



SKAPS INDUSTRIES
GEONET DIVISION

Sales Office:
Engineered Synthetic Products, Inc.
3985 Steve Reynolds Blvd Unit H
Norcross, GA USA 30093
www.espgeosynthetics.com
www.skaps.com

QUALITY CONTROL

PROGRAM OUTLINE



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GENERAL

Scope

The following describes parameters for the manufacture, supply, and installation of SKAPS Industries Drainage Net and Geocomposite. SKAPS Industries is dedicated to manufacturing the finest quality geosynthetics under the most rigorous testing protocol.

Qualifications

SKAPS Industries has successfully manufactured over 100,000,000 square feet of polyethylene drainage net each of the past ten years. SKAPS Industries operates three state-of-the-art Geonet Extrusion Lines. This ensures that our customers who have special project-specific requirements are serviced without interfering with standard daily production.

Manufacturing Quality Assurance

SKAPS Industries maintains laboratories at each of our manufacturing facilities. These Facilities maintain strict quality control over our products using the best and latest in testing equipment and techniques. The quality control testing laboratory is designed around the latest GRI and ASTM procedures and standards.



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MATERIALS

Drainage Net

The drainage net is manufactured by extruding two sets of polyethylene strands to form a three dimensional structure to provide for planar flow. The drainage net is manufactured with virgin polyethylene resin manufactured specifically for the intended application. The natural polyethylene resin without the carbon black shall meet the following requirements:

Property Test Method Requirements

Density, g/cc ASTM D 1505 > 0.94

Melt Index, g/10 min. ASTM D 1238 < 1.0

The drainage net is manufactured in Commerce GA. Labels on each roll shall identify the thickness of the material, the width and length of the roll, roll number, and name of the manufacturer.

Geotextile

The geotextile shall be a non-woven, needle punched polypropylene fabric manufactured by SKAPS Industries. SKAPS nonwoven geotextile is a superior quality, nonwoven geotextile produced by needlepunching together 100% polypropylene staple fibers in a random network to form a high strength dimensionally stable fabric. The polypropylene fibers are specially formulated to resist ultraviolet light deterioration, and are inert to commonly encountered soil chemicals. The fabric will not mildew, is non-biodegradable, and is resistant to damage from insects and rodents. Polypropylene is stable within a ph range of 2 to 13.

Geocomposite

The geocomposite shall consist of the SKAPS Industries HDPE drainage net heat bonded to one layer or sandwiched between two layers of geotextile to create a single-sided or double-sided geocomposite. The geotextiles shall extend 6 inches beyond the edges of drainage net on both sides of the geocomposite roll.



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GEONET / GEOCOMPOSITE TESTING PROCEDURES

QC Sampling Schedule

All tests are performed every 35,000 square feet of production except for compressibility, which is tested once per shift (approximately every 250,000 square feet of production). Transmissivity is done on a requested basis.

Weight / Area (ASTM D 5261)

The width is determined by measuring the sample in three places--once across each cut end and once across the center. The three measurements are then averaged and reported in inches. The length is also determined by measuring three places--along both edges and along the center. These values are averaged and reported in inches. Samples are then taken and weighed to the nearest .001 lb/sf. The weight is divided by the average width to obtain a weight per length value. The weight/length number is divided by the average width value to obtain weight per area. The value is reported in lbs/sf.

Thickness (ASTM D 5199)

Five specimens are cut from across the width of the lab sample. A thickness gauge with a $\frac{3}{4}$ inch presser foot is used to measure the thickness of each specimen. The values are recorded and reported as an average in inches.

Tensile Strength (ASTM D 5035)

Five specimens are cut from across the width of the lab sample. They are then placed in the jaws of the Instron Machine and a load is applied at a constant strain of 12 in/min until yield. The results of the tensile test are then averaged and recorded.



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% Carbon Black (ASTM D 4218)

The carbon black test determines the percent by weight of the product that is carbon black. The percent of carbon black is the ratio of the residue weight after pyrolysis in a muffle furnace compared to the weight of input specimen. Two grams of the net are cut and placed in aluminum dishes. The samples are then placed in a muffle furnace for ten minutes at 600 degrees centigrade. The samples are removed and allowed to cool. The carbon black percentage is calculated and recorded.

Ply Adhesion (ASTM D 7005)

Five specimens are cut from across the entire width of the composite sample, each measuring one inch wide by ten inches long. The strain rate for the test is 10 in/min. The fabric is clamped in one jaw of the Instron machine while the net is clamped in the other. The fabric is pulled away from the net to test the adhesion of the fabric to the net.

Transmissivity (ASTM D 4716)

The transmissivity test for the composite is identical to the test for the geonet.

Melt Index (ASTM D 1238)

The melt index determines the rate of the extrusion of the molten resin through a die of specified length and diameter at a temperature of 190 degrees centigrade under a load of 2.16 kg and is measured in g/10min. A sample of approximately 2.5 grams of geonet is then put through the melt plastometer to verify flow rates.

Density of Polymer (ASTM D 1505)

Taking samples from the melt index test, small strands are cut and measured in a density column. A mixture of distilled water and isopropyl alcohol is used as the suspension fluid.



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Transmissivity (ASTM D 4716)

The transmissivity test measures the inplane flow of water across the net sample. In the standard test, the sample is placed between two steel plates with the water temperature at 20 degrees centigrade. Different gradients and loads are applied to the sample. The values are then calculated and converted to gallons per min/ft, or meters²/sec. Transmissivity is not a standard manufacturing quality control test but rather a design indicator and is tested on a per project request basis.



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TRANSNET

DRAINAGE NET

GEOCOMPOSITE

HANDLING AND INSTALLATION
MANUAL



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Introduction

Geocomposites provide a solution to various drainage problems. As with any synthetic product, the quality assurance and quality control does not stop once the product is shipped from the factory. Whether the product has been specified for vertical wall hydrostatic relief or horizontal flow zones for landfill cells/closure and roadways, care in handling and installation is critical to the future functioning of the product.

TRANSNET is manufactured utilizing high quality HDPE resin and lamination of high strength to weight ratio nonwoven geotextiles. The lamination process is completed at the same location where the net is manufactured, minimizing additional handling and allowing for supply of custom lengths. TRANSNET can have one or both sides laminated in order to meet the design specification.

Manufacturing

TRANSNET is manufactured utilizing state-of-the-art counter rotating dies and the highest quality resin. TRANSNET is manufactured with the addition of carbon black to stabilize against degradation from UV exposure.

Packaging

Upon completion of the lamination process, the geocomposite will be wrapped in an opaque wrap to prevent exposure to UV and for protection from the weather, dust, etc. In the event only TRANSNET is required, shipping in a wrapper is not necessary.



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Each roll will be labeled or tagged so that the following information is available at all times from the manufacturer:

- **Manufacturer's Name**
- **Product Identification**
- **Lot Number**
- **Roll Dimensions**

Shipping and Storage

Geocomposite rolls will be shipped in original packaging. In the event the packaging is damaged during shipment, repairs should be made to ensure protection against UV and weather. Care should be used during the off loading to ensure that the machinery used does not penetrate packaging.

Storage of the rolls prior to installation should be in an area where they are not in standing water. For storage longer than 30 days, rolls should be elevated off the ground with tires, pallets or 2x4's to prevent water from saturating the bottom row. The stack should then be covered with a material that will give additional protection from the elements. Should the product be exposed to excessive dust, the product should be washed prior to installation.

Site Preparation

The design engineer will determine how and where the geocomposite is to be utilized. With any application, care should be used in placing net or composite so that it is not damaged by stones or other protrusions that may compromise the functionality of the product.



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Installation

TRANSNET should be installed by hand. Once the roll is delivered to the installation location via rubber-tired loader or other appropriate machinery, the rolls should be inspected for any damage from shipping or handling. Once the rolls are positioned, they should be unrolled by hand. For slope applications, the rolls should be rolled from top to bottom and hand tightened to remove any wrinkles. The TRANSNET portion of adjacent rolls shall be overlapped two to four inches or according to the Engineer's recommendation. When placing TRANSNET end to end, overlap in shingle placement fashion a minimum of one foot. For end-to-end placement, the top layer of geotextile shall be peeled back and excess TRANSNET will be trimmed so that the top layer of geotextile covers the attachment of the two layers of geocomposite. The TRANSNET will be attached to adjacent rolls utilizing plastic wire ties. These ties will be placed at a maximum spacing of 5 feet along the sides of the rolls and a maximum of 2 feet for end to end attachment, or according to the Engineer's specification.

Metal ties or hog rings are not to be used.

Anchoring

For slope applications, TRANSNET should be placed in a trench so that pull out or slippage is prevented. The trench should be in accordance with the Design Engineer's requirements. Sand bags should be on hand at all times and placed on edges not seamed to prevent uplift from the wind. Welding of the TRANSNET to HDPE liner or any other geomembrane is not recommended.



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INSTALLATION GUIDELINES

Nonwoven Geotextile, Nets and Composites

Heat Seaming

Nonwoven Separate or Laminated

Nonwoven geotextiles can be joined together by using fusion seaming methods. The minimum overlap for this type of welding is four inches. Prior to fusion seaming the geotextile together, the installer must demonstrate to the Field Engineer the ability to perform this type of installation method. Areas burned through that are damaged by fusion welding shall be properly repaired. Care should be taken during installation to prevent damage to the geotextile. Torn or punctured material shall be patched with sufficient overlap to prevent separation.

Sewing Procedure

Nonwoven Separate or Laminated

Fabric layers should be placed on the ground (preferably firm ground) so that the edges to be sewn are parallel and overlapping. The sewing operation typically requires three men--a machine operator and a man on each side of the machine. The lead man should hold the fabric edges evenly together and feed the fabric into the sewing machine head or folder. The man behind the machine should hold tension on the fabric so the machine operator has a taut and straight edge to sew across. If the machine misses a stitch or runs off the fabric, terminate the seam by cutting and tying the thread. Begin a new seam approximately one foot behind the broken seam.



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Overlapping

Nonwoven Separate or Laminated

Roll goods form of geotextile should be overlapped a minimum of 12". Care should be taken that roll goods remain parallel to each other. Extreme care should be taken to assure that soil does not intrude into the composite structure thus clogging the drainage net.