SKAPS INDUSTRIES

DROP-IN SPECIFICATIONS
GEOTEXTILE FOR EROSION CONTROL

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1.GENERAL

1.1 SECTION INCLUDES

A. This document covers the general installation of non-woven geotextiles and woven
B. Monofilament geotextiles for permanent erosion control applications.
C. The Contractor shall install geocomposite in conjunction with the earthwork and other components of the project.

1.2 UNIT PRICES

A. Method of Measurement: By the square meter (or square yard as indicated in contract documents) including seams, overlaps, and wastage.
B. Basis of Payment: By the square meter (or square yard - as indicated in contract documents) installed.

1.3 REFERENCES

A. AASHTO Test Standards:

T 88 – Standard Test Method for Particle Size Analysis of Soils
T 90 – Standard Test Method for Determining the Plastic Limit and Plasticity Index of Soils

B. American Society for Testing and Materials (ASTM):

1. D 123 – Standard Terminology Relating to Geotextiles
2. D 276 – Standard Test Method for Identification of Fibers in Textiles
3. D 4354 - Practice for Sampling of Geosynthetics for Testing.
4. D 4355 -Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
5. D 4439 - Terminology for Geotextiles.
6. D 4491 - Test Methods for Water Permeability of Geotextiles by Permittivity.
7. D 4533 - Test Method for Index Trapezoid Tearing Strength of Geotextiles.
8. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.

9. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.
10. D 4751 - Test Method for Determining Apparent Opening Size of a Geotextile.
11. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.

1.4 DEFINITIONS

A. *Maximum Average Roll Value (MaxARV)*: Property value calculated as typical plus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will be below the value reported.

B. *Minimum Average Roll Value (MARV)*: Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

C. *Typical Roll Value*: Property value calculated from average or mean obtained from test data.

1.5 SUBMITTALS

A. CERTIFICATION:

1. Prior to material delivery to project site, the contractor shall provide the engineer with a written certification or manufacturers quality control data which displays that the geotextile meets or exceeds minimum average roll values (MARV) specified herein.

2. The contractor shall submit, if required by the engineer, manufacturer's quality control manual for the geotextile to be delivered to the site.

3. The Manufacturer shall demonstrate transparency of their manufacturing process by showing traceability of the product from origin of raw material through finished good.

4. The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request.

5. The manufacturer's certificate shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the manufacturer's quality control program. The certificate shall be attested to by a person having legal authority to bind the Manufacturer.

6. Manufacturing Quality Control (MQC) test results shall be provided upon request.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Geotextile labeling, shipment and storage shall follow ASTM D 4873.

B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.

C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

D. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.

E. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap of geotextile material must be discarded before installation.

F. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71ºC (160ºF) and any other environmental condition that might damage the geotextile.

2. PRODUCTS

2.1 MANUFACTURERS

A. All rolls of the geotextile shall be identified with permanent marking on the roll or packaging, with the manufacturers name, product identification, roll number and roll dimensions.

2.2 GENERAL REQUIREMENTS

A. The geotextile construction shall be a nonwoven, staple fiber, needle punched, polypropylene geotextile; the fibers are needled together to form a stable network that retains dimensional stability relative to each other.

B. The geotextile should be resistant to UV degradation and biological and chemical environments normally encountered in soils.

C. The geotextile should meet the following Minimum Average Roll Values (MARV) for nonwoven geotextile:

Table 1– Required Properties, Test Methods and Values for SKAPS Nonwoven Geotextiles Used For Erosion Control

Property	Test Method ASTM	Units	GT116	GT112	GT110	GT180
Grab Tensile Strength	**D 4632**	**lbs (kN)**	380 (1.690)	300 (1.334)	250 (1.112)	205 (0.911)
Elongation	**D 4632**	**%**	50	50	50	50
Trapezoidal Tear	**D 4533**	**lbs (kN)**	145 (0.644)	115 (0.511)	100 (0.444)	85 (0.378)
CBR Puncture	**D 6241**	**lbs (kN)**	1080 (4.804)	850 (3.780)	700 (3.113)	535 (2.370)
Apparent Opening Size	**D 4751**	**U.S Sieve (mm)**	100 (0.150)	100 (0.150)	100 (0.150)	80 (0.180)
Permittivity	**D 4491**	**sec^{-1}**	0.70	1.00	1.20	1.35
Water Flow Rate	**D 4491**	**gpm/ft^2 ($l/min/m^2$)**	50 (2035)	75 (3055)	80 (3251)	90 (3657)
UV Resistance	**D 4355**	**%/hrs**	70/500		70/500	

2.3 GEOTEXTILE QUALITY ASSURANCE

A. Product Marking

1. Labels should be affixed to the exterior of the packaged roll to include:

a) Name of source manufacturing facility
b) Geotextile product name as listed with AASHTO/NTPEP
c) AASHTO M288 class (es) that product meets
d) Date of manufacture

B. Quality Control Testing

1. All supplied geotextiles shall be tested for quality control in in-house testing facilities as per required standard.
2. All supplied geotextiles shall include certificates of analysis for all specified properties.
3. Geotextile properties, other than Ultraviolet Stability shall be tested by NTPEP to verify conformance with this specification.
4. Testing laboratories shall be compliant and certified to the ISO 9001:2008 quality system standard.

C. Sewn Seams (if required):

1. For seams that are to be sewn in the field, the Contractor shall provide at least a 2meter (6 ft) length of sewn seam for sampling by the Engineer before the geotextile is installed.
2. For seams that are sewn in the factory, the Engineer shall obtain samples of the factory seams at random from and roll of geotextile that is to be used on the project.
3. If seams are to be sewn in both directions, samples of seams from both directions shall be provided.
4. For seams that are field sewn, the seams sewn for sampling shall be sewn using the same equipment and procedures as will be used for the production seams.
5. The Contractor along with the sample of the seam shall submit the seam assembly description. The description shall include the seam type, sewing thread, and stitch density.

D. Manufacturing Facilities

1. The source manufacturing facility for supplied geotextiles shall maintain audited compliance through AASHTO representative auditors for Quality Management System Processes for:

    a) Organization and Organizational Policies
    b) Product Marking and Labeling
    c) Manufacturing Process and Documentation Control
    d) Quality Control of Raw Materials
    e) Quality Control Inspection, Measurement, and Testing for Geotextile Products.

f) Quality Control Personnel – Training and Competency Evaluation
g) Statistical Analysis of Test Results
h) Resolution of Non-Conforming Product of Test Results
i) Retention of Test Results and Product Traceability
j) Quality Control Testing Facilities
k) Marking, Storage, Shipping, and Handling of Finished Geotextile
l) Internal Quality Audits of Each Plant Producing Product

2. Source manufacturing facilities shall be compliant and certified to the ISO 9001:2008 quality system standard.

E. Sewing/Overlapping

1. Adjacent geotextile sheets shall be joined by either sewing or overlapping. Overlapped seams of roll ends shall be a minimum of 300 mm except where placed under water. In such instances the overlap shall be a minimum of 1 m. Overlaps of adjacent rolls shall be a minimum of 300 mm in all instances.
2. When overlapping, successive sheets of the geotextile shall be overlapped upstream over downstream, and/or upslope over downslope. In cases where wave action or multidirectional flow is anticipated, all seams perpendicular to the direction of flow shall be sewn.
3. Sewing thread shall consist of high strength polypropylene or polyester (Nylon shall not be used).
4. The thread shall be of a contrasting color to the geotextile.

3. EXECUTION

3.1 PREPARATION

A. Prepare surfaces to receive geotextile to smooth condition as indicated or as directed by Engineer.
B. Fill depressions; remove debris and obstructions that could damage the geotextile.

3.2 INSTALLATION

A. The geotextile shall be placed in intimate contact with the soils without wrinkles or folds and anchored on a smooth graded surface approved by the engineer. The geotextile shall be placed in such a manner that placement of the overlying materials will not excessively stretch so as to tear the geotextile. Anchoring of the terminal ends of the geotextile shall be accomplished through the use of key trenches or aprons at the crest and toe of slope.

B. The geotextile shall be placed with the machine direction parallel to the direction of water flow, which is normally parallel to the slope for erosion control runoff and wave action and parallel to the stream or channel in the case of streambank and channel protection.

C. The top edge of the filter fabric shall be anchored by digging a 300 mm deep trench, inserting the top edge of the fabric and backfilling with compacted soil.

D. Care shall be taken during installation so as to avoid damage occurring to the geotextile as a result of the installation process. Should the geotextile be damaged during installation, a geotextile patch shall be placed over the damaged area extending 1 m beyond the perimeter of the damage.

E. The armor system placement shall begin at the toe and proceed up the slope. Placement shall take place so as to avoid stretching and subsequent tearing of the geotextile. Riprap and heavy stone filling shall not be dropped from a height of more than 300 mm. Stone with a mass of more than 100 kg shall not be allowed to roll down the slope.

F. Slope protection and smaller sizes of stone filling shall not be dropped from a height exceeding 1 m, or a demonstration provided showing that the placement procedures will not damage the geotextile. In underwater applications, the geotextile and backfill material shall be placed the same day. All void spaces in the armor stone shall be backfilled with small stone to ensure full coverage.

G. Following placement of the armor stone, grading of the slope shall not be permitted if the grading results in movement of the stone directly above the geotextile.

H. Field monitoring shall be performed to verify that the armor system placement does not damage the geotextile.

I. Any geotextile damaged during backfill placement shall be replaced as directed by the engineer at the contractor's expense.

END OF SECTION