

**R A V E N**

## **TECHNICAL DROP-IN SPECIFICATION**

HydraFlex<sup>®</sup> H-Series

Blended Linear Polyethylene

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. Raven Industries assumes no liability in connection with the use of this information. Please visit the Raven website at [www.ravenfd.com](http://www.ravenfd.com) for current product specification sheets.

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TECHNICAL DROP-IN SPECIFICATIONS

## BLENDING LINEAR POLYETHYLENE GEOMEMBRANE SPECIFICATION

Blended Linear Polyethylene Geomembranes serve as liners and covers for the containment of 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 Blended Linear Polyethylene Geomembrane be free from defects and installed without damage.

### A. DESCRIPTION

#### 1. 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 Blended Polyethylene Geomembrane including all necessary and incidental items as detailed or required to complete the installation in accordance with the Contract Drawing and these Specifications

#### 2. RELATED WORK:

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

#### 3. REFERENCE STANDARDS:

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

*ASTM D6693 Standard Test Method for Non-Reinforced Polyethylene and Non-Reinforced Flexible Polypropylene Geomembranes.*

*ASTM D751 Standard Test Methods for Coated Fabrics.*

*ASTM D1004 Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.*

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

*ASTM D6392 Standard Test Method for Determining the Integrity of Non-Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods*

#### 4. QUALITY ASSURANCE:

Quality Assurance during installation of Blended Polyethylene Geomembrane will be provided by the Owner as described in the accompanying Project CQA Manual.

#### 5. MANUFACTURERS QUALIFICATIONS:

a. The Manufacturer shall have previously demonstrated his ability to produce the required Blended Polyethylene Geomembrane by having successfully manufactured a minimum of 10,000,000 ft<sup>2</sup> of Blended Polyethylene Geomembrane.

b. Manufacturer must be ISO 9001 certified

## 6. INSTALLER QUALIFICATIONS:

The Blended Polyethylene Geomembrane Installer shall have installed a minimum of 500,000 ft<sup>2</sup> of Blended Polyethylene Geomembrane (or similar material).

## B. MATERIALS

### 1. GENERAL:

The materials supplied under these Specifications shall consist of first-quality virgin products and select reprocessed resins 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.

### 2. BLENDED POLYETHYLENE GEOMEMBRANE MATERIALS:

- a. Blended Polyethylene Geomembrane shall be manufactured to meet the following requirements:
  1. Provide finished product free from holes, pin holes, bubbles, blisters, excessive gels, undispersed resins and/or carbon black, or contamination by foreign matter.
  2. Blended Polyethylene Geomembrane shall be a flexible Geomembrane containing carbon black for UV stability and contain no plasticizers.
- b. Approved Blended Polyethylene Geomembrane:
  1. HydraFlex H20B  
HydraFlex H30B  
HydraFlex H40B  
As manufactured by Raven Industries of Sioux Falls, SD.
  2. Equal material, as approved by the Engineer.

## C. FACTORY FABRICATION

1. The Blended Polyethylene 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.
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 Blended Polyethylene Geomembrane installation, the Contractor shall submit the following:

- a. 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 Blended Polyethylene Geomembrane attesting that the Blended Polyethylene Geomembrane meets the physical and manufacturing requirements stated in these Specifications. The Contractor shall also submit a sample of the Blended Polyethylene 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.
- b. Shipping, Handling, and Storage Instructions: The Manufacturer's plan for shipping, handling, and storage shall be submitted for review.
- c. 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 sufficiently anchoring the Blended Polyethylene Geomembrane to satisfy the Contractor's Performance Warranty. This plan shall be approved by the Engineer prior to construction.
- d. 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 Blended Polyethylene Geomembrane installation, the Contractor shall submit the following:

- a. Completed material performance warranty.

## E. SITE PREPERATION AND INSTALLATION

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

TABLE 1:

REQUIRED BLENDEED POLYETHYLENE GEOMEMBRANE PROPERTIES 20 MIL.

PROPERTY	TEST METHOD	IMPERIAL UNITS	METRIC UNITS	IMPERIAL MIN. ROLL AVERAGES	METRIC MIN. ROLL AVERAGES
Thickness	Nominal	mils	mm	18	0.46
Tensile Strength	ASTM D6693	ppi	N/cm	68	119
Tensile Elongation	ASTM D6693	%		700	
Tear Resistance	ASTM D1004	lbs	N	10	44
Puncture Resistance	ASTM D4833	lbs	N	24	107
Bonded Seam Strength	ASTM D6392	lbf/inch width	N/cm width	30	133
Seam Peel Adhesion	ASTM D6392	lbf/inch width	N/cm width	25	111

TABLE 2:  
REQUIRED BLENDED POLYETHYLENE GEOMEMBRANE PROPERTIES 30 MIL.

PROPERTY	TEST METHOD	IMPERIAL UNITS	METRIC UNITS	IMPERIAL MIN. ROLL AVERAGES	METRIC MIN. ROLL AVERAGES
Thickness	Nominal	mils	mm	27	0.69
Tensile Strength	ASTM D6693	ppi	N/cm	102	179
Tensile Elongation	ASTM D6693	%		700	
Tear Resistance	ASTM D1004	lbs	N	15	67
Puncture Resistance	ASTM D4833	lbs	N	36	160
Bonded Seam Strength	ASTM D6392	lbf/inch width	N/cm width	45	200
Seam Peel Adhesion	ASTM D6392	lbf/inch width	N/cm width	38	169

TABLE 3:  
REQUIRED BLENDED POLYETHYLENE GEOMEMBRANE PROPERTIES 40 MIL.

PROPERTY	TEST METHOD	IMPERIAL UNITS	METRIC UNITS	IMPERIAL MIN. ROLL AVERAGES	METRIC MIN. ROLL AVERAGES
Thickness	Nominal	mils	mm	36	0.91
Tensile Strength	ASTM D6693	ppi	N/cm	136	238
Tensile Elongation	ASTM D6693	%		700	
Tear Resistance	ASTM D1004	lbs	N	20	89
Puncture Resistance	ASTM D4833	lbs	N	48	214
Bonded Seam Strength	ASTM D6392	lbf/inch width	N/cm width	60	267
Seam Peel Adhesion	ASTM D6392	lbf/inch width	N/cm width	50	222

Notes:

1. The Engineer may allow alternates to these requirements.