APPLICATION INSTRUCTIONS

VULKEM EWS® WITH PUMA TECHNOLOGY

Waterproof Traffic Coating System
- Pedestrian System

1. PURPOSE

1.1 The purpose of this document is to establish uniform procedures for applying the Vulkem® Extreme Wearing System (EWS) in pedestrian applications. The techniques involved may require modifications to adjust to job-site conditions. If you have any questions regarding your application, contact your local Tremco Field Sales Representative for specific design requirements. This document will provide instructions and troubleshooting for the application of the Vulkem EWS to qualify for the manufacturer's warranty.

2. SUBSTRATE PREPARATION

2.1 Investigation of the substrate should be performed to determine the type of surface preparation that will need to take place to achieve the appropriate surface profile required for the coating application. Shotblast is required prior to any Vulkem EWS installation. Refer to ICRI's Technical Guideline No. 310.2R-2013 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair for best practices on selecting the appropriate method of concrete preparation. Vulkem EWS application requires a CSP 3-4.

2.2 For preparation of metal substrates, please follow The Society for Protective Coatings recommendations that followed in section 3.12.

3. CONDITIONS FOR SUBSTRATES

Concrete Surfaces:

3.1 Concrete shall be water cured and attain a 3000 PSI minimum compressive strength. Moisture content in the concrete must be lower than 6% as measured using a Tramex CME 4 Moisture Meter. Excess moisture in the concrete can prevent the coating materials from performing as intended. Depending on the concrete construction and job site location, additional concrete testing may be required. Please contact your local Tremco Sales or Technical Representative.

3.2 Excess moisture in the concrete can prevent the coating materials from performing as intended. To detect the presence of excess moisture, several tests may be employed:

- ASTM D4263 – Plastic Sheet
- ASTM F1869 – Calcium Chloride
- ASTM F2659 – Tramex CME 4
- ASTM F2170 – Insitu

3.3 All concrete surfaces must be shotblast prior to any coating application. For proper methods, refer to ICRI's Technical Guideline No. 310.2R-2013. For supplier information contact Tremco's Technical Service.

3.4 Concrete surface shall be properly cleaned so that the surface to receive the coating, sealant or liquid applied flashing is free of all laitance, mold, paint, sealers, coatings, curing agents, loose particles and other contamination or foreign matter which may interfere with the adhesion. Consult a Tremco Technical Service Representative for recommendations prior to installing materials.

3.5 Shrinkage cracks in the concrete surface which are 1/16" (1.5 mm) wide or greater shall be treated according to the instructions in Sections 5 and 7.

3.6 Structural cracks, regardless of width, shall be treated according to the instructions in Sections 5 and 7.

3.7 Spalled areas shall be cleaned and free of loose contaminants prior to repair. Due to the fact that jobsite conditions vary, it is recommended that you contact Tremco's Technical Service or your local Tremco Sales Representative for the best method of repair.

3.8 In the event of exposed reinforcing steel, it is recommended that the structural engineer of record be contacted for investigation of the condition and for the best method of repair.

3.9 Surfaces shall be made free of defects that may telegraph and show through the finished coating. Surfaces which are rough (fins, ridges, exposed aggregate, honeycombs, deep broom finish, etc.) shall be leveled and made smooth by applying a coat of sand-filled Tremco PUMA WC according to the instructions in Section 7.

3.10 All drains shall be cleaned and operative. Drains shall be recessed lower than the deck surface. Surface shall be sloped to drain and provide positive drainage. Drains should be detailed as instructed below:

- Cut a 1/4" wide x 1/4" deep (6 mm x 12 mm) keyway into the concrete surface at any point where the coating will have an exposed terminating edge- that is, any point where the coating will end in an open area subject to traffic, for example, at the end of a ramp, around drains and alongside expansion joints.

3.11 If the project is a restoration deck, old sealant and backing material shall be removed. The joint interface will require a thorough wire brushing, grinding, sandblasting and primer.

Metal Surfaces:

3.12 Follow standard SSPC-SP 10/NACE No. 2 Near White Blast Cleaning. A near-white metal blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and foreign matter.

Wood Surfaces:

3.13 Wood must be 5/8", exterior-grade plywood, "A"-side up and well fastened with ring shank nails, or screws, with proper consideration given to joints and movement.

3.14 All drains shall be cleaned and operative. Drains shall be recessed lower than the deck surface. Surface shall be sloped to drain and provide positive drainage.

4. JOBSITE MATERIALS

Recommended materials and their use are as follows:

4.1 **Dymonic 100:** A one-part, moisture curing, gun grade polyurethane sealant for use in precast, masonry, expansion joints, control joints and for use in forming cants.

4.2 **TREMprime VB Plus Primer:** A two component, modified epoxy primer designed to seal concrete and reduce moisture vapor transmission on concrete slabs with elevated levels of moisture.

4.3 **Tremco PUMA Primer:** A two-part, chemical-curing PMMA primer for porous and non-porous surfaces.

4.4 **Tremco PUMA BC:** A two-part, chemical-curing PUMA coating used as an elastomeric, waterproofing membrane for Vulkem EWS.

4.5 **Tremco PUMA BC LM:** A lower modulus version of Tremco PUMA BC used as the waterproofing membrane for Vulkem EWS for service temperatures below 32° F (0° C).

4.6 **Tremco PUMA BC T:** A thixotropic version of Tremco PUMA BC used for detailing and field applied cant beads.

4.7 **Tremco PUMA BC R:** A rollable version of Tremco PUMA BC used for ramps and upturns.

4.8 **Tremco PUMA WC:** A two-part, chemical curing PUMA wearing course that can also be used with sand to level out uneven areas in the concrete.

4.9 **Tremco PUMA TC:** A two-part, chemical-curing PMMA coating used to lock in aggregate and provide additional chemical and UV resistance to Vulkem EWS.

4.10 **Tremco PUMA Cleaner:** A one-part MMA cleaner for all tools such as mixing paddles, squeegees, spiked rollers and spatulas. Always use this cleaner for Vulkem EWS materials. Never use any kind of solvent to clean any of your tools as this will cause contamination and inhibit cure.

4.11 **Tremco PUMA Initiator+:** A reactive catalyst in the form of a white powder used to cure all resins of Vulkem EWS.

4.12 **Tremco PUMA Filler Powder:** A non-reactive, white, filler powder used to thicken Tremco PUMA WC.

4.13 **Aggregate:** 0.3 to 0.6 mm (30-50 mesh)-sized silica sand for the primer application. 0.6 to 1.2 mm (16-30 mesh)-sized silica sand for the wear application, which imparts a textured surface and contributes to wear resistance. In a pedestrian system, the first top coat is considered the wear coat. For supplier information, contact Tremco Technical Service.

5. DETAIL WORK – DYMONIC 100

The preferred method of crack detailing is Tremco PUMA BC or BC LM. Tremco PUMA BC or BC LM will fill cracks and non-moving joints when applied at the recommended thickness, noted in section 8. Tremco PUMA BC and BC LM are not for use inside expansion joints. If using the preferred crack detailing method, please proceed to section 6, Priming Concrete Surface.

Note: Do not apply sealant to a frosty, damp or wet surface or when substrate temperature is below 40 °F (4 °C) or the surface temperature is above 110 °F (43 °C). Cure times as stated below are based upon standard ambient conditions of 75 °F (25 °C), 50% RH. A decrease in ambient temperature and humidity will significantly lengthen the cure time.

Note: Dymonic 100 must be fully cured before application of Tremco PUMA Primer.

5.1 Lay a 1/4" (6 mm) diameter backer rod into the corner at the juncture of all horizontal and vertical surfaces such as curbs, wall sections, columns or penetrations through the deck. Apply a bead of Dymonic 100 1" (2.5 cm) wide over the backer rod. Tool the sealant bead to form a 45°cant. Use sufficient pressure to force out any trapped air and to assure complete wetting of the surface. Remove excess sealant from the deck or wall joint.

Note: Backer rod is only required for moving joints.

5.2 Install a backer rod, 1/8" to 1/4" (3 mm to 6 mm) diameter larger than the joint width to all prepared control joints. Set depth of backer rod to control the depth of the sealant. (Depth of sealant is measured from the top of the backer rod to the top of the concrete surface.) Proper depth of sealant is as follows:

5.3 For joints 1/4" (6.4 mm) to 1 /2 " (12.7 mm) wide, the depth ratio should be equal.

5.4 Joints 1/2" (12.7 mm) wide or greater should have a sealant depth of 1/2" (12.7 mm). The minimum joint size is 1/4" x 1/4" (6.4 mm x 6.4 mm).

5.5 All cracks and joints shall be sealed with Dymonic 100 and tooled flush with the surface.

Note: Expansion joints should not be coated over. A full line of expansion joint solutions is available from Tremco Constructions Products Group companies. For treatment of expansion joints, contact your local Tremco Sales Representative.

5.6 Allow sealant to fully cure.

6. PRIMING CONCRETE SURFACE

Note: When detailing cracks with Tremco PUMA BC or BC LM, the surface must be primed but cracks should not be filled with Tremco PUMA Primer.

Note: Ensure any lumps in the Tremco PUMA Initiator+ are fully broken up prior to weighing and mixing into the resin.

6.1 Mix Tremco PUMA Primer for 1 to 2 min prior to the addition of Tremco PUMA Initiator+.

6.2 Mix Tremco PUMA Primer thoroughly together with Tremco PUMA Initiator+ in accordance with Table 3 for 2 to 3 min.

6.3 Apply Tremco PUMA Primer at a minimum of 90 ft^2/gal to yield 17 wet mils to the entire area to be coated. The recommended method of application is with a roller. Application below 17 wet mils will result in the primer not curing.

6.4 Once primer is rolled out evenly, lightly broadcast 0.3 to 0.6 mm (30-50 mesh)-sized silica sand into the primer at a rate of 0.7 lb/10 ft^2.

6.5 Allow Tremco PUMA Primer a minimum of 30 min to fully cure.

7. DETAIL WORK – TREMCO PUMA PRODUCTS

Contact local sales representative for expansion joint detailing.

Defects, Patching and Sloping

7.1 Mix Tremco PUMA WC for 1 to 2 min prior to the addition of the silica sand.

7.2 Begin with 10 lb of sand for every gallon of Tremco PUMA WC. Additional sand can be added if a thicker consistency is desired.

7.3 Once Tremco PUMA WC and the sand are blended together, combine this mixture with the Tremco PUMA Initiator+ in accordance with Table 3 and mix thoroughly for 2 to 3 min. Amount of Tremco PUMA Initiator+ is dependent on ambient temperature. Please note the Tremco PUMA Initiator+ addition is based in the ratio of Initiator+ to Tremco PUMA WC, not Initiator+ to Tremco PUMA WC with silica sand. Please see Table 3 for addition amounts.

7.4 For uneven spots and other defects in the surface, such as pitting or cratering, a thicker mix of Tremco PUMA WC and sand may be required. Trowel the material to create an even surface with the concrete.

7.5 Allow Tremco PUMA WC with sand mixture to cure a minimum of 45 min before proceeding to base coat application.

Horizontal to Vertical Transition

Note: Proceed to 7.9 if horizontal to vertical transitions were treated with Dymonic 100.

7.6 Mix the Tremco PUMA BC T for 2 to 3 min prior to the addition of the Tremco PUMA Initiator+. Ensure that Tremco PUMA BC T is thoroughly mixed together with the Tremco PUMA Initiator+ in accordance with Table 3 for 2 to 3 min.

7.7 Apply a cant of Tremco PUMA BC T 1" (2.5 cm) wide at the juncture of all horizontal and vertical surfaces (such as curbs, wall sections, columns or penetrations through the deck). Tool Tremco PUMA BC T to form a 45° cant. Use sufficient pressure to force out any trapped air and to assure complete wetting of the surface. Remove excess material from the deck or wall surface. For a cant bead at a 45° angle in a horizontal to vertical transition, 1 gallon of Tremco PUMA BC T for every 38.5 LF (11.7 M) is required.

7.8 Apply a strip of tape (masking tape or duct tape) to the vertical sections, 2 to 3" above the Tremco PUMA BC T or Dymonic 100 cant to provide a neat termination of Tremco PUMA BC R.

7.9 Apply Tremco PUMA Primer over Dymonic 100 cant before applying coating.

7.10 For penetrations, apply Tremco PUMA Primer over the cant, up the penetration to 1” below the top of the projected overburden. Allow primer to cure.

7.11 Following the primer application, mix Tremco PUMA BC R. Mix in Tremco PUMA Initiator+ in accordance with Table 3.

7.12 Apply the Tremco PUMA BC R mixture using a medium-nap roller to achieve a minimum thickness of 40 mils over the primed penetration, over the cant and extended minimum of 9 inches onto the horizontal plane. Spiked rollers are not required for change in plane.

8. BASE COAT APPLICATION

Note: In environmental conditions where large temperature swings exist, such as Northern US and Canada, Tremco PUMA BC LM can be used in lieu of Tremco PUMA BC.

Note: When using more than one consecutive coat of Tremco PUMA BC or BC LM, please contact Tremco Technical Service for further details.

8.1 Mix Tremco PUMA BC or BC LM for 1 to 2 min prior to the addition of Tremco PUMA Initiator+. Note: for ramps up to a 40% slope, mix Tremco PUMA BC R for 2 to 3 min before adding Tremco PUMA Initiator+.

8.2 Tremco PUMA BC, Tremco PUMA BC LM or Tremco PUMA BC R is thoroughly mixed together with the Tremco PUMA Initiator+ in accordance with Table 3 for 2 to 3 min. Amount of Tremco PUMA Initiator+ is dependent on the ambient temperature. Please see Table 3 for addition amounts.

8.3 Apply Tremco PUMA BC, Tremco PUMA BC LM or Tremco PUMA BC R at 27 ft^2/gal to yield 60 wet mils (1.5 mm) thick to the entire area. The recommended method of application is with a metal notched rake for Tremco PUMA BC or BC LM and a nap roller for BC R.

8.4 Spike roll Tremco PUMA BC or Tremco PUMA BC LM immediately to release all air bubbles from the coating. Tremco PUMA BC R does not need to be spike rolled.

8.5 Allow Tremco PUMA BC, Tremco PUMA BC LM or Tremco PUMA BC R a minimum of 45 min to cure.

9. TOP COAT APPLICATION

Note: If using Tremco PUMA TC Tintable, add the universal color paks prior to mixing at a ratio of 1 color pak to 2 gallons of tintable top coat.

9.1 Mix Tremco PUMA TC for 1 to 2 min prior to the addition of Tremco PUMA Initiator+.

9.2 Thoroughly mix Tremco PUMA TC together with the Tremco PUMA Initiator+ in accordance with Table 3. Amount of Tremco PUMA Initiator+ is dependent on the ambient temperature. Please see Table 3 for addition amounts.

9.3 Apply Tremco PUMA TC at 17 to 20 mils (80-90 ft²/gal). The recommended method of application is with a roller.

9.4 Immediately following the application of the Tremco PUMA TC, broadcast to refusal (flood coat) the material with 0.6 to 1.2 mm (16-30 mesh)-sized silica sand.

9.5 Allow Tremco PUMA TC a minimum of 45 min to cure. Before proceeding with the final Tremco PUMA TC, sweep or blow off any excess sand.

9.6 Apply Tremco PUMA TC at 25 to 30 mils (53-64 ft²/gal). Allow to cure a minimum of 1 hr before opening to pedestrian traffic.

10. CLEAN UP

10.1 Immediately clean all adjacent areas to remove any stains or spills with Tremco PUMA Cleaner before material cures.

10.2 Immediately clean tools or equipment with Tremco PUMA Cleaner to remove curing material. Intermittent cleaning during application is recommended.

10.3 Clean hands by soaking in hot, soapy water then brush with a stiff bristle brush.

11. MATERIAL USAGE GUIDELINES

The following is a guide to determine material usage. Recommended coverage rates are approximate. Sand broadcasting methods and concrete surface profiles may increase the amount of material required to obtain uniform coverage.

11.1 **Tremco PUMA Primer:** When applied at 90 ft²/gal (2.2 M²/L) will yield a mil thickness of 17 wet mils.

11.2 **TREMprime VB Plus Primer:** When applied at 100 ft²/gal (2.4 M²/L) will yield a mil thickness of 16 wet mils.

11.3 **Dymonic 100:** For a 1" (25 mm) cant bead over a 1/4" (6 mm) backer rod, 1 case of sealant for every 48lf (14.6 M) is required.

11.4 **Tremco PUMA BC, BC LM or BC R:** When applied at 27 ft²/gal (0.6 M²/L) will yield a mil thickness of 60 wet mils.

11.5 **Tremco PUMA BC T:** For a cant bead at a 45° angle in a horizontal to vertical transition, 1 gallon of Tremco PUMA BC T for every 38.5 LF (11.7 M) is required.

11.6 **Tremco PUMA TC:** When applied at 53 to 90 ft²/gal (1.3 to 2.2 M²/L) depending on silica method will yield a mil thickness of 17 to 30 wet mils.

11.7 **Tremco PUMA Initiator+:** See Table 3 for exact addition amounts.

11.8 **Aggregate:** Broadcast silica sand at a rate of 0.7 lb/10 ft² immediately after the Tremco PUMA Primer application.

11.9 **Aggregate:** Broadcast silica sand at a rate of 1 lb/ft² immediately after the Tremco PUMA TC application.

12. TROUBLESHOOTING

This section describes common industry application issues when certain environmental conditions exist. Below are some commonly seen issues and remedies. If any of these should occur, it is always recommended you contact your local Tremco Sales Representative or Tremco's Technical Service.

12.1 Tremco requires that any possible re-coating job be reviewed and approved by your Sales and/or Technical Representative prior to installation.

12.2 When a deck contains too much moisture, the excess moisture may change into a vapor which then condenses at the concrete-membrane interface before the coating has cured, which will cause blisters or bubbles, which, in turn, will interfere with proper adhesion. If this should occur the blisters/bubbles can be cut out, allowing the moisture to escape. After moisture has escaped and the surface is dry, the area can be repaired.

12.3 If the coating is applied in very hot ambient temperatures, the air in the small spaces between the concrete particles increases in volume and forms blisters. Contact Tremco's Technical Service should this occur.

12.4 Tremco PUMA products should only be applied when the UV index is less than 7 and substrate temperature is below 115 °F (46 °C).

TABLE 1: Quick Reference Application Chart				
LAYER	**PRODUCT**	**WET MILS**	**CURE TIME**	**SQUARE FEET PER GALLON**
Primer	Tremco PUMA Primer	17	30 min	90
Base Coat	Tremco PUMA BC or BC LM	60	45 min	27
Top Coat	Tremco PUMA TC	17-20	45 min	80-90
Top Coat	Tremco PUMA TC	25-30	1 hr	53-64

TABLE 2: Quick Reference Application Chart (Ramps)				
LAYER	**PRODUCT**	**WET MILS**	**CURE TIME**	**SQUARE FEET PER GALLON**
Primer	Tremco PUMA Primer	17	30 min	90
Base Coat	Tremco PUMA BC R	60	45 min	27
Top Coat	Tremco PUMA TC	17-20	45 min	80-90
Top Coat	Tremco PUMA TC	25-30	1 hr	53-64

12.5 Recommended coverage rates are approximate. Sand loading methods and concrete surface profiles may increase the amount of material required to obtain uniform coverage.

TABLE 3: Temperature Chart		**Tremco PUMA Initiator+**
TEMPERATURE °F	**TEMPERATURE °C**	**GRAMS OR OUNCES/GALLON**
68 to 95	20 to 35	37.5 g or 1.35 oz of initiator/gal resin
50 to 68	10 to 20	75 g or 2.7 oz of initiator/gal resin
32 to 50	0 to 10	150 g or 5.4 oz of initiator/gal resin
14 to 32	-10 to 0	225 g or 8 oz of initiator/gal resin

12.6 The prescribed amount of initiator in Table 3 is the minimum amount required per gallon for that temperature range.

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.

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