

SECTION 07 13 26

CHEMICAL RESISTANT SHEET WATERPROOFING MEMBRANE (ULTRA CRM™ 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 chemical-resistant, self-adhering sheet waterproofing membrane systems. Polyguard® Ultra CRM™ is used as a chemical-resistant waterproofing membrane/vapor barrier to eliminate water and vapor transmission through concrete foundation walls. In addition to protecting wall finishes and indoor air quality, Ultra CRM™ also acts as a barrier to withstand elevated concentrations of contaminants typically found in construction sites which may be considered brownfield projects.

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 30 00 - Cast-in-Place Concrete.
 - B. Section 04 20 00 – Unit Masonry
 - C. Section 07 11 00 – Dampproofing
 - D. Section 07 60 00 – Flashing and Sheet Metal
 - E. Section 07 92 00 – Joint Sealants
 - F. Section 07 95 00 – Expansion Control
 - G. Section 33 46 00 – Subdrainage

1.03 REFERENCES

- A. ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
- B. ASTM D 146 – Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Woven Fabrics for Roofing and Waterproofing.
- C. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- D. ASTM D 543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- E. ASTM D 570 - Standard Test Method for Water Absorption of Plastics.
- F. ASTM D 882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- G. ASTM D 903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- H. ASTM D 1000 - Standard Test Methods for Pressure-Sensitive, Adhesive-Coated Tapes used for Electrical and Electronic Applications.
- I. ASTM D 1434 – Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting.
- J. ASTM D 1876 - Standard Test Method for Peel Resistance of Adhesives (T Peel Test).
- K. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- L. ASTM D 5385 – Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes.
- M. ASTM E 96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- N. ASTM E 154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- O. ASTM F 739 - Standard Test Method for Permeation of Liquids and Gases through Protective Clothing Materials under Conditions of Continuous Contact.
- P. General Services Administration, Public Building Service: GSA-PBS-07115 Guide Specification for Elastomeric Waterproofing.

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. 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. All trades that intersect the post-applied membrane waterproofing need to have representation at the meeting. 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. For best results, store membrane and accessories above 50° F (10° C) prior to application.
- D. Store membrane cartons on pallets. Do not stack membrane and accessory material(s) higher than 5-feet vertically, nor double stack pallets.
- E. Keep membrane and accessory material(s) away from sparks and flames.
- F. Completely cover membrane when stored outside. Protect from rain, heat above 90° F (32° C) for extended periods, cold below 50° F (10° C) for extended periods, and lack of ventilation.

- G. Protect materials during handling and application to prevent damage or contamination.
- H. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, PVC materials, or polyurethanes that may come into contact with the 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. Do not install the membrane or accessory products in inclement weather. Install Ultra CRM™ when temperature is 40° F (5° C) and rising. Do not apply Ultra CRM™ if the temperature is below 40° F (5° C); or to a damp, frost-covered, or otherwise contaminated substrate surface.
- B. Proceed with installation only when substrate construction and preparation work is complete. Ensure that concrete substrate is approved by architect or geotechnical firm.
- C. Caution 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, Chemical Resistant Waterproofing: Shall be Polyguard® Ultra CRM™, a strong, post-applied sheet membrane with a purpose-built, multi-component, proprietary chemical-resistant backing laminated to a thick layer of proprietary waterproofing adhesive compound. Total membrane thickness is factory controlled at 60 mils, meeting or exceeding the following requirements:

PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	TYPICAL VALUE
FILM COLOR		Silver
MEMBRANE THICKNESS	ASTM D 1000	60 mils
TENSILE STRENGTH - MEMBRANE	ASTM D 412 Modified Die C	1673 psi
ELONGATION - ULTIMATE FAILURE OF RUBBERIZED ASPHALT	ASTM D 412	600%
TENSILE STRENGTH - FILM	ASTM D 882	7294 psi
PERMEANCE	ASTM E 96 Method B	0.022 Perms
CRACK CYCLING	ASTM C 836 Tested @ -15°F (-26°C)	No effect
PEEL ADHESION	ASTM D 903	21.3 lbs./in. width CF
LAP PEEL ADHESION	ASTM D 1876	12.5 lbs./in. width

LOW TEMPERATURE FLEXIBILITY (-15°F)	ASTM D 1970 Modified	Pass
PLIABILITY	ASTM D 146 180° bend over 1" mandrel at -25°F (-32°C)	No effect
PUNCTURE RESISTANCE - MEMBRANE	ASTM E 154	188.9 lbs.
RESISTANCE TO HYDROSTATIC HEAD	ASTM D 5385	231 ft.
EXPOSURE TO FUNGI IN SOIL	GSA-PBS 07115 (16 weeks)	No effect
RESISTANCE TO PERMEANCE BY METHANE GAS	ASTM D 1434 tested using 99.99% purity	$< 5 \times 10^{-16}$ mol/m ² •s•Pa
WATER ABSORPTION	ASTM D 570	0.1%

CHEMICAL VAPOR TRANSMISSION (AT 75°F, 90% RH)		
GAS AND VAPOR		
METHANE	ASTM D 1434	0.0028 Perms
HYDROGEN SULFIDE	ASTM F 739	7.183×10^{-7} Perms
WATER VAPOR TRANSMISSION	ASTM E 96 Method B	0.054 Perms
FUELS		
GASOLINE	ASTM E 96 Method B	0.192 Perms
DIESEL	ASTM E 96 Method B	0.165 Perms
ETHANOL	ASTM E 96 Method B	0.351 Perms
ISOOCTANE	ASTM E 96 Method B	0.471 Perms
CHLORINATED SOLVENTS	Test Methods & Results Upon Request	
ORGANIC SOLVENTS	Test Methods & Results Upon Request	
ASTM D 543 CHEMICAL RESISTANCE (7 DAYS TOTAL IMMERSION)		
CHEMICAL	PHYSICAL APPEARANCE	WEIGHT CHANGE
WATER	No swelling or delamination	0.24%
OILS & FUELS	PHYSICAL APPEARANCE	WEIGHT CHANGE
MOTOR OIL	No swelling or delamination	- 0.02%
DIESEL	No swelling or delamination	0.74%
ETHANOL	No swelling or delamination	0.14%
ISOOCTANE	No swelling or delamination	3.27%
GASOLINE	No swelling or delamination	4.49%
ORGANIC SOLVENTS	Test Methods & Results Upon Request	

2.03 SYSTEM ACCESSORIES

A. Surface Primer Roller-Grade Adhesive:

1. Polyguard® 650 LT Liquid Adhesive: A rubber-based, tacky adhesive specifically formulated to provide excellent adhesion.
2. Polyguard® California Sealant: A rubber-based sealant 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.
3. Polyguard® CR™ Sealant: A 100% solids, moisture tolerant, penetrating epoxy primer which is specifically formulated to provide excellent adhesion with the Polyguard Chemical-Resistant Waterproofing Membranes to prime all structural concrete, masonry, insulation, or wood surfaces. Designed to be used on applications down to 40° F (4° C).

B. Seam Tapes:

1. Polyguard® CR™ Seam Tape: A chemical-resistant waterproofing membrane laminated to a chemical-resistant 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 CR™ Seam Tape is used around pipe penetrations, Ultra CRM™ end laps, exposed edges, and for patching Ultra CRM™ damaged areas.
2. Polyguard® Detail Tape: A proprietary waterproofing adhesive compound laminated to a polypropylene 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 Detail Tape will only be used when it is under the field sheet of Ultra CRM™, such as inside or outside corners, prior to membrane application. It is not to be used at areas that could possibly be exposed to chemicals, such as pipe penetrations.

C. Liquid Membranes:

1. Polyguard® CR™ Liquid Membrane: A 100% solids, two-component, highly elastomeric, polysulfide-based waterproofing membrane to be used in a variety of applications in conjunction with Polyguard® Chemical Resistant Waterproofing System.
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.

E. Drainage and Protection Board:

1. Polyguard® Polyflow 15: Polyflow® 15 Sheet Molded Drainage Mat, geo-composite drain consisting of a formed polypropylene core covered on one side with non-woven 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 Sheet Molded Drainage Mat is a two-part, prefabricated, geocomposite drain consisting of a formed polypropylene core covered on one side with woven 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive chemical-resistant 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. Do not apply waterproofing to surfaces unacceptable to manufacturer.
- C. Do not use concrete curing compounds containing oil, wax, or pigments.

- D. Form release agents must be the self-dissipating type which will not transfer to the membrane.
- E. Concrete surfaces must be clean, smooth, and free of standing water. Ultra CRM™ is not designed to be applied in areas where water will pond.
- F. Clean all surfaces to remove debris, dust and loose stones before application begins. DO NOT apply system to frozen concrete.
- G. Surface must be free of voids, spalled areas, sharp projections, loose aggregate and form release agents.
- H. Patch all holes and voids and smooth out any surface misalignments with cementitious material that will bond to the substrate per the project's structural requirements.
- I. Cast-In-Place Concrete:
 - 1. Normal weight structural concrete must be allowed to cure a minimum of seven (7) days. All concrete surfaces must be dry to the touch before proceeding with the installation of the waterproofing system.
 - 2. Fill all form tie holes with cementitious material that will bond to the substrate per the project's structural requirements. Finish flush with the surrounding surface.
 - 3. Fill and repair bug holes in concrete with cementitious material that will bond to the substrate per the project's structural requirements. Finish flush with the surrounding surface.
 - 4. A smooth, monolithic, concrete surface is required. Provide an ICRI designated Concrete Surface Profile (CSP) 1 thru 3. Broom surfaces are not recommended.
 - 5. All cracks over 1/16-inch in width, and any moving cracks under 1/16-inch, shall be routed out to a minimum of 1/4-inch width and sealed using a high-performance polyurethane sealant. Allow adequate curing time per the manufacturer's directions. Upon cure install an 8-inch wide strip of Ultra CRM™ or Detail Tape over the crack.

3.03 MEMBRANE APPLICATION

A. Priming:

- 1. Apply primer to a cleaned, dust free surface by roller or sprayer. Apply Polyguard® 650 LT Liquid Adhesive or Polyguard® California Sealant at a rate of 250-300 sq. ft. per gallon when the substrate surface and ambient air temperature are both 40° F (5° C) and rising. Allow to dry per manufacturer's directions. Do not prime underneath Polyguard® Detail Sealant PW™ or Polyguard® LM-95 Liquid Membrane.
- 2. Use brush or short nap lamb's wool roller for Liquid Adhesive application.
- 3. 650 LT Liquid Adhesive or California Sealant provides a tacky adhesive surface. Liquid Adhesive must be tacky to touch, but not wet, prior to application of Ultra CRM™. Tack or cure for these products is dependent on relative humidity, ambient temperature, and substrate surface temperature.
- 4. Metal surfaces may require Liquid Adhesive to obtain bond of membrane to substrate.
- 5. Re-prime if membrane is not applied to the Liquid Adhesive within the same working day.

B. Membrane Installation - Vertical Surfaces:

- 1. Install a 3/4-inch, 45 degree angle cant (fillet) of Polyguard® Detail Sealant PW™, Polyguard® LM-95 Liquid Membrane, or a cementitious material that will bond to the substrate per the project's structural requirements. Provide the selected cant (fillet) material at all changes in plane, including inside corners, to 6" vertically and horizontally beyond the cant (fillet). Do not use wood or fiber cant strips.

2. All inside and outside corners shall then be treated either with a 12-inch wide strip of Detail Tape or Ultra CRM™ centered along the vertical axis, or by applying a minimum 90-mil thick application of Polyguard® Detail Sealant PW™ or Polyguard® LM-95 Liquid Membrane as a 3/4" fillet (cant) and 6" vertically and horizontally away from the fillet (cant).
3. Prior to the Ultra CRM™ application, seal all drains, projections, and pipe penetrations with CR Sealant and CR Liquid Membrane for a distance of 6-inches away from drain and 2-inches from the base of the pipe penetration or projection. After membrane application, prime with CR Sealant, then seal all terminations with CR Liquid Membrane.
4. Apply the Ultra CRM™ waterproofing membrane vertically in sections that can be easily managed, to ensure complete adhesion to the substrate; typically 8 feet in length or less. When vertical walls sections of more than 8-feet are to be waterproofed, apply Ultra CRM™ in sections no longer than 8 feet, starting from the lower foundation base and rising to the top with the 6-inch end lap overlap shingling down on each ply of membrane.
5. Ultra CRM™ side laps must be 2-1/2 inches minimum and end laps shall be 6 inches minimum. Apply CR™ Seam Tape to all exposed edges for continuity of chemical resistance properties.
6. A determined effort must be made to assure complete adhesion of membrane to the primed surface. Use heavy hand pressure while smoothing out the membrane surface as it is applied. The entire membrane surface must be rolled with a hand roller prior to being covered with a drainage composite and soil.
7. Ultra CRM™ does not function as an expansion joint material. All expansion joints must be addressed using expansion joint material(s) approved by the expansion joint manufacturer.
8. When terminated on the vertical surface, use a reglet, counter flashing or termination bar. Firmly press the terminated edge with a hand roller, and protect with a troweled bead of CR™ Liquid Membrane to substrate prepared with CR™ Sealant. Termination must be covered and sealed with the CR Liquid Membrane to substrate prepared with CR™ Sealant.
9. Once installed, protect the Ultra CRM™ from damage due to spark, flame, or heat exhaust caused by mechanical equipment.
10. Inadequately lapped Ultra CRM™ seams and damaged Ultra CRM™ areas should be patched with Polyguard® CR™ Seam Tape or Ultra CRM™. Make repairs by removing all damaged membrane so only well-bonded Ultra CRM™ remains. Re-prime any exposed concrete with 650 LT Liquid Adhesive or California Sealant, following installation guidelines. When patching, care must be taken to avoid getting adhesive / sealant onto the existing Ultra CRM™. Extend the patch at least 6 inches in each direction beyond the defect. Seal the patch edges with one of the following methods:
 - a. Apply CR™ Seam Tape on all edges.
 - b. Prime the substrate with Polyguard® CR™ Sealant and apply a coating of CR™ Liquid Membrane.
11. Fishmouths and/or severe wrinkles must be slit and the flaps overlapped to be made flat or flush in preparation for a repair patch of CR™ Seam Tape or Ultra CRM™. Extend the patch material minimum 6 inches in all directions beyond the repair area. When patching, care must be taken to avoid getting adhesive / sealant onto the existing Ultra CRM™. Seal the patch edges with one of the following methods:
 - a. Apply CR™ Seam Tape on all edges.
 - b. Prime the substrate with Polyguard® CR™ Sealant and apply a coating of CR™ Liquid Membrane.

12. Air blisters larger than 2 inches shall be punctured and have the air expelled for a flat or flush area for the patch to seal properly. Prime and repair with a CR™ Seam Tape patch or an Ultra CRM™ patch. Extend the patch material minimum 6 inches in all directions beyond the repair area. When patching, care must be taken to avoid getting adhesive / sealant onto the existing Ultra CRM™. Seal the patch edges with one of the following methods:

- a. Apply CR™ Seam Tape on all edges.
- b. Prime the substrate with Polyguard® CR™ Sealant and apply a coating of CR™ Liquid Membrane.

C. Protection and Drainage Course:

1. Protection board is required over Ultra CRM™. Polypropylene is an acceptable material for vertical applications. The Polyflow® 15 drainage board can be used in place of protection board.
2. Apply protection board and/or perimeter drainage composite in accordance with project conditions and following the manufacturer's written directions.
3. Membrane should be free from all obstructions that will prevent direct contact to membrane prior to protection board installation.
4. Apply protection board systems so that it is not fastened through the membrane system causing damage to the membrane. When adhering protection board systems, use a Polyguard approved adhesive system with spot adhesion, rather than full adhesion. If any backfill settlement occurs, exerting downward pressure, the protection system will be able to detach from the membrane and slip downwards.
5. Once installed, ensure the protection board and/or perimeter drainage composite is not exposed to spark, flame, or heat exhaust caused by mechanical equipment. Repair any undue damage to the protection board and/or perimeter drainage composite.

D. Backfill Requirements:

1. No waiting is required before backfilling.
2. Shall be compacted per project specifications in 12-inch lifts. Use mechanical compaction in horizontal layers to achieve the desired backfill results. During mechanical compaction, prevent membrane damage by ensuring exhaust from equipment is directed away from the structure.
3. Shall be select fill with the following qualities:
 - a. Free of large dirt clogs, rocks, tree roots, and debris.
 - b. A type of material readily compactible upon deposit.
 - c. Low in water content.

END OF SECTION