



APPLICATION INSTRUCTIONS

VULKEM® X4

Part of the Vulkem® Roofing Series
Two-Component, Low-Odor, Modified
Polyurethane Methacrylate Coating

1. PURPOSE

- 1.1 The purpose of this document is to establish uniform procedures for installing the Vulkem® X4 waterproofing membrane for waterproof roofing applications.
- 1.2 The techniques involved may require modifications to adjust to jobsite conditions. Consult your Tremco Representative for specific design requirements.

2. SCOPE

- 2.1 This document will provide the necessary instructions for the application of the Vulkem X4 Waterproofing System to qualify for the manufacturer's warranty. Tremco recognizes that site specific conditions, weather patterns, contractor preferences and membrane detailing may require deviation or alteration from these prescribed installation procedures. When such circumstances and situations exist on a project, Tremco recommends that the local Tremco Sales Representative or Technical Services be contacted for assistance and approval as required.

3. SYSTEM COMPONENTS

- Dymonic 100
- TREMprime VB Plus Primer
- Tremco Epoxy Primer
- Permafab
- TREMprime Non-Porous Primer
- TREMDrain Series Drainage Mats
- Vulkem 191 Primer
- 6-mil Polyethylene Sheeting (Not Tremco Branded)

4. JOBSITE PREPARATION

- 4.1 Cover and protect existing adjacent portions of building and building equipment from damage, discoloration, and spills from the waterproofing materials to be installed.
- 4.2 Mask all surfaces to be protected. Seal joints subject to infiltration by coating materials.
- 4.3 Limit traffic and material storage to areas of the roof that have been protected.
- 4.4 Maintain temporary protection and leave protection in place until all roof coating has been completed.
- 4.5 Ensure compliance with all environmental regulations of authorities having jurisdiction.
- 4.6 Limit all potential spread areas of dust and debris. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade.
- 4.7 Shut down air intake equipment in the vicinity of the install in coordination with the Owner. Cover air intake louvers before proceeding with re-coating work that could affect indoor air quality or activate smoke detectors in the ductwork.
- 4.8 Verify that rooftop utilities and service piping affected by the install have been shut off before commencing installation.
- 4.9 Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecasted.
- 4.10 Do not permit water to enter into or under existing system components that are to remain.

5. SUBSTRATE PREPARATION

- 5.1 Surface to be waterproofed may be dry, green, or damp concrete and shall be clean, sound, and free of all contaminants which may interfere with adhesion or proper curing of the membrane. If release agents are present, they must be removed prior to the application of Vulkem X4.
- 5.2 Concrete slabs should be cleaned, roughened and made absorptive by mechanical abrasion. Remove surface laitance and abrade surface to CSP 3-6 in accordance with ICRI Guideline 310.

- 5.3 Concrete surface shall be free of voids, exposed aggregate areas, honeycombs, splatters, ridges, fins, and other projections or depressions. All reinforcing, including cut off rebar, shall be covered by a minimum of 3/4" (18 mm) of concrete epoxy, or approved repair mortar.
- 5.4 Concrete that is to receive waterproofing shall be water-cured. Consult an Architect or Engineer for minimum cure time on concrete before water can be stopped and foot traffic is permitted. Allow a minimum of 24 hours for concrete surface to dry after stopping water cure on decks or removing forms from walls or underside of decks. In the event it is necessary to use a curing agent, contact your local Tremco Representative.
- 5.5 Most dissipating types of curing compounds require removal before membranes can be successfully applied. Numerous manufacturers claim their curing compounds will not affect the adhesion of membranes and sealants and in some cases, they may not. Sometimes the breakdown of the curing compound does not happen and/or the residual materials are left on the concrete and can cause adhesion problems with the membrane. Tremco will not accept responsibility for adhesion failures caused by curing compounds.
- 5.6 Metal flashing that is to receive waterproofing shall be set in a continuous bedding bead of Dymonic 100. Install sealant S-bead between metal laps and mechanical fasten to substrate along leading edges every 4" (101 mm) O.C., staggered linearly to lie flat with fishmouths. To keep with from occurring, do not countersink fasteners; keep them flush. It is preferred for the concrete to be routed in the leading edges, so the flashing lies flush with the decking.
- 5.7 For horizontal applications, such as planters, follow good drainage practices to permit unimpeded water flow to drain(s) that are type and number sufficient to allow water to thoroughly evacuate the membrane surface.
- 5.8 Sidewalls of expansion joints shall be parallel, smooth, and straight. Block out, if required, shall be per the recommendations of the manufacturer. Expansion joints running through planters, walls, or at building to deck shall have a curb to curb construction approved by a Tremco Waterproofing Contractor and Architect/Engineer.
- 5.9 Do not damage metal counterflashings that are to remain. Replace damaged metal counterflashings.
- 5.10 Verify that the cleaned surface pulls concrete when tested per ASTM D 4541.
- 5.11 Verify that concrete substrate is visibly dry and exhibits a moisture level of 6% or less when tested per ASTM F2659.

6. DETAIL WORK

- 6.1 All shrinkage cracks shall be treated with a 30-mil coating of Vulkem X4, 6" (152 mm) wide, centered over the crack.
- 6.2 Moving structural cracks greater than 1/16" (1.6 mm) shall be routed and caulked with Dymonic 100, followed by a 30-mil detail coat of Vulkem X4 extending a minimum of 3" (76 mm) on either side of the crack.
- 6.3 A 1" (25 mm) cant of Dymonic 100 shall be installed at all horizontal-vertical junctures and projections. Integral flashing shall be installed to the height indicated on the drawings.
- 6.4 A 1" (25 mm) cant of Dymonic 100 shall be installed around all penetrations. Install a 60-mil detail coat of Vulkem X4 extending 2" (50 mm) onto the penetration and 6" (152 mm) onto the surrounding substrate.
- 6.5 Inside corners shall be treated with a fillet bead of Dymonic 100. Install a 30-mil detail coat of Vulkem X4 extending 6" (15 cm) on either side of the surrounding substrate.
- 6.6 Outside corners should have a 3/4" to 1" (18 to 25 mm) chamfer. Install a 30-mil detail coat of Vulkem X4 extending 6" (15 cm) on either side of the corner.
- 6.7 Curb/Penetration/Wall Flashings
 - a. Apply surface primers as needed and allow to cure prior to installation of Vulkem X4.
 - b. Pre-cut or Permafab fabric reinforcement ensuring it fully wraps the entire flashing and allows for a minimum 3" side overlap. The height of the reinforcement should extend up to the underside or underneath all terminations. Along the base of the flashing, the reinforcement should extend a minimum of 4" onto the flat roof surface and a minimum of 2" beyond the base laps of the flashing. Separate corner pieces should be cut to cover all base corner areas and a relief cut should be made in the center of each to allow for smooth transition up the vertical in these areas.
 - c. Apply Vulkem X4 over the entire flashing area at 2½ gallons per 100 sq. ft. (40 wet mils). The liquid product shall be applied up to the underside of left-in-place terminations or underneath removed terminations and a minimum of 4" onto the roof field surface, and 1" beyond the edge of the to be installed reinforcement in each direction.
 - d. Immediately embed into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. On the vertical, wrap piece of reinforcement then make a 45-degree cut centered at each base corner to allow for a smooth wrap to each face of the flashing. Following installation of the vertical wrap, install each individual base corner reinforcement piece. Adjacent pieces of Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.
 - e. While the base layer is still wet, immediately install a second application of Vulkem X4 Mastic over the reinforcement at 2½ gallons per 100 sq. ft. (40 wet mils), ensuring a consistent finish free of bare spots or pinholing. Feather out the edges and allow the application to cure.
 - f. Reinstall metal terminations or counterflashing as required.

6.8 Drains

- a. Remove existing clamping ring and clean membrane under surface of clamping ring. Note: Clamping ring must be reinstalled if precipitation is in the forecast to ensure water does not enter the building below the membrane or roof substrate at the drain.
- b. Apply surface primers as needed and allow to cure prior to installation of Vulkem X4.
- c. Pre-cut the fabric reinforcement ensuring it extends underneath the drain ring. Fabric can be cut just beyond the inside edge of the drain ring or extended into the bowl assembly if desired. Along the perimeter, the reinforcement should extend a minimum of 4" onto the flat roof surface or a minimum of 2" beyond the laps of the drain target patch.
- d. Apply Vulkem X4 over the entire drain sump area at 2½ gallons per 100 sq. ft. (40 wet mils). The liquid product shall be applied beyond the drain sump and onto the roof surface a minimum of 6" onto the roof field surface, and 1" beyond the edges of the to be installed reinforcement in each direction.
- e. Immediately embed Permafab into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. Adjacent pieces of Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.
- f. While the base layer is still wet, immediately install a second application Vulkem X4 over the reinforcement at 2½ gallons per 100 sq. ft. (40 wet mils), ensuring a consistent finish free of bare spots or pin-holing. Feather out the edges and allow the application to cure.
- g. Once cured, apply a solid bead of Dymonic 100 around the base of the clamping ring, replace water block as needed, and properly reinstall clamping ring and all drain bolts.

6.9 Embedded Edge Metal / Fascia / Gutters

- a. Apply surface primers as needed and allow to cure prior to installation of Vulkem X4.
- b. Apply Vulkem X4 onto the prepared metal and roofing substrate at 2½ gallons per 100 sq. ft. (40 wet mils). The liquid product shall be applied a minimum of 6" onto the roof surface and 1" beyond the edges of the to be installed reinforcement in each direction.
- c. Immediately embed Permafab into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. Adjacent pieces of Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.
- d. While the base layer is still wet, immediately install a second application Vulkem X4 over the reinforcement at 2½ gallons per 100 sq. ft. (40 wet mils), ensuring a consistent finish free of bare spots or pin-holing. Feather out the edges and allow the application to cure.

6.10 Pipe Penetrations

- a. Apply surface primers as needed and allow to cure prior to installation of Vulkem X4.
- b. Pre-cut Permafab fabric reinforcement. Begin by cutting a base flashing piece which should extend a minimum of 4" onto the flat roof surface or a minimum of 2" beyond the laps of the target patch. Fold base flashing reinforcement piece onto itself twice and snip the inside corner to identify the middle. Then place the snipped middle into the center of the pipe opening and trace along the inside top edge of the pipe. Cut along the traced edge line and remove the cut fabric. Then cut the vertical wrap which should extend up to the underside or underneath all terminations.
- c. Apply Vulkem X4 onto the prepared base flashing at 2½ gallons per 100 sq. ft. (40 wet mils). The liquid product shall be applied a minimum of 6" onto the roof surface and 1" beyond the edges of the to be installed reinforcement in each direction.
- d. Immediately fit the base flashing reinforcement piece with the cut-out centered over the pipe and pull reinforcement down into place. If unable to fit the reinforcement over the top of the pipe, a relief cut can be made in the center of one side into the pipe cut-out and the piece can be wrapped around the pipe. Once in place, the reinforcement should turn-up the vertical between ¼ - ½". Embed Permafab into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. Adjacent pieces of Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.
- e. Once the base flashing is complete, Apply Vulkem X4 onto the prepared vertical flashing at 2½ gallons per 100 sq. ft. (40 wet mils). The liquid product shall be applied up to the underside of left-in-place terminations or underneath removed terminations.
- f. Immediately install the vertical wrap reinforcement piece flush with the roof surface covering the ¼ - ½" turn-up on the bottom edge and up to the underside of left-in-place terminations or underneath removed terminations. Embed Permafab into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. Adjacent pieces Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.

- g. While the base layers are still wet, immediately install a second application Vulkem X4 over the base and vertical reinforcement at 2½ gallons per 100 sq. ft. (40 wet mils), ensuring a consistent finish free of bare spots or pin-holing. Feather out the edges and allow the application to cure.
- h. Reinstall metal terminations or counterflashing as required.

7. MEMBRANE APPLICATION

7.1 General Application Guidelines:

- a. Vulkem X4 liquid resin must be catalyzed using Vulkem X4 Catalyst prior to installation. The amount of catalyst needed varies depending on the amount of resin, atmospheric/site conditions. See Table 1.1
- b. The use of surface primers may be required. Follow these instructions for use:
 - i. Concrete/Masonry Surfaces: Apply Tremco Epoxy Primer at ½ gallon per 100 sq. ft. (8 wet mils) on properly prepared concrete or masonry surfaces. Allow primer to cure prior to installation of Vulkem X4.
 - ii. Metal Surfaces: Grind metal surfaces where application is planned to achieve clean, bare metal. TREMprime Non-Porous Primer at 1,400 - 1,800 sq. ft. per gallon on properly prepared metal tie-in areas. Allow primer to cure prior to installation of Vulkem X4.
- c. Existing flashing heights should extend a minimum of 8" from the roof surface.
- d. All products must be installed following Tremco written recommendations. Be sure to follow product specific guidelines pertaining to application methods, requirements, restrictions/limitations, etc.

7.2 Membrane Application Methods:

- a. Vulkem X4 may be applied using brush, roller, squeegee and backroll, or trowel.
- b. Apply catalyzed Vulkem X4 onto the prepared field of the roof at 3 gallons per 100 sq. ft. (48 wet mils).
- c. Immediately embed Permafab into the wet liquid and brush or roll for proper adhesion and removal of all voids, pinholes, air pockets, etc. Vulkem X4 must achieve 100% bleed through of the Permafab reinforcement. Adjacent pieces of Permafab should be lapped a minimum of 3" on side laps and 6" on end laps. Overlap areas require additional liquid product to allow for proper embedment.
- d. While the base layer is still wet, immediately install a second application Vulkem X4 over the reinforcement at 3-3½ gallons per 100 sq. ft. (48-54 wet mils), ensuring a consistent finish free of bare spots or pin-holing.
- e. Allow application to cure.
- f. For horizontal applications where the membrane is turned up on a wall, terminate the waterproofing to eliminate the possibility of ponded surface water penetrating the wall above the membrane. The minimum height is determined by the designer and should take into account the opportunity for such occurrence as well as the building's geometry and environment.
- g. On horizontal slabs, a flood test should be run in accordance with ASTM D5927. The membrane should be cured to a firm rubber set (36 hr minimum) before flooding. Flood with a minimum of 1" (25 mm) of water for 24 hr. As an alternative, Electronic Field Vector Mapping may also be used. Please contact your EFVM manufacturer for assistance with this method.

8. CLEAN UP

- 8.1 As work progresses, it is essential to keep equipment in clean, working condition using Acetone, Isopropyl Alcohol, or Xylene. General clean-up with same.
- 8.2 At the conclusion of the project, all equipment should be cleaned and returned to its designated location. Disposal of empty, partially full, or full pails or drums should be discussed with the building owner, contractor, or engineer.

Table 1: Vulkem X4 Temperature Chart

Temperature °F	Temperature °C	Catalyst Pouches per 5 Gal Pail of Fluid
50 - 60	10 - 15.5	20
60 - 70	15.5 - 21.1	15
70 - 80	21.1 - 26.6	10
80 - 90	26.6 - 32.2	5

VULX4AI/1024

Tremco Construction Products Group (CPG) brings together Tremco CPG Inc. and its Dryvit and Nudura brands; Willseal; Prebuck LLC; Tremco Barrier Solutions, Inc.; Weatherproofing Technologies, Inc. and its Pure Air Control Services and Canam Building Envelope Specialists offerings; and Weatherproofing Technologies Canada, Inc.



tremcosealants.com | 800.321.7906



Construction Products Group

3735 Green Rd. | Beachwood, OH 44122
800.321.7906 | tremcocpg.com