$^{th}$). Under normal conditions hours of operation should be similar for each pump. This information can be recorded to determine estimated flows for the system.

**Breakers**-The motor, control, (and optional receptacle) breakers are accessible from the interior door. A tripped breaker typically indicates a short circuit. Please note that there are also fuses in the interior for the transformer or control power or optional receptacle. See additional information in interior components section.

**INTERIOR COMPONENTS**: Should be serviced with power off or by a qualified service personnel. NOTE: Power will be present in the incoming wiring to the main disconnect.
**----------ELECTRICAL HAZARD EXISTS!----------**

**Motor Breaker**-Three pole circuit breaker-typically located on upper far right is provided for the short circuit protection and allow service of the system. If a breaker trips check for a short circuit and reset. If the breaker trips again there may be an electrical problem which should be checked by a qualified electrician. Motor breaker switches off primary voltage to the motor starter contactors and pump.

**Control Breaker**-Single pole control circuit breaker-Typically located left position of the motor breaker is provided for the short circuit protection and allow service of the system. If a breaker trips check for a short circuit and reset. If the breaker trips again there may be an electrical problem which should be checked by a qualified electrician. There is also a fuse between the breaker and the control circuit. at the transformer which Control breaker switches off 120v control power to operator control components.

**Receptacle Breaker** (OPTION) -Single pole circuit breaker-Typically located far left position of the motor breaker is provided for the short circuit protection and protection of the system. There is also a fuse between the breaker and the receptacle which typically may blow due to overloaded circuit (limit usage to 5 amp service).

**Transformer and Fuses** (if applicable) – The transformer provides low 120 volt power for the control operations. There are three fuses mounted on top of the transformers, The upper two are the incoming power (230/460 volt) and the lower fuse is the control circuit power (120 volt). When replacing fuses use the identical type and rating as originally provided.

**Relays** ("ICE CUBE" relays)-These are plug in style relays which work between the level controller/H-O-A switch and the motor starter coil (and where applicable the high level lights) which minimizes the wear of the level controller contacts. Coil voltage is 120v.

**Motor Starter/Overload relay** -Contains overload protection and magnetic coil to energizes to allow power to the pump. Red bar resets overloads. Coil voltage is 120v.

**Voltage/Phase Monitor**- Plug in style device monitor incoming power and detects and protects motor from high or low voltage, loss of phase, or reversed phase (on three phase models). A led light indicates proper operation and adjustable knob allows for setting the unit to the normal operating voltage range. If the range exceeds approximately 10% of the set point the pump will be prevented from operating (motor starter coil will not pull in) until the problem is corrected. If the LED will not come on with adjustment check voltage and the associated fuses. High voltage surges may damage monitor. GunnCo normally stocks replacement units. At start-up the operating voltage should be set. Voltage must be within the range of the monitor. On three phase systems, if the unit will not energize at start-up after adjustment of range setting, the phases may need to be reversed at the monitor-to accomplish switch any two legs.

**ISB**-Intrinsically Safe Barrier-This devices provides a safety for the level control voltage and must be used to ensure safe operation where the sensor is in a hazardous location. The barrier contain two replaceable fuses.

**24VDC Power Supply** (OPTION)-Supplies power to the voltage meter. Plugs into socket.

**Lock Out Relay** (OPTION) –Provides sensing of a closed contact (float switch or relay) up to 5000' away through a pair of wires and provides panel pump lock out circuit function. Plugs into socket.

**Motor Saver (OPTION)**-Monitors motor load and provides protection for pump dry run, "dead head", and a variety of voltage and phase protection when the panel is in the "A" mode. A fault CODE is provided after a fault event is detected. May be programmed for specific protection category and ranges including short cycle (delay start), phase unbalance, high/low voltage, delay period before restart, and number of restarts after a fault. Typically programmed to provide backup overload and voltage protection. See instructions for programming and fault codes.

**Heater & Thermostat**-An enclosure heater is provided to minimize the formation of condensate within the enclosure to help ensure electrical components maintain minimum operating temperatures. The thermostat is adjustable but should typically be set around 90 for effective operation. If condensate continues to exist increase thermostat setting to 100 and/or check for sources of liquid into the enclosure.

**Bellows-**The panel is equipped with a bellow breather device which connects to the transducer breather to provide a closed venting loop to allow the transducer diaphragm to adjust.

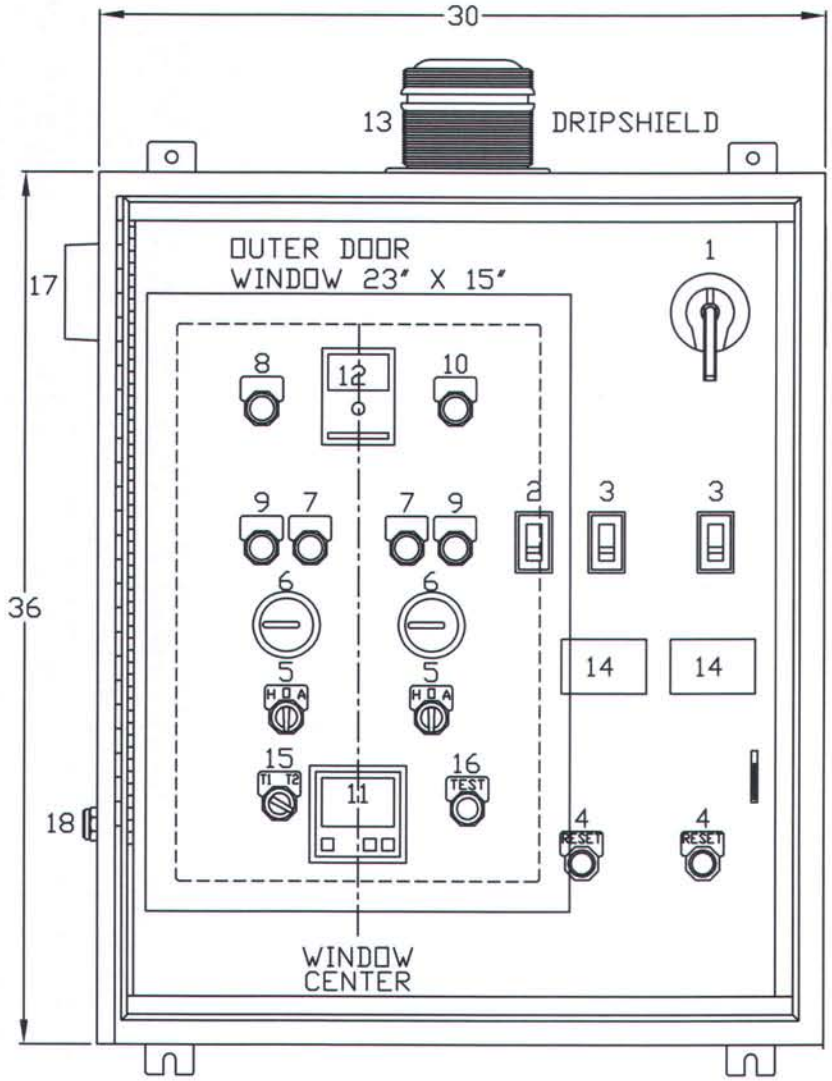
**Surge Suppressor** (110 Volt control circuit)-provides protection to the control circuit if a surge condition occurs. An indicating light is on when operating properly.

**Surge Suppressor** (24V/4-20Ma)-provide protection from surges entering panel from level sensor-Note that level sensor is also surge protected with an integral surge suppressor which is contained within the level sensor. If device damaged the signal between the sensor and the level indicating controller may will be lost and result in a negative level display of approximately –34.6. Also see ISB below.

**TVSS Transient Voltage Surge Suppressor Lightning Arrestor**-Square or rectangular device absorbs power line surges to protect the system. If the green LED light does not energize with power to the panel the unit may be no longer functional and replacement is required.

**Lightning Capacitor**-Cylinder Device mounted on the right of the enclosure. This device worked in conjunction to the Lightning Arrestor and is a "one shot" device, which absorbs high amperage line surges to protect the system. If a severe event occurs damage may be visual. If damaged the device should be immediate replaced. If damaged do not touch any exposed parts or wires.

Call GunnCo for assistance in operating and trouble shooting problems and for replacement parts or sources.
Our phone number is 770-889-7114.




OUTER DOOR HAS BEEN REMOVED FOR CLARITY

1 - MCB MAIN CIRCUIT BREAKER
2 - CCB CONTROL CIRCUIT BREAKER
3 - MB1-2 MOTOR BREAKER 1-2
4 - PL2-3 OVERLOAD RESET
5 - PUMP HAND-OFF-AUTO
6 - ETM ELAPSE TIME METER
7 - RL1-2 RUN LIGHT
8 - PL1 PHASE FAULT LIGHT
9 - OL1-2 OVERLOAD LIGHT 1-2
10 - PUMP LOCKOUT LIGHT (OPTIONAL)
11 - FLOWMETER (OPTIONAL)
12 - PUMP CONTROLLER
13 - STROBE LIGHT
14 - PUMP SAVER CUTOUTS
15 - TRANSDUCER SELECTOR SWITCH
16 - ALARM TEST
17 - AH ALARM HORN
18 - ASB ALARM SILENCE BUTTON

3PT LATCH ON
OUTER DOOR

TERMINAL STRIP E
ON BACK OF DF FOR
OPTIONAL EQUIPMENT

| | |
|---|---|
| SIDESLOPER PUMPING SYSTEMS | |
| MODEL NO: | GCD-7.5-13.2-AACAB |
| PROJECT: | MARSHALL STEAM PLANT |
| DATE: 9/8/2010 | REVISION: A |

GUNNCO PUMP & CONTROL
515 INDUSTRIAL WAY
CUMMING, GA 30040
TEL. 770-889-7114

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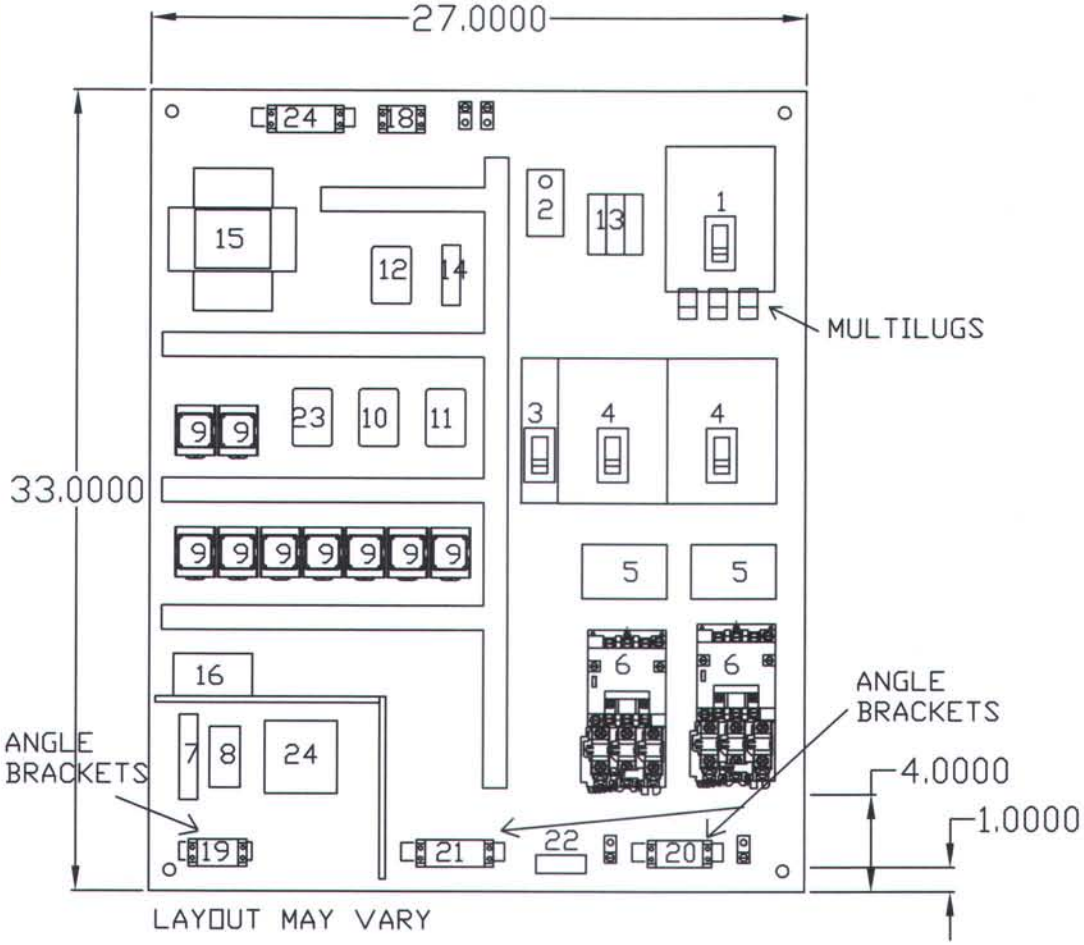


1 - MCB MAIN CIRCUIT BREAKER
2 - SA1 SURGE ARRESTOR 120V
3 - CCB CONTROL CIRCUIT BREAKER
4 - MB1-2 MOTOR BREAKER
5 - MOTOR SAVER 1-2
6 - MS1&2 MOTOR STARTER
7 - ISB INTRINSCIALLY SAFE BARRIER
8 - SA2 SURGE ARRESTOR 4-20MA
9 - R1-9 CONTROL RELAY
10 - WAR LEVEL RELAY (OPTIONAL)
11 - PS POWER SUPPLY (OPTIONAL)
12 - PM PHASE MONITOR
13 - PM FUSE BLOCK
14 - TH THERMOSTAT
15 - CPT CONTROL POWER TRANSFORMER
16 - TRANSDUCER BREATHER
17 - LPA LOOP POWERED ALARM
18 - TSA TERMINAL STRIP A
19 - TSB TERMINAL STRIP B
20 - TSC TERMINAL STRIP C
21 - TSD TERMINAL STRIP D
22 - HT HEATER STRIP
23 - ALT ALTERNATOR
24 - TSF TERMINAL STRIP F

SIDESLOPER PUMPING SYSTEMS

| | | | |
|---|---|---|---|
| MODEL NO: | GCD-7.5-13.2-AACACAB | | |
| PROJECT: | MARSHALL STEAM PLANT | | |
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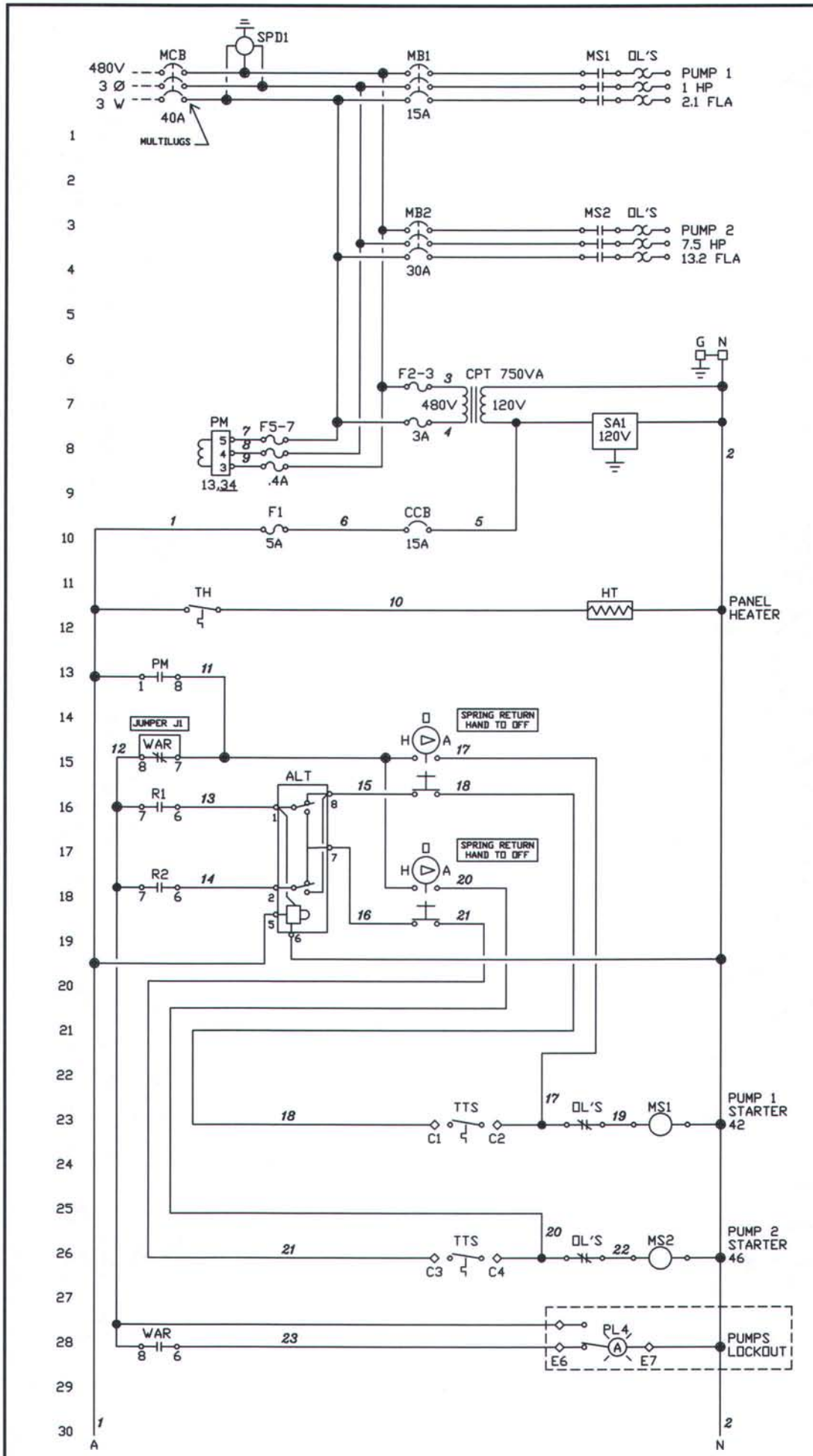


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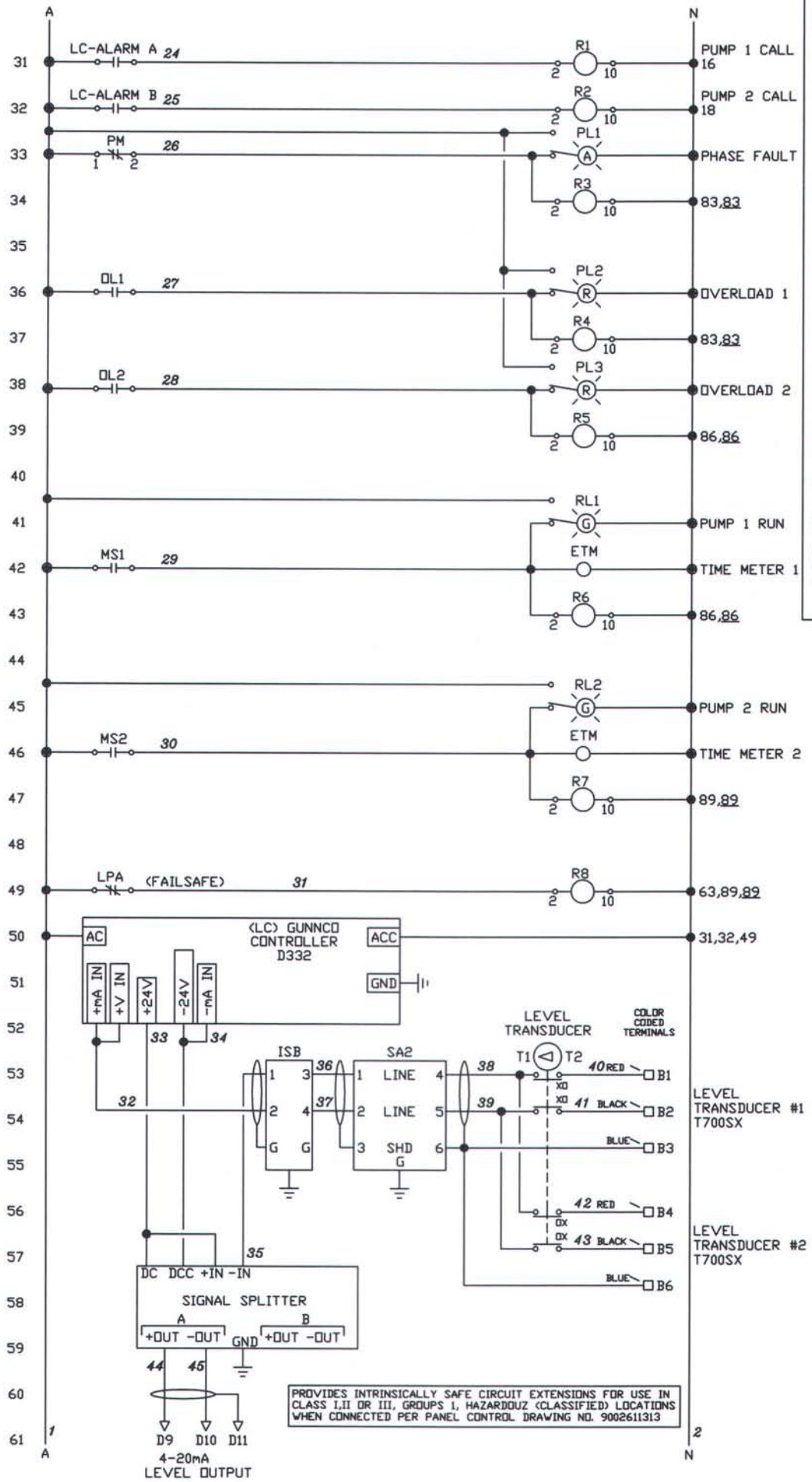


SIDESLOPER PUMPING SYSTEMS

MODEL NO: GCD-7.5-13.2-AACACAB

PROJECT: MARSHALL STEAM PLANT

DATE: 9/8/2010

REVISION: A

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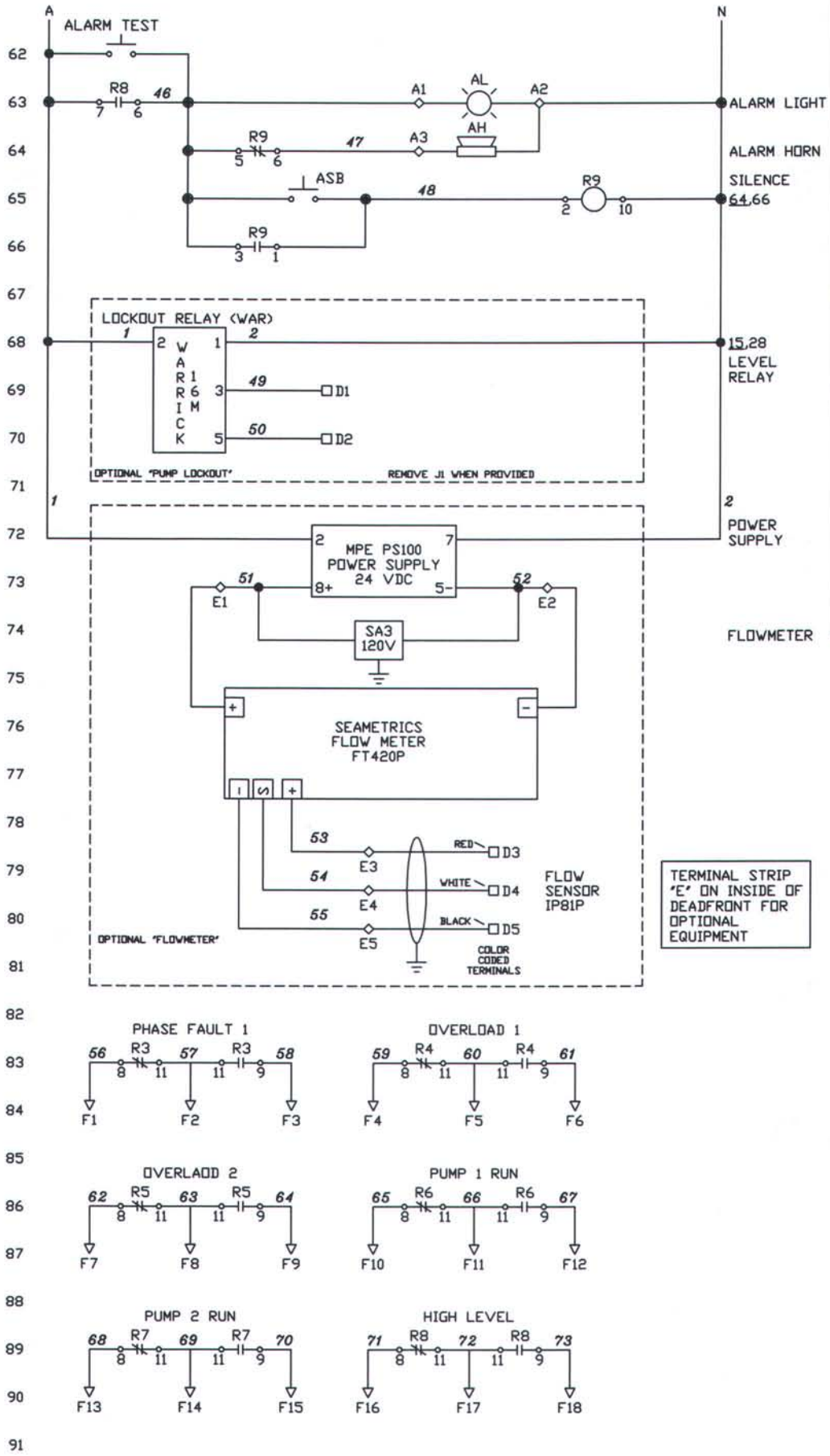


SIDESLOPER PUMPING SYSTEMS

MODEL NO: GCD-7.5-13.2-AACACAB

PROJECT: MARSHALL STEAM PLANT

DATE: 9/8/2010

REVISION: A

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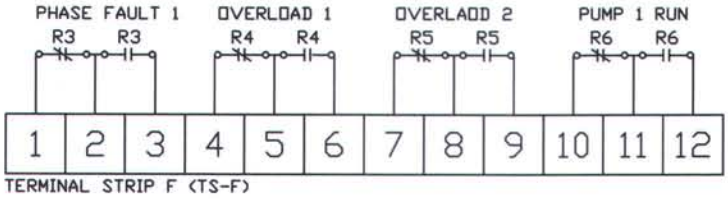
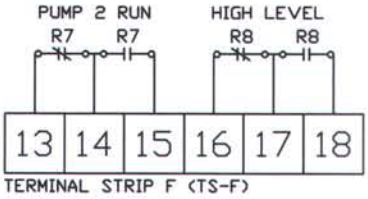
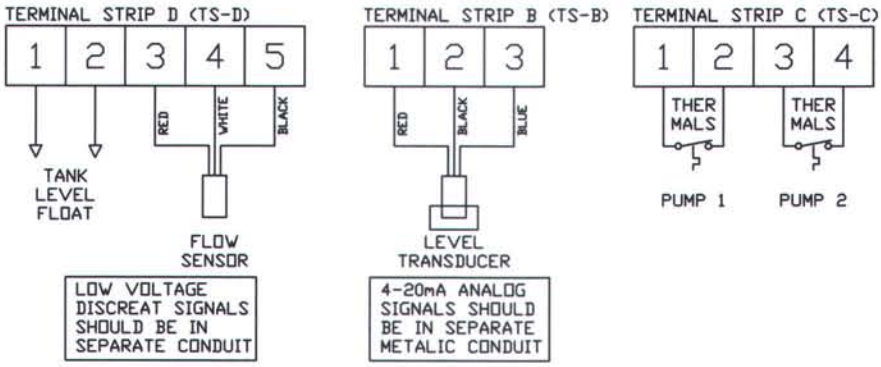
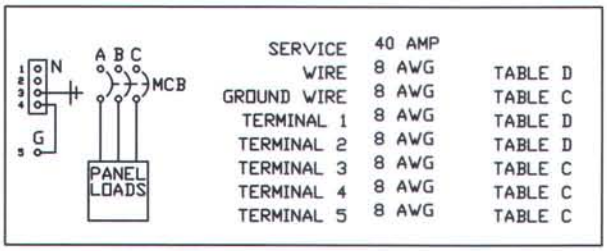



| | |
|---|---|
| CUSTOMER | - |
| JOB NAME | MARSHALL STEAM PLANT |
| ENCLOSURE UL TYPE RATING: | UL TYPE 1 |
| VOLTAGE | 480V PHASE 3 HZ 60 |
| H.P. | #1 1 #2 7.5 #3 X #4 X |
| F.L.A. | 2.1A 13.2A X X |
| TOTAL F.L.A. | 19.13A |
| SERIAL # | 10- DATE: - |
| SCCR: | 5KA SYMMETRICAL RMS,480V. MAX. |

MANUFACTURED BY:
STA CON INC 2525 S. OBT APOPKA FL 32703




SIDESLOPER PUMPING SYSTEMS

MODEL NO: GCD-7.5-13.2-AACACAB

PROJECT: MARSHALL STEAM PLANT

DATE: 9/8/2010 REVISION: A

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515 INDUSTRIAL WAY
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TEL 770-889-7114

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TNT

70236BA

# GUNNCO PUMP & CONTROL, INC

| BILL OF MATERIAL | BY: TNT |
|---|---|

| | | | |
|---|---|---|---|
| QUOTE NO. | 70236BA | Date: 9/8/2010 | Rev: A |
| JOB NAME | MARSHALL STEAM PLANT | SN: | |
| CUSTOMER | | PO: | |

| QTY | LEGEND | DESCRIPTION | MFG. | PART # | Check Off |
|---|---|---|---|---|---|
| 1 | | ENCLOSURE (4X SS) 36x30x10 | HOFFMAN | A36H3010SSLP | [ ] |
| 1 | | SUB PANEL | HOFFMAN * | A-36P30 | [ ] |
| 1 | | 3 POINT LATCH (36"-48") | HOFFMAN | A-L36CR | [ ] |
| 1 | | WINDOW KIT (STAINLESS) | HOFFMAN | APWK2315NFSS | [ ] |
| **1** | **N** | **ISOLATED NEUTRAL BLOCK 175 A. (1-4) Line [2/0 to 14] – Load [4 to 14]** | **BUSSMANN** | **16220-1** | **[ ]** |
| 1 | MCB | MAIN CIRCUIT BREAKER | SQD | HDL36040 | [ ] |
| 1 | | MULTI-LUG KITS (6-#14-#6) | SQD | PDC6HD6 | [ ] |
| 1 | OP M | OPERATOR MECHANISM ***5-1/2" to 21-3/8 MOUNTING DEPTH*** (H or J – FRAME) | SQD | 9421LZL250H43 | [ ] |
| 1 | MB | MOTOR BREAKER | SQD | HDL36015 | [ ] |
| 1 | MB | MOTOR BREAKER | SQD | HDL36030 | [ ] |
| 1 | CCB | CONTROL BREAKER | SQD | QOU115 | [ ] |
| 2 | MS | MOTOR STARTER (SIZE 1) | SQD | 8536-SCO3V02S | [ ] |
| 3 | OL | OVERLOAD HEATERS | SQD | B 3 | [ ] |
| 3 | OL | OVERLOAD HEATERS | SQD | B 22 | [ ] |
| 2 | | OL AUXILIARY CONTACTS (NC, NO) | SQD | 9999-SO4 | [ ] |
| 2 | OL R | OVERLOAD RESET | SQD | 9066-RA1 | [ ] |
| 1 | CPT | CONTROL POWER TRANSFORMER | SQD | 9070-TF750D1 | [ ] |
| 1 | AL | ALARM LIGHT (STROBE) | INGRAM | SBN120AC | [ ] |
| 1 | AH | ALARM HORN W/TRIM RING (4X, 120VAC) | FEDERAL SIGNAL | 350TR-120 | [ ] |
| **4** | | **ANGLE BRACKET KIT** | **SQD** | **9080MH82** | **[ ]** |
| **34** | **TS** | **TERMINAL STRIP (NATURAL)** | **SQD** | **9080-GK6** | **[ ]** |
| **2** | **TS** | **TERMINAL STRIP (RED)** | **SQD** | **9080-GKR6** | **[ ]** |
| **2** | **TS** | **TERMINAL STRIP (BLACK)** | **SQD** | **9080-GKB6** | **[ ]** |
| **1** | **TS** | **TERMINAL STRIP (BLUE)** | **SQD** | **9080-GKL6** | **[ ]** |
| **4** | **TS** | **TERMINAL STRIP END BARRIER** | **SQD** | **9080-GK6B** | **[ ]** |
| 1 | * F1 | FUSE | BUSSMANN | KTK-R –5 /250V | [ ] |
| 2 | * F2-3 | FUSE (750VA) (TIME DELAY AC-DC) | BUSSMANN | FNQ-R –3 /600V | [ ] |
| **2** | **HOA** | **HAND-OFF-AUTO SELECTOR** | **SQD** | **9001SKS63B** | **[ ]** |
| 2 | | (NO, NC) CONTACT | SQD | 9001-KA1 | [ ] |
| 1 | SW | T1/T2 SWITCH | SQD | 9001-SKS11B | [ ] |
| 2 | | (NO, NC) CONTACT | SQD | 9001-KA1 | [ ] |
| 2 | RL | RUN LIGHT (GREEN) (120VAC, PTT) | SQD | 9001SKT38LG | [ ] |
| 1 | PL | PILOT LIGHT (RED) (120VAC, PTT) | SQD | 9001SKT38LR | [ ] |
| 2 | PL | PILOT LIGHT (YELLOW) (120VAC, PTT) | SQD | 9001SKT38LY | [ ] |
| 2 | P/B | PUSH BUTTON | SQD | 9001-SKR1U | [ ] |
| 2 | | (NO) CONTACT | SQD | 9001-KA2 | [ ] |

| | | | | | |
|---|---|---|---|---|---|
| 1 | ETM | ELAPSED TIME METER | REDINGTON | 710-0016 | [ ] |
| 9 | R1-9 | CONTROL RELAY (120VAC W/PL) | SQD | 8501KP13P14V20 | [ ] |
| 1 | PMD | PHASE MONITOR DISCONNECT (MANUAL MS) (.25-.4 amps) | SQD | GV2ME03 | [ ] |
| 2 | | 8 PIN SOCKET | IDEC | SR2P-06 | [ ] |
| 9 | | 11 PIN SOCKET | IDEC | SR3P-05 | [ ] |
| 1 | | 8 PIN SOCKET 600V | CUSTOM CONN | RB08 | [ ] |
| 1 | | 12 PIN SOCKET | CUSTOM CONN | SD12 | [ ] |
| 1 | TH | THERMOSTAT | BILBEE | S200-A | [ ] |
| 1 | HT | HEATER | HEATRON | HEATFLEX | [ ] |

**NOTES:**

*** OR EQUAL**
**+ INDICATES LINE ITEM CHANGE**
SPECIAL ITEMS **IN BOLD TYPE**
**@ PROVIDED BY PUMP REP**

# PACKING LIST

| **Quote#: 70236BA** | **Date: 9/8/2010** | **Rev: A** |
|---|---|---|

**SPARE PARTS**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | F | FUSE | BUSSMANN | KTK-R-5/250V | [ ] |
| 2 | F | FUSE | BUSSMANN | FNQ-R-3/600V | [ ] |
| 1 | | LIGHT BULB (6.3V) for SQD 120V PL | CANDELA CORP | 755 | [ ] |

**PARTS PROVIDED FOR PANEL INSTALLATION**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | LC | LEVEL CONTROLLER | GUNNCO | D332 | [ ] |
| 1 | | BREATHER | PRESSURE SYSTEMS | A-815 | [ ] |
| 1 | PM | PHASE MONITOR | MPE | 001-440-118 | [ ] |
| 1 | ISB | INTRINSICALLY SAFE BARRIER (XD) | STAHL | 9002/13-280-110-01 | [ ] |
| 1 | SA1 | SURGE ARRESTOR | CITEL | DS40-120 | [ ] |
| 1 | SA2 | SURGE ARRESTOR | CITEL | DLA-24D3 | [ ] |
| 1 | SA3 | SURGE ARRESTOR | CITEL | DS210-24DC | [ ] |
| 1 | ALT | AUTO ALTERNATOR | MPE | 008-120-13SP | [ ] |
| 1 | SI | SIGNAL ISOLATOR/ SPLITTER | MOORE INDUSTRIES | ECT/4-20Ma/2x4-20mA/24VDC/TX/DIN | [ ] |

**PARTS PROVIDED LOOSE**

| QTY | LEGEND | DESCRIPTION | MFG | PART # | |
|---|---|---|---|---|---|
| 1 | | LEVEL TRANSDUCER | KPSI | T700SX100 | [ ] |

The differential between PUMP ON and PUMP OFF must allow at **least 10 minutes** between starts to prevent early (and non-warranty) motor failure. In some installation the pump may produce greater flow than the perforations of the riser pipe allow the pipe sump area to recharge. Under these conditions it is available to maximize the ON-OFF settings-Typically we suggest setting PUMP OFF to 6" and PUMP ON to 24" or above. Call GunnCo for details.

**Typically:**

PUMP OFF (A-RESET) is set to 6" to 12".

PUMP ON (A-SET) is set to 12" to 24".

HIGH LEVEL ALARM ON (B-SET) is set to 30" or greater

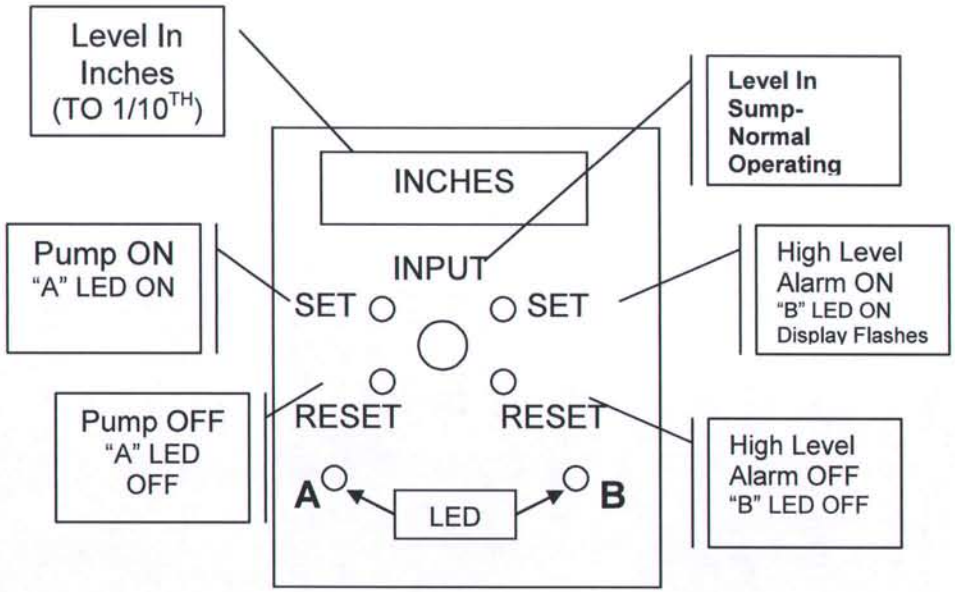
HIGH LEVEL ALARM OFF (B-RESET)( is set 2" below the B-SET point.

(For deep sumps add 6" or more to each setting)

For programming and operating assistance PLEASE give us a call @ 770-889-7114.

To check setting-Turn Knob to point and current setting will be displayed.

To change setting-Turn Knob to point and adjust screw until the desired new setting is displayed..




GunnCo Devar 332 Indicating Controller

# Series 700 Submersible Pressure Transducer

The Series 700 pressure transducer uses piezoresistive pressure cell sensing technology with a 316 stainless steel diaphragm. The housing is 316 stainless steel with Teflon wetted materials. Cable is a heavy duty polyurethane jacketed and shielded with polyethylene breather tube. Conductors are 22 AWG.

Signal is 4-20mA provided by a 24 volt powered control loop.

Standard pressure range for leachate cell pump applications is 0-5 psi with 0-10 psi available. Higher ranges are available for storage tank applications.

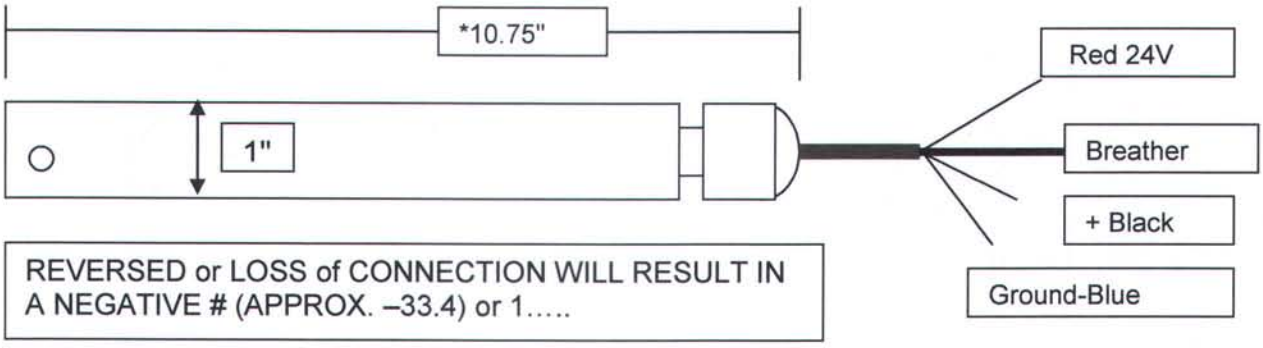
Accuracy is +/- 1.00 % of full range (for 0-5 psi accuracy is +/-1.4" minimum).

Rated burst pressure is 2X pressure range (10 psi minimum).

The standard Sidesloper unit is provided with an internal surge suppressor with more than 10,000 amperes peak surge. Protectors are multi-stage design, with a solid state section that intercepts the leading edge of the surge in a nanosecond. The second stage of the design contains a gas discharge tube which crowbars up to 20,000 ampere currents to ground. The tube remains in the crowbar start until the surge has passed, then rests to normal operation automatically.

Approvals are available for FM, CSA, and UL for Class 1, Div 1, Groups A, B, & C, and Class II, Div 1, group E, F, & G, and Class III, Div 1 hazardous locations. Hazardous location approvals are accomplished using approved electrical barrier.

A permanent bellows breather device mounted in the control panel allows the device to "breath" and prevents moisture from entering and condensing in the vent tube of the cable. This device replaces desiccant tubes which require periodic replacement.



# GunnCo *Sidesloper*™

## Pumps and Systems Warranty Policy

1. All ***Sidesloper***™ GunnCo packages sold as specified and complete systems (pump, panel, and level sensor) shall be covered by a 12-month warranty. The warranty period begins upon the date of shipment and covers all components against failure to function due to workmanship, component failure, or materials compatibility for the application as recommended and sold and paid for within quoted terms.
2. All ***Sidesloper***™ pumps or components not sold as a complete system are subject to a warranty period of one year from shipment date or per the manufacturers standard warranty, whichever expires first.
3. Claims under the warranty can be made by obtaining a return authorization number from GunnCo during the warranty period and returning the defective component(s), freight pre-paid to GunnCo or the proper service location as directed by GunnCo. Details of the problem should be included with the returned item along with the return authorization number. The defective component must be returned within 30 days of the authorization date. The option to repair, replace, or adjust the problem component shall be that of GunnCo. Costs associated with troubleshooting, removal or replacement of components, rental equipment, rush premium charges, and freight is not included under warranty.
4. Warranty does not cover normal wear, damage due to accident or physical damage (during shipment, installation, storage), acts of nature (lightning) (blown fuses and voltage monitors), misuse, abuse, improper storage, improper/defective electrical service (low/high voltage/surges), improper installation, improper selection, or improper or unauthorized service or modifications.
5. Warranty applies only to system as operating under the conditions at time of installation (clean leachate). Build up of abrasives in sump riser such as sludge, sand, silt or scale in pump/motor/carrier/transducer will void warranty.
6. GunnCo accepts no responsibility for damage, loss, or expenses incurred through the sale or use of its equipment. Under no condition shall GunnCo be held liable for any special, incidental, or consequential damage.

## Service Labor, Repairs and Components/Parts Warranty Policy

1) Service labor is warranted for quality of provided service. Repairs by GunnCo or GunnCo representative are warranted for 90 days from original installation/service dates. Failure due to work by others, modifications, non-approval for proper repairs, temporary repairs, materials by others, abuse, misuse, acts of nature, and non-recommended parts or components may not be covered by this warranty.
2) Parts and component are subject to original manufacturer's warranty periods and limits and may be subject to manufacturer's final inspection of a failed items.
3) GunnCo retains right to replace, repair, or refund labor and materials under the warranty where applicable.
4) Repair warranty for shop repairs is 90 days and does not include freight, removal, installation, non-GunnCo provided components or as noted for above service warranty.

**********

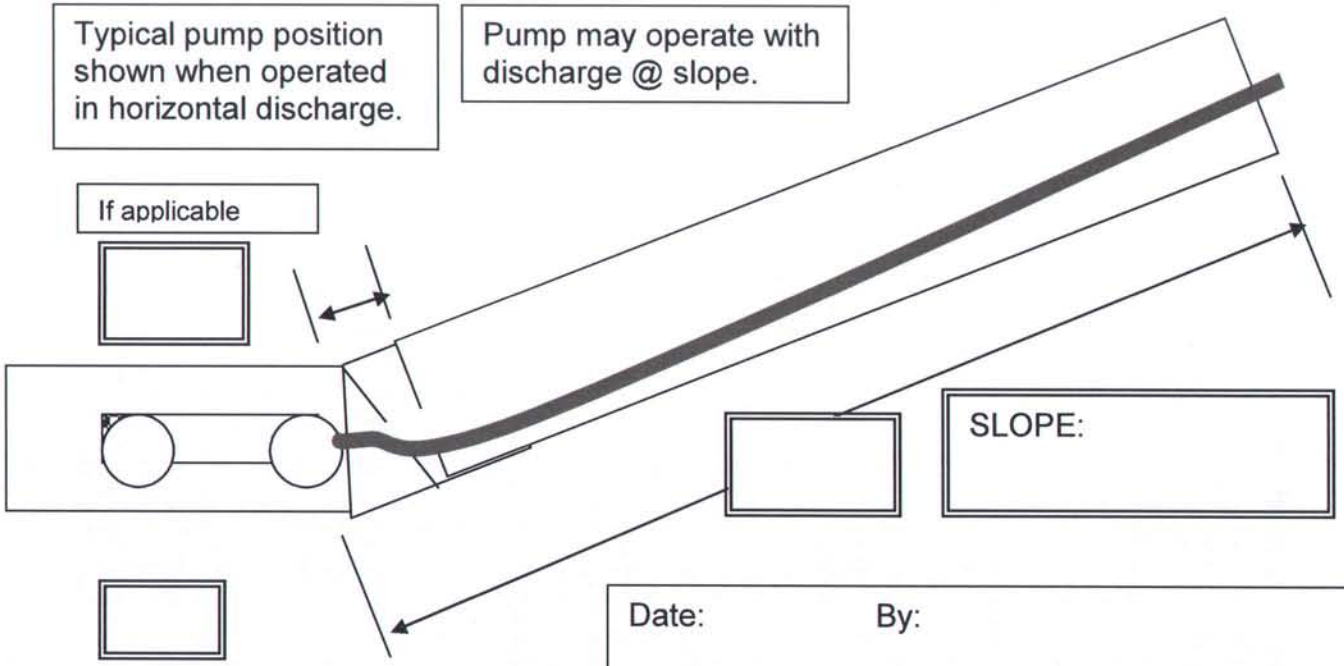
Please contact us immediately should you suspect there may be a problem or if you have any questions concerning the operation or installation of a system or component. By contacting us immediately we can assist in determining the problem and provide the fastest possible response.

# **GunnCo** *Sidesloper* Leachate Pumping Systems- 1/2000

## RISER AS BUILT DATA RECORD

***Please Complete Data***

How is riser constructed at toe of slope? (design of turn / number of miters / distance of transition):




SLOPE:

Date: By:

# APPENDIX III – ANCILLARY FACILITIES
## Section 2 – Electrical/Mechanical Drawing Set

Drawings Under Seperate Cover

# APPENDIX III – ANCILLARY FACILITIES
## Section 3 – Fencing Plan Drawings

Drawings Under Seperate Cover

Drawings Under Separate Cover

# APPENDIX III – ANCILLARY FACILITIES

## Section 4 – Visual Screening Plan Drawings and Zoning Compliance Certificate

Drawings Under Seperate Cover