SKAPS INDUSTRIES

DROP-IN SPECIFICATIONS

SKAPS GEOTEXTILE FOR GEOMEMBRANE CUSHIONING

The following drop-in specification is a sample guideline to be customized by the engineer for preparing site-specific specification. This information is provided for reference purposes only and is not intended as a warranty or guarantee. SKAPS assumes no liability in connection with the use of this information.
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1. GENERAL

1.1 SECTION INCLUDES

A. Placement of geotextile cushioning for geomembrane.

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. 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.

B. Environmental Protection Agency (EPA) –Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities.

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 71 deg C (160 deg F) 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 as Geomembrane Protection (or Cushioning) Materials

Property	Test Method ASTM	Unit	Mass/Unit Area (oz/yd^2)			
Mass per unit area	**D5261**	oz/yd^2	10	12	16	24
Grab tensile strength	**D4632**	lb	230	300	370	450
Grab tensile elongation	**D4632**	%	50	50	50	50
Trapezoid tear strength	**D4533**	lb	95	115	145	200
Puncture (CBR) strength	**D6241**	lb	700	800	900	1100
UV resistance	**D7238**	%	70	70	70	70

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 2-meter (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
3. All manufacturing facilities shall be located within the United States or US territories

3. EXECUTION

3.1 PREPARATION

A. Remove loose or extraneous material, large rocks, and sharp objects from the subgrade that may come in contact with the geomembrane and geotextile cushion fabric.

3.2 INSTALLATION

A. Install geotextile at elevations and alignment as indicated or as directed by Engineer, and in accordance with Technical Guidance Document.

B. Do not install geomembrane and geotextile cushion fabric in the presence of standing water, while raining, under strong winds, or when material temperatures are outside the limits specified by the manufacturer.

C. Place the 1st layer of geotextile cushion fabric directly on the subgrade before placing geomembrane on top of the 1st layer of geotextile cushion fabric. Place the 2nd geotextile cushion fabric directly on the geomembrane with the geomembrane sandwiched between the geotextile cushion fabric layers.

D. Geotextile cushion fabric pieces must be shingled. Overlaps must be at least 12 inches. Patch or replace geotextile cushion fabric damaged during construction. The patch material must extend at least 18 inches beyond damaged area.

END OF SECTION