

SECTION 07 13 26

SHEET WATERPROOFING MEMBRANE (UNDERSLAB SYSTEM)

This guide specification has been prepared by Polyguard Products Inc., in printed and electronic media, as an aid to specifiers in preparing written construction documents for underslab sheet waterproofing membrane systems. Polyguard® Underseal® Underslab Membrane is used as a waterproofing membrane/vapor barrier to virtually eliminate water and vapor transmission through concrete slabs on grade. In addition to protecting floor finishes and indoor air quality, Underslab Membrane also acts as a barrier to methane gas and radon gas.

Edit entire master document to suit project requirements. Modify or add items as necessary. Delete items which are not applicable. Words and sentences may contain a choice to be made regarding inclusion or exclusion of a particular item or statement. This section may include performance-, proprietary-, and/or descriptive-type specifications. Edit to avoid conflicting requirements. Editor notes to guide the specifier are included between lines of asterisks to assist in choices. Remove these editor notes before final printing of specification.

This guide specification is written around the Construction Specifications Institute (CSI) Section Format standards.

For specification assistance on specific product applications, please contact our offices or any of our local product representatives throughout the country.

Polyguard Products Inc. reserves the right to modify these guide specifications at any time. Updates for this guide specification will be posted on the manufacturer's web site and/or in printed media as they occur. Manufacturer makes no expressed or implied warranties regarding content, errors, or omissions in the information presented.

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
B. Application of sheet waterproofing membrane system.
C. Accessory Products

1.02 RELATED SECTIONS

Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.

- A. Section 03 10 00 – Concrete Forming.
B. Section 03 15 00 – Concrete Accessories.
C. Section 03 20 00 – Concrete Reinforcing.
D. Section 03 30 00 - Cast-in-Place Concrete.
E. Section 31 20 00 – Earth Moving.
F. Section 31 62 00 – Driven Piles.
G. Section 31 64 00 – Caissons.

1.03 REFERENCES

- A. ASTM C 836 (06) - Standard Specification for High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
B. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
C. ASTM D 570 - Standard Test Method for Water Absorption of Plastics.
D. ASTM D 882 (02) - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

- E. ASTM D 903-98 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- F. ASTM D 1000 - Standard Test Methods for Pressure-Sensitive, Adhesive-Coated Tapes used for Electrical and Electronic Applications.
- G. ASTM D 1434 – Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting.
- H. ASTM D 1876 - Standard Test Method for Peel Resistance of Adhesives (T Peel Test).
- I. ASTM D 1970 (01) - Standard Specification for Self Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- J. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
- K. ASTM D 4716 (01) – Test Method for Determining the (In plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
- L. ASTM D 5385 (06) - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
- M. ASTM D 6574 (00) - Test Method for Determining the (In Plane) Hydraulic Transmissivity of a Geosynthetic by Radial Flow.
- N. ASTM E 96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- O. ASTM E 154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- P. General Services Administration, Public Building Service: GSA-PBS-07115 Guide Specification for Elastomeric Waterproofing.
- Q. Radon Reduction Technology Laboratory - Resistance to Permeance by Radioactive Radon Gas; Resistance to Diffusion by Radioactive Radon Gas.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations. Include certification of data indicating VOC (Volatile Organic Compound) content of all components of waterproofing system.
- B. Samples: Submit representative samples of the following for approval:
 - 1. Sheet membrane
 - 2. Fabric Tape and Accessories.
- C. Sustainable Design Submittals:
 - 1. Submit invoices and documentation from manufacturer of the amounts of materials and content for products specified.
 - 2. Submit invoices and documentation showing manufacturing locations and origins of materials for products manufactured and sourced within 500 miles of project site.
- D. LEED Submittals:
 - 1. LEED Indoor Environmental Quality (IEQ) Credit 5 – Indoor Chemical and Pollutant Source Control: Design to minimize and control the entry of pollutants into buildings and later cross-contamination of regularly occupied areas.
 - 2. LEED Innovation in Design (ID) Credit 1 – The opportunity to achieve exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

3. LEED Materials & Resources (MR) Credit 2 – Construction Waste Management: Provide documentation of reusable materials by weight and volume diverted back to manufacturing process or to appropriate sites.
4. LEED Materials & Resources (MR) Credit 5 – Regional Materials: Provide documentation for cost of materials or products that have been extracted, harvested, or recovered and also manufactured within 500 miles of project site.
 - a. If only a portion of the materials or products is extracted, harvested, or recovered and manufactured locally, then only provide percentage by weight for credit value.
5. LEED Sustainable Site (SS) Credit 3 – Brownfield Development: Provide documentation of materials that contribute to the redevelopment of a contaminated land site that has been defined as a Brownfield by a local, state or federal government agency.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Sheet Membrane Waterproofing Barrier System must be manufactured by a company with a minimum of ten (10) years of experience in the production and sales of membrane waterproofing materials.
- B. Applicator Qualifications: A firm having at least three (3) years of experience in applying these types of specified materials and specifically accepted in writing by the membrane system manufacturer.
- C. Materials: For each type of material required to complete the work of this section, provide primary materials which are the products of a single manufacturer.
- D. Pre-Application Conference: A pre-application conference shall be held to establish procedures and to review conditions, installation procedures and coordination with other related work. Meeting agenda shall include review of special details and flashing.
- E. Manufacturer's Representative: Arrange to have trained representative of the manufacturer on site periodically to review installation procedures.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Store adhesives at temperatures of 40° F (4°C) and above to facilitate handling.
- D. Store membrane cartons on pallets.
- E. Do not store at temperatures above 90° F (32°C) for extended periods.
- F. Keep away from sparks and flames.
- G. Completely cover when stored outside. Protect from rain.
- H. Protect materials during handling and application to prevent damage or contamination.
- I. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

1.07 PROJECT CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the membrane manufacturer. Install Underslab Membrane when temperature is 25°F (-4°C) and rising.

- B. Proceed with installation only when substrate construction and preparation work is complete. Ensure that subsoil is approved by architect or geotechnical firm.
- C. Warn personnel against breathing of vapors and contact with skin and eyes; wear appropriate protective clothing and respiratory equipment.
- D. Keep flammable products away from spark or flame. Post “No Smoking” signs. Do not allow use of spark-producing equipment during application and until all vapors have dissipated.
- E. Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from the site daily.

1.08 WARRANTY

- A. Product will be replaced, at no charge, if proved to be defective within twelve (12) months of purchase, provided it has been applied in accordance with manufacturer written directions for uses recommended as suitable for this product. Proof of purchase must be provided. A five (5) year material or system warranty may be available upon request. Contact Polyguard Products, Inc. for further details.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Polyguard Products Inc. P.O. Box 755 Ennis, TX 75120-0755; Phone: (214) 515-5000; Email: info@polyguard.com

2.02 SYSTEM MATERIALS

- A. High Strength Waterproofing: Shall be Polyguard® Underseal™ Underslab Membrane, a strong sheet membrane with a double-thickness, cross-laminated, high-density polyethylene (HDPE) backing laminated to a thick layer of proprietary waterproofing adhesive compound integrated into a high-strength, nonwoven geotextile fabric. Total membrane thickness is factory controlled at 85 mils. On the fabric side, a four (4) inch-wide lap of waterproofing adhesive compound is left exposed along one edge with a removable silicone coated release sheet, which creates a four (4) inch-wide self-adhesive overlap seam.

PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	TYPICAL VALUE
FILM COLOR		Black/White
MEMBRANE THICKNESS	ASTM D 1000	85 mils
TENSILE STRENGTH	ASTM D 4632	80 lbs.
TENSILE STRENGTH, FILM	ASTM D 412	4,250 psi
HYDRAULIC TRANSMISSIVITY OF A GEOSYNTHETIC USING A CONSTANT HEAD	ASTM D 4716	No measurable flow
(IN-PLANE) HYDRAULIC TRANSMISSIVITY OF A GEOSYNTHETIC BY RADIAL FLOW	ASTM D 6574	No water flow
BREAKING STRENGTH OF 1" WIDTH SAMPLE POLYETHYLENE GEOMEMBRANE LAYER	ASTM D 882	5470 psi
ELONGATION – ULTIMATE FAILURE OF RUBBERIZED ASPHALT COMPOUND	ASTM D 412	> 460%
PERMEANCE TO WATER VAPOR TRANSMISSION	ASTM E 96 Method B	0.01 Perms
CRACK CYCLING	ASTM C 836 Tested @ -15°F	No effect
PEEL ADHESION TO CONCRETE	ASTM D 903	31.3 lbs./in.
LAP PEEL ADHESION	ASTM D 1876	8.7 lbs./in.
LOW TEMPERATURE FLEXIBILITY	ASTM D 1970 180° bend over 1" mandrel at -20°F (-29°C)	No effect
PUNCTURE RESISTANCE (MINIMUM)	ASTM E 154	220 lbs.
RESISTANCE TO HYDROSTATIC HEAD (MINIMUM)	ASTM D 5385	231 ft.
EXPOSURE TO SOIL FUNGI	GSA-PBS 07115 (16 weeks)	No effect
RESISTANCE TO PERMEANCE BY METHANE GAS	ASTM D 1434 tested using 99.99% purity	3.48 x 10 ⁻⁷ ft ³ /(ft ² • hr • psi)
RESISTANCE TO RADIOACTIVE RADON GAS	Radon Reduction Technology Laboratory % reduction in radon gas diffusion	97.10%
WATER ABSORPTION (MAXIMUM)	ASTM D 570	0.1%

2.03 SYSTEM ACCESSORIES

- A. Surface Primer Roller-Grade Adhesive:
1. Polyguard® 650 LT Liquid Adhesive: A rubber-based, tacky adhesive which is specifically formulated to provide excellent adhesion.
 2. Polyguard® California Sealant: A rubber-based sealant which is specifically formulated to provide excellent adhesion. The VOC (Volatile Organic Compound) content meets the South Coast Air Quality Management District regulations established under the February 1, 1991 version of Rule 1168 ©) (2) Adhesion and Sealant Applications. California Sealant is classified as an Architectural Sealant Primer Porous, with VOC of 527 g/L. Current SCAQMD regulations for this type sealant primer are 775 g/L.
- B. Adhesive Tape:
1. Polyguard® Underseal® Fabric Tape: Rubberized asphalt waterproofing membrane laminated to polypropylene fabric backing. The membrane is wound onto a disposable silicone treated release sheet to prevent the membrane from sticking onto itself while in the roll. Polyguard Underseal Fabric Tape is used around pipe penetrations with a annular space of pipe through opening exceeding 1/2-inch end laps and for patching damaged areas.
 2. Polyguard® 606 Tape: 606 Tape is a high-strength, double-sided tape comprised of rubberized asphalt. The tape utilizes both Kraft paper and plastic film release sheets which are removed prior to application to provide a fast, non-volatile solution for sealing seams and providing tie-in details.
- C. Liquid Membranes:
1. Polyguard® LM-85 SSL (Semi-Self-Leveling): A two-component, semi-self-leveling, asphalt-modified, urethane material.
 2. Polyguard® LM-95 Liquid Membrane: A two-component, asphalt-modified, urethane.
- D. Detail Sealant:
1. Polyguard® Detail Sealant PW™: A single-component, STPE, 100% solid moisture-cured, elastomeric sealant. It is an environmentally-friendly, non-isocyanate product that replaces silicone and urethane sealants. It is also a low VOC / HAPS-free, cold-applied, self-adhesive, elastomeric sealant.
Detail Sealant PW™ is only to be used for top termination for Fabric Tape and Endlaps.
- E. Corner Boots:
1. Polyguard® US Inside Corner Boot: 60-mil combination of rubberized asphalt bonded to polyethylene. The adhesive surface is covered with a release liner which will be removed prior to application on an inside corner to reinforce and seal corners of the Underslab Membrane.
 2. Polyguard® US Outside Corner Boot: 60-mil combination of rubberized asphalt bonded to polyethylene. The adhesive surface is covered with a release liner which will be removed prior to application on an outside corner to reinforce and seal corners of the Underslab Membrane.
 3. Polyguard® US Pit Top Corner Boot: 60-mil combination of rubberized asphalt bonded to polyethylene. The adhesive surface is covered with a release liner which will be removed prior to application on all corners to reinforce and seal corners of the Underslab Membrane.
- F. Drainage and Protection Board:
1. Polyguard® Polyflow 15: Polyflow® 15 Vertical Drainage Mat is two-part prefabricated geocomposite drain consisting of a formed polymeric core covered on one side with polymeric filter fabric. The fabric allows water to pass into the drain core while restricting the movement of soil particles which might clog the core. The core allows the water to flow to designated drainage exits. Polyflow 15 is designed for vertical applications.

2. Polyguard® Polyflow 18: Polyflow® 18 Horizontal Drainage Mat is two-part prefabricated geocomposite drain consisting of a formed polymeric core covered on one side with woven mono-filament filter fabric. The fabric allows water to pass into the drain core while restricting the movement of soil particles which might clog the core. The core allows the water to flow to designated drainage exits. Polyflow 18 is designed for horizontal applications.
3. Polyguard® Totalflow™: Totalflow is a combination of our Polyguard sheet drain products with our unique Totalflow™ product. In the Totalflow™ system, the sheet drain performs its normal function of water collection, while the Totalflow™ section provides both water collection and a high-profile section allowing for high-capacity water flow to designated drainage exits.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive sheet waterproofing membrane. Notify General Contractor if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- C. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- D. Concrete surfaces must be clean, smooth, and free of standing water.

3.03 MEMBRANE APPLICATION

- A. Membrane Installation – Horizontal Surfaces (Typical):
Horizontal application shall be in accordance with manufacturer's instructions.
 1. Install Underslab Membrane when temperatures are 25°F (-4°C) and rising.
 2. Unroll waterproofing membrane with longest dimension parallel to direction of pour.
 3. Place double-thick, high-strength, cross-laminated polyethylene backing to the soil and fabric to the concrete.
 4. Apply required preformed inside and outside corner boots prior to application of membrane according to manufacturer's details and specifications.
 5. Seal waterproofing membrane to foundation walls or footers.
 6. Overlap side seams using the four (4) inch edge trim seal. Clean polyethylene backing of waterproofing barrier membrane prior to application on the four (4) inch edge seal with 30% Isopropyl Alcohol.
 7. End laps should be overlapped a minimum of three (3) inches, maximum of four (4) inches, and addressed by applying a coat of liquid adhesive approximately 50 - 75 sq. ft. per gallon to fabric side of waterproofing barrier membrane and placing adjacent sheet on top. Roll to assure full adhesion.
 8. After application of end lap use liquid adhesive to prime seam and apply a twelve (12) inch piece of Fabric Tape centered over seam to seal extend out six (6) inches past side laps – roll with laminate roller.
 9. Pipe surface should be cleaned and roughened with sandpaper or a wire brush to insure adequate adhesion.

10. If the annular space of pipe through an opening exceeds 1/2-inch, a patch of Underslab Membrane is required to close the gap. The size of the patch should extend a minimum 6-inches in all directions from the penetration under the field sheet. Apply 650 LT Liquid Adhesive or California Sealant at a rate of 50 – 75 square feet per gallon. While the 650 LT Liquid Adhesive or California Sealant is still tacky, seal the pipe with the LM-95 Liquid Membrane. Apply a cant/ fillet with a min. 3/4-inch face of LM-95 extending onto the fabric side of the Underslab Membrane patch encapsulating the edge of the field membrane and onto the pipe a minimum of 3-inches. Allow LM-95 Liquid Membrane a minimum of 2 hours to cure.

Note: If pipes or penetrations are in tight clusters and a more flowable detailing liquid is required LM-85 SSL should be used, refer to US 16 Detail.

11. If the annular space of pipe through an opening is 1/2-inch or less, apply 650 LT Liquid Adhesive or California Sealant to the fabric side of Underslab Membrane at a rate of 50 – 75 square feet per gallon. Apply a cant/fillet with a min. 3/4-inch face of LM-95 Liquid Membrane extending onto the fabric side of the Underslab Membrane and onto the pipe a minimum of 6-inches.

Note: If pipes or penetrations are in tight clusters and a more flowable detailing liquid is required LM-85 SSL should be used, refer to US 16 Detail.

12. Steel reinforcements may be applied directly over the waterproofing barrier membrane. It is important that reinforcement (rebar) chairs used are compatible with the system. Blocks, pavers or dobies made of concrete or brick are clearly the best choice. Individual chairs are acceptable as long as they have a flat base or bolsters with rails. Contact Polyguard Technical Service for approval and written permission for other types of rebar chairs.
13. Precaution should be taken to protect the waterproofing barrier membrane during placement of reinforcing or concrete. Visually inspect waterproofing barrier membrane prior to pouring of concrete for any punctures or damage to membrane which needs to be repaired. Patch any damaged areas by applying the liquid adhesive at a rate of 50 - 75 sq. ft. per gallon to fabric side of waterproofing barrier membrane and liquid membrane provided by manufacturer, then apply a patch of Underseal® Fabric Tape.
14. Prior to slab pour all standing water must be removed from the membrane.
15. When pouring concrete, the concrete overlay that is applied over the Underslab Membrane must be a minimum 3 1/2-inches. The structural slab must be sound to avoid buckling. It is recommended that concrete be poured within 30 days of the membrane installation. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

B. Membrane Installation – Vertical Surfaces:

1. Apply waterproofing membrane with the high-density backing to the drainage board.
2. Install Underslab Membrane when temperatures are 25°F (-4°C) and rising.
3. Application up to 20 feet should be done by applying pins with washers every 12 inches across the top lagging thru the membrane and drainage board, allowing the membrane to hang down the wall.
4. For applications over 20 feet, contact the manufacturer for recommendations.
5. Provide vertical wall terminations to protect the self-adhered membrane for critical future tie-in to other products, or for protection from trade damage. Review Polyguard's published details for critical detailing procedures at all top terminations.

6. Side laps are furnished with edge trim of 4'. Apply powder-actuated fasteners every 16-to-24 inches and 1 inch in from the outside edge to secure membrane to wall. Prior to side lap application, remove any debris and dust on the polyethylene backing, clean the backing with 30% Isopropyl Alcohol, and then apply to the edge trim. Finish the seal by rolling with a laminate-type roller to obtain full adhesion.
7. Prime end laps, and on adjoining sheets, with a minimum 6-inch heavy coat of 650 LT Liquid Adhesive or California Sealant at a coverage rate of 50 – 75 sq. ft. per gallon. Allow this adhesive to dry (until tacky) before membrane application. Install a reverse shingle lap with the Underslab Membrane on the vertical wall; at a maximum 4-inch and a minimum 3-inch overlap. Center and place a 12-inch wide piece of Fabric Tape over the primed seam area. Apply even pressure with a roller to obtain full adhesion.
8. If the annular gap between the rough opening and the pipe, bolt, or other penetration is 1/2-inch diameter or less, apply liquid adhesive to the fabric side of the surrounding field course of Underslab Membrane. Then apply a minimum 3/4-inch cant (fillet) of LM-95 Liquid Membrane around the pipe penetration extending a minimum of 3 inches onto both the prepared fabric side of the Underslab Membrane field course and the penetrating item. Allow the LM-95 Liquid Membrane PW to cure for 2 hours.
9. If the annular gap between the rough opening and the pipe, bolt, or penetration exceeds 1/2-inch diameter, apply a patch of Underslab Membrane tight around the penetrating item with a minimum distance of 6 inches onto the surrounding field course of Underslab Membrane. Then seal with LM-95 Liquid Membrane as a minimum 3/4-inch cant (fillet) extending onto the Underslab Membrane skirt and the penetrating item a minimum distance of 3 inches. Then apply a heavy coat (approximately 50 – 75 sq. ft. per gallon) of Polyguard® 650 LT Liquid Adhesive or Polyguard® California Sealant onto the fabric side of the Underslab Membrane patch extending 6 inches onto the field coating of Underslab Membrane. Next apply a patch of Polyguard® Fabric Tape around the termination edges of the Underslab Membrane patch. Press or roll the patch firmly to obtain full adhesion to the field coating of Underslab Membrane. Apply another coat of Polyguard® 650 LT Liquid Adhesive or Polyguard® California Sealant to the Polyguard® Fabric Tape patch edges and apply liquid membrane at Fabric Tape edge terminations.
10. Visually inspect membrane prior to pouring of concrete for any punctures/damage.
11. Repair damaged Underslab Membrane areas by applying Polyguard® 650 LT Liquid Adhesive or Polyguard® California Sealant at a rate of 50 -75 sq. ft. per gallon to the fabric side of the Blindside Membrane and apply LM-95 Liquid Membrane a minimum of 3 inches in each direction. Next, apply Polyguard® 650 LT Liquid Adhesive or Polyguard® California Sealant at a rate of 50 -75 sq. ft. per gallon over the Liquid Membrane and the Underslab Membrane field course to a minimum 6 inches in all directions from the damaged area. Apply a Polyguard Fabric Tape patch a minimum 6 inches larger than damaged area in all directions.

C. Shotcrete Applications In the Water-Table:

1. Contact Polyguard Architectural Technical Services at archtech@polyguard.com

END OF SECTION