TECHNICAL DROP-IN SPECIFICATION

Dura-Skrim® NQ Series

Reinforced Polypropylene Liners & Covers

The following technical drop-in specifications are provided as guidelines to be customized and finalized by the design engineer for preparing specific project specifications. This information is provided for reference purposes only and is not intended as a warranty or guarantee. Viaflex Inc. assumes no liability in connection with the use of this information. Please visit the Viaflex website at www.viaflex.com for current product specification sheets.

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# REINFORCED POLYPROPYLENE LINERS & COVER

Reinforced Polypropylene fPP-R Geomembranes serve as liners and covers to contain water, leachate or other liquids. As a liner they can contain the liquid to prevent leakage or environmental impact and as a cover to minimize evaporation or contamination. It is of great importance that the Reinforced Polypropylene Geomembrane be free from defects and installed without damage.

1. **DESCRIPTION**
2. GENERAL:

The purpose of this specification is to provide details of Manufacturing Quality Control (MQC), Manufacturing Quality Assurance (MQA), Construction Quality Control (CQC), and Construction Quality Assurance (CQA) for the manufacture and pre-assembly of geomembrane products. The Contractor shall furnish all labor, material, and equipment to install the Reinforced Polypropylene Geomembrane including all necessary and incidental items as detailed or required to complete the installation in accordance with the Contract Drawings and these Specifications.

1. RELATED WORK:

Related Contract Work is described in the following section of the specification as approved by the CQA Engineer.

1. REFERENCE STANDARDS:

ASTM D5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.

ASTM D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles.

ASTM D7003 Standard Test Method for Strip Tensile Properties of Reinforced Geomembranes.

ASTM D5884 Standard Test Method for Determining Tearing Strength of Internally Reinforced Geomembranes.

ASTM D7004 Standard Test Method for Grab Tensile Properties of Reinforced Geomembranes.

ASTM D4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.

ASTM D5994 Standard Test Method for Measuring Core Thickness of Textured Geomembranes.

GRI GM18 Test Methods, Test Properties and Testing Frequency for

Reinforced Polypropylene (fPP-R) Nonreinforced and Reinforced Geomembranes

1. QUALITY ASSURANCE:

Quality Assurance during installation of Reinforced Polypropylene fPP-R Geomembrane will be provided by the Owner as described in the accompanying Project CQA Manual.

1. MANUFACTURERS QUALIFICATIONS:
2. The Manufacturer shall have previously demonstrated his ability to produce the required Reinforced Polypropylene fPP-R Geomembrane by having successfully manufactured a minimum of 10,000,000 ft2 of scrim reinforced Polypropylene Geomembrane.
3. Manufacturer must be ISO 9001 certified
4. INSTALLER QUALIFICATIONS:

The Reinforced Polypropylene fPP-R Geomembrane Installer shall have installed a minimum of 500,000 ft2 of Reinforced Polypropylene Geomembrane (or similar material).

1. WARRANTIES:

The manufacturer of the Reinforced Polypropylene fPP-R Geomembrane will warrant the material to the installer on a pro rata basis for up to 20 years after the final acceptance of the work, based on thickness of product, the application and location of the installation. This warranty shall include but not be limited to defects related to workmanship and manufacturing.

**B. MATERIALS**

1. GENERAL:

The materials supplied under these Specifications shall consist of first-quality 100% virgin products designed and manufactured specifically for the purpose of this work, which shall have been satisfactorily demonstrated, by prior use, to be suitable and durable for such purposes.

1. REINFORCED POLYPROPYLENE FPP-R GEOMEMBRANE MATERIALS:
2. Reinforced Polypropylene fPP-R Geomembrane shall be manufactured to meet the following requirements:
3. Provide finished product free from holes, pinholes, bubbles, blisters, excessive gels, undispersed resins and/or carbon black, or contamination by foreign matter.
4. Reinforced Polypropylene Geomembrane shall be a Polypropylene Geomembrane composed of a heavy encapsulated 1000 denier weft inserted polyester scrim fully encapsulated between 2 layers of highly UV stabilized Polypropylene.
5. Approved Reinforced Polypropylene fPP-R Geomembrane:
6. Dura-Skrim NQ36B/N45B As manufactured by Viaflex Inc. of Sioux Falls, SD.
7. Equal material, as approved by the Engineer.

**C. FACTORY FABRICATION**

1. The Reinforced Polypropylene fPP-R Geomembrane shall be supplied in panels which shall be of maximum size to provide the largest manageable sheet for the fewest seams.
2. Factory seams are produced by thermal sealing methods and shall have a minimum seam width of 1 ½ inch scrim to scrim.
3. Factory seams are 100% visually inspected and destructive testing is done to verify quality compliance.
4. Labels on the panels shall identify the thickness, length, width, lot and panel numbers, and name of Manufacturer.
5. Factory pre-assembled panels are accordion folded and rolled on a cardboard core. Rolled panels are wrapped in a protective layer for shipment.

**D. SUBMITTALS**

The Contractor shall submit the following to the CQA Engineer:

1. PRE-INSTALLATION REQUIREMENTS:

Prior to Reinforced Polypropylene fPP-R Geomembrane installation the Contractor shall submit the following:

1. Certificate of Conformance and Sample: Prior to shipping to the site, the Contractor shall submit a certificate or affidavit signed by a legally authorized official of the Manufacturer for the Reinforced Polypropylene Geomembrane attesting that the Reinforced Polypropylene Geomembrane meets the physical and manufacturing requirements stated in these Specifications. The Contractor shall also submit a sample of the Reinforced Polypropylene fPP-R Geomembrane to be used (sample may be of different color). The sample shall be labeled with the product name and be accompanied by the Manufacturer's specifications.
2. Shipping, Handling, and Storage Instructions: The Manufacturer's plan for shipping, handling, and storage shall be submitted for review.
3. Installation Procedures:

Submit installation procedures for carrying out the work. Installation procedures to be addressed shall include but not be limited to material installation, repair, and protection to be provided in the event of rain or strong winds. With regard to protection, the Contractor shall provide a plan of anchoring the Reinforced Polypropylene fPP-R Geomembrane sufficient to satisfy the Contractor’s Performance Warranty. This plan shall be approved by the Engineer prior to construction.

1. Furnish copies of the delivery tickets or other approved receipts as evidence for materials received that will be incorporated into the construction.

2. POST-INSTALLATION REQUIREMENTS:

Upon completion of the Reinforced Polypropylene fPP-R Geomembrane installation, the Contractor shall submit the following:

1. Completed material performance warranty.

**E. SITE PREPARATION AND INSTALLATION**

1. Installation shall be done in accordance with the manufacturer Geomembrane Installation Guidelines.

TABLE 1: REQUIRED Reinforced Polypropylene fPP-R Geomembrane PROPERTIES 36 MIL SMOOTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PROPERTY** | **TEST METHOD** | **UNITS** | **MIMIMUM ROLL AVERAGES** | **TYPICAL ROLL AVERAGES** |
| Thickness | ASTM D5199 | Mils | 32 | 36 |
| Weight | ASTM D5261 | lbs/MSF | 150 | 156 |
| Tensile Elongation @ Break | ASTM D7004 | % | 22 | 31 |
| Tongue Tear | ASTM D5884 | lbf | 90 | 129 |
| Grab Tensile Strength | ASTM D7004 | lbf | 200 | 280 |
| Puncture Resistance | ASTM D4833 | lbf | 80 | 101 |
| Ultraviolet Light Resistance 1. % strength retained after 20,00 hours

 or1. % elongation retained after 20,00 hours
 | D7238 @ 70° CD6693-IVD6693-IV  |     >50 >50 | >50>50 | Per Formulation  |

Notes:

1. The Engineer may allow alternates to these requirements.

TABLE 2: REQUIRED Reinforced Polypropylene fPP-R Geomembrane PROPERTIES 45 MIL SMOOTH

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PROPERTY** | **TEST METHOD** | **UNITS** | **MIMIMUM ROLL AVERAGES** | **TYPICAL ROLL AVERAGES** |
| Thickness | ASTM D5199 | Mils | 40 | 45 |
| Weight | ASTM D5261 | lbs/MSF | 180 | 195 |
| Tensile Elongation @ Break | ASTM D7004 | % | 25 | 35 |
| Tongue Tear | ASTM D5884 | lbf | 90 | 120 |
| Grab Tensile Strength | ASTM D7004 | lbf | 250 | 300 |
| Puncture Resistance | ASTM D4833 | lbf | 85 | 105 |
| Ultraviolet Light Resistance 1. % strength retained after 20,00 hours

 or1. % elongation retained after 20,00 hours
 | D7238 @ 70° CD6693-IVD6693-IV  |     >50 >50 | >50>50 | Per Formulation  |

Notes:

1. The Engineer may allow alternates to these requirements.