



TECHNICAL DROP-IN SPECIFICATION

Absolute Barrier® Y-Series

7-Layer Co-Extruded LLDPE Barrier

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TECHNICAL DROP-IN SPECIFICATIONS

7-LAYER CO-EXTRUDED LLDPE BARRIER GEOMEMBRANE SPECIFICATION

The 7-layer co-extruded membrane consisting of very flexible, linear low-density polyethylene (LLDPE) and an inner core of chemically resistance barrier resin. The 7-layer co-extruded geomembranes serve as liners and covers for the containment of water, leachate or other liquids. The inner core of barrier layer is designed specifically to act as a barrier to VOC's such as radon, methane and hydro-carbons. As a liner they can contain the liquid to prevent leakage or environmental impact and as a cover to minimize evaporation or contamination all while reducing the diffusion of VOC's. It is of great importance that the 7-layer co-extruded 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 7-layer co-extruded barrier 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 Determining Tensile Properties of Non-Reinforced Polyethylene and Non-Reinforced Flexible Polypropylene Geomembranes.*

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

ASTM D4218 *Standard Test Method for Determining Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.*

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

ASTM D3895 *Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry.*

ASTM D5885 *Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry.*

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

4. QUALITY ASSURANCE:

Quality Assurance during installation of 7-layer co-extruded barrier 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 7-layer co-extruded barrier geomembrane by having successfully manufactured a minimum of 10,000,000 ft² of 7-layer co-extruded barrier geomembrane.
- b. Manufacturer must be ISO 9001 certified

6. INSTALLER QUALIFICATIONS:

The 7-layer co-extruded barrier geomembrane Installer shall have installed a minimum of 500,000 ft² of LLDPE Geomembrane (or similar material).

7. WARRANTIES:

The manufacturer of the 7-layer co-extruded barrier 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, 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.

2. 7 LAYER CO-EXTRUDED BARRIER GEOMEMBRANE MATERIALS:

- a. 7-layer co-extruded barrier 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. 7-layer co-extruded barrier geomembrane shall be a very flexible Linear Low-Density Polyethylene Geomembrane with an EVOH inner core as well as containing carbon black and stabilizers for resistance to degradation.
- b. Approved 7-layer Co-Extruded Barrier Geomembrane:
 1. Absolute Barrier Y30BAC
Absolute Barrier Y40BAC
As manufactured by Viaflex of Sioux Falls, SD.
 2. Equal material, as approved by the Engineer.

3. FACTORY FABRICATION

1. The 7-layer co-extruded barrier geomembrane shall be supplied in panels which shall be of maximum size to provide the largest manageable sheet for the fewest possible field 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 produced in accordance with ASTM D7982 and 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 7-layer co-extruded barrier 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 7-layer co-extruded barrier geomembrane attesting that the 7-layer co-extruded barrier geomembrane meets the physical and manufacturing requirements stated in these Specifications. The Contractor shall also submit a sample of the 7-layer co-extruded barrier 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 7-layer co-extruded barrier 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 7-layer co-extruded barrier 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 7 LAYER CO-EXTRUDED BARRIER GEOMEMBRANE PROPERTIES 30 MIL.

PROPERTY	TEST METHOD	IMPERIAL UNITS	METRIC UNITS	IMPERIAL MIN. ROLL AVERAGES	METRIC MIN. ROLL AVERAGES
Thickness, average	ASTM D5199	mils	mm	30	0.76
Weight		lbs/msf	g/m ²	150	732
Tensile Strength	ASTM D6693	lbs	N/cm	95	166
Tensile Elongation	ASTM D6693	%		550	
Tear Resistance	ASTM D1004	lbs	N	18	80
Puncture Resistance	ASTM D4833	lbs	N	60	267
Standard OIT	ASTM D3895	min		100	
High Pressure HPOIT	ASTM D5885	min		400	
Carbon Black	ASTM D4218	%		2	
Bonded Seam Strength	ASTM D6392	lbs/inch width	N/cm width	57	100
Seam Peel Adhesion	ASTM D6392	lbs/inch width	N/cm width	45	79

TABLE 2:

REQUIRED 7-LAYER CO-EXTRUDED BARRIER GEOMEMBRANE PROPERTIES 40 MIL.

PROPERTY	TEST METHOD	IMPERIAL UNITS	METRIC UNITS	IMPERIAL MIN. ROLL AVERAGES	METRIC MIN. ROLL AVERAGES
Thickness	ASTM D5199	mils	mm	40	0.76
Weight		lbs/msf	g/m ²	205	1001
Tensile strength	ASTM D6693	lbs	N/cm	125	166
Tensile elongation	ASTM D6693	%		550	
Tear Resistance	ASTM D1004	lbs	N	22	80
Puncture Resistance	ASTM D4833	lbs	N	70	267
Carbon Black	ASTM D4218	%		2	
Standard OIT	ASTM D3895	min		100	
High Pressure HPOIT	ASTM D5885	min		400	

Bonded Seam Strength	ASTM D6392	lbs/inch width	N/cm width	80	140
Seam Peel Adhesion	ASTM D6392	lbs/inch width	N/cm width	60	105

Notes:

1. The Engineer may allow alternates to these requirements.
2. Seam testing performed at 20" per minute