Vulkem® EWS with PUMA Technology (Heavy Duty)

Waterproof Traffic Coating System - Ready for Use 1 Hour after Application

APPLICATION INSTRUCTIONS

1. Purpose

1.1 The purpose of this document is to establish uniform procedures for applying the Vulkem® Extreme Wearing System (EWS) in heavy duty 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 are referenced in section 3.12.

3. Conditions for Substrates

Concrete Surfaces:

3.1 Concrete shall be water-cured and attain a 4000 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 concrete construction and job site location, additional concrete testing may be required. Please contact your local Tremco Sales or Technical Representative.

3.2 To detect the presence of excess moisture, several tests may be employed:

- ASTM D4263- Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
- ASTM F2170-02 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs
- Calcium Chloride Test

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 any 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.

4. Jobsite Materials

4.1 Recommended materials and their use are as follows:

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.

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

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

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).

Tremco PUMA BC T: A thixotropic version of Tremco PUMA BC, used for detailing horizontal to vertical transitions.

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

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

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

Tremco PUMA Cleaner: A one-part PUMA 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.

Tremco PUMA Initiator: A benzoyl peroxide-based initiator used to react to all components of Vulkem EWS.

Tremco PUMA Filler Powder: A calcium carbonate filler used to thicken PUMA resins.

For temperatures of 20 °F (-6 °C) and below, please contact Tremco Technical Service for details.

Aggregate: 0.3 to 0.6 mm (30-50 mesh)-sized silica sand for the primer application. Aluminum Oxide (Bauxite): A 1 to 3-mm sized, heavy-duty aggregate for the wear coat application. For supplier information, contact Tremco Technical Service.

5. Detail Work – Dymonic 100

The preferred method of crack detailing is Tremco PUMA BC. Tremco PUMA BC will fill cracks and moving joints when applied at the recommended thickness, noted in Section 8. Please note, Tremco PUMA BC is not for use in the application of 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.

Dymonic 100 must be applied and fully cured prior to applying 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:

5.2a. For joints 1/4" (6.4 mm) to 1 /2 " (12.7 mm) wide, the depth ratio should be equal.

5.2b. 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).

5.3 All cracks and joints shall be sealed with Dymonic 100, and tooled flush with the surface. Note: Expansion joints should not be coated over. For treatment of expansion joints, contact your local Tremco Sales Representative.

5.4 Allow sealant to fully cure.

6. Priming Concrete Surface

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 ft²/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 ft².

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

7. Detail Work – 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 Vulkem 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 gal of Tremco PUMA BC T for every 38.5 lf (11.74M) 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 the Tremco PUMA BC T or 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 pentration, over the cant, and extended minimum of 12 inches onto the horizontal plane. Spiked rollers are not required for change in plane.

7.13 Apply Tremco PUMA Primer over the Tremco PUMA BC R before coating over.

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.

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 20 ft²/gal to yield 80 wet mils (2.0 mm) thick to the entire area. The recommended method is a metal notched rake. The recommended application method for Tremco PUMA BC R is a nap roller.

8.4 Spike roll Tremco PUMA BC, Tremco PUMA BC LM, or Tremco PUMA BC R 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. Wear Coat Application

There are two acceptable methods for applying the Tremco PUMA WC:

Option 1

9.1 Mix Tremco PUMA WC for 1 to 2 min prior to the addition of Tremco PUMA Filler Powder.

9.2 12.5 lb of Tremco PUMA Filler Powder is used for every gallon of Tremco PUMA WC.

9.3 Once Tremco PUMA WC and Tremco PUMA Filler Powder are blended, this mixture is thoroughly mixed together with the Tremco PUMA Initiator in accordance with Table 3 for 2 to 3 min. Please Note: the Tremco PUMA Initiator addition is based on the ratio of Initiator to Tremco PUMA WC, not Initiator to Tremco PUMA WC with Tremco PUMA Filler Powder. Please see Table 3 for addition amounts.

9.4 Apply Tremco PUMA WC with Tremco PUMA Filler Powder mixture at 16 ft²/gal to yield 100 wet mils (2.54 mm) thick to the entire area. The recommended method is a metal notch rake.

9.5 Spike roll Tremco PUMA WC immediately to release all air bubbles from the coating.

9.6 Immediately following the application of the Tremco PUMA WC, broadcast to refusal (flood coat) the material with 1 to 3 mm-sized aluminum oxide (bauxite).

9.7 Allow Tremco PUMA WC a minimum of 45 min to cure. Before proceeding with the Tremco PUMA TC, sweep or blow off any excess aluminum oxide (bauxite).

Option 2

9.8 Mix the Tremco PUMA WC for 1 to 2 minutes prior to the addition of the Tremco PUMA Initiator. Mix the Tremco PUMA WC and initiator in accordance with Table 3 for 2 to 3 min.

9.9 Apply the Tremco PUMA WC at 80 ft²/gal to yield 20 wet mils (0.51 mm) thick to the entire area. The recommended method of application is with a medium-nap roller.

9.10 Immediately following the application of the Tremco PUMA WC, broadcast 0.3 lb/ft² of 1 to 3mm-sized aluminum oxide (bauxite).

9.11 Allow Tremco PUMA WC a minimum of 45 minutes to cure. Prior to proceeding with the next application of the Tremco PUMA WC, sweep and/or blow off any excess aluminum oxide (bauxite).

9.12 Mix the Tremco PUMA WC for 1 to 2 minutes prior to the addition of the Tremco PUMA initiator. Mix the Tremco PUMA WC and initiator in accordance with Table 2 for 2 to 3 min.

9.13 Apply the Tremco PUMA WC at 57 ft²/gal to yield 28 wet mils (0.71 mm) thick to the entire area.

9.14 Immediately following the application of the Tremco PUMA WC, broadcast to refusal the material with 1 to 3mm-sized aluminum oxide (bauxite).

9.15 Allow the Tremco PUMA WC a minimum of 45 minutes to cure. Prior to proceeding with the next application of Tremco PUMA WC, sweep and/or blow off any excess aluminum oxide (bauxite).

9.16 Mix the Tremco PUMA WC for 1 to 2 minutes prior to the addition of the Tremco PUMA initiator. Mix the Tremco PUMA WC and initiator in accordance with Table 2 for 2 to 3 min.

9.17 Apply the Tremco PUMA WC at 57 ft²/gal to yield 28 wet mils (0.71 mm) thick to the entire area.

9.18 Immediately following the application of the Tremco PUMA WC, broadcast to refusal the material with 1 to 3 mm-sized aluminum oxide (bauxite).

9.19 Allow the Tremco PUMA WC a minimum of 45 minutes to cure. Prior to proceeding with the Tremco PUMA TC, sweep and/or blow off any excess aluminum oxide (bauxite).

Note: For ramps, Option 2 is recommended, see Table 2.

10. Top Coat Application

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

10.2 Tremco PUMA TC 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.

10.3 Apply Tremco PUMA TC at 53 to 90 ft²/gal to yield 17 to 30 wet mils (0.43 to 0.76 mm) thick to the entire area. The recommended method of application is with a roller.

10.4 Allow Tremco PUMA TC a minimum of 1 hr to cure before opening to vehicular traffic.

11. Clean Up

11.1 Clean all adjacent areas to remove any stains or spills with Tremco PUMA Cleaner.

11.2 Clean tools or equipment with Tremco PUMA Cleaner.

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

12. Material Usage Guidelines

The following is a guide to determine material usage:

Tremco PUMA Primer: When applied at 90 ft²/gal (2.21 M²/L) will yield a mil thickness of 17 wet mils.

Tremco PUMA BC, BC LM, BC R: When applied at 20 ft²/gal (0.49 M²/L) will yield a mil thickness of 80 wet mils.

Tremco PUMA WC with Tremco PUMA Filler Powder:

Option 1 - When applied at 25 ft²/gal (0.61 M²/L) will yield a mil thickness of 65 wet mils. When applied at 16 ft²/gal (0.39 M²/L) will yield a mil thickness of 100 wet mils.

Option 2 - When applied at 80 ft²/gal (1.96 M²/L) will yield a mil thickness of 20 wet mils. When applied at 57 ft²/gal (1.4 M²/L) will yield a mil thickness of 28 wet mils.

Tremco PUMA TC: When applied at 53 to 90 ft²/gal (1.30 to 2.21 M²/L) depending on silica method will yield a mil thickness of 17 to 30 wet mils.

Apply silica sand at a rate of 0.7 lb/10 ft² immediately after the Tremco PUMA Primer application.

Apply aluminum oxide (bauxite) at roughly a rate of 12.5 lb/10 ft² immediately after the Tremco PUMA WC application.

13. 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.

13.1 Tremco requires that any possible recoating job be reviewed and approved by your Sales and/or Technical Representative prior to installation.

13.2 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.

13.3 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.

13.4 Tremco PUMA products should only be applied when the UV index is less than 7 and substrate temperatures below 115°F.

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	80	45 min	20
Wear Coat	Tremco PUMA WC w/Tremco PUMA Filler Powder	100	45 min	16
Top Coat	Tremco PUMA TC	17-30	1 hr for vehicular traffic	53-90

Table 2: Quick Reference Application Chart (Ramps)

Layer	Product	Wet Mils	Cure Time	Square Feet Per Gallon
Primer	Tremco PUMA Primer	17	15 min	90
Base Coat	Tremco PUMA BC R	80	45 min	20
Wear Coat #1	Tremco PUMA WC	20	45 min	80
Wear Coat #2	Tremco PUMA WC	28	45 min	57
Wear Coat #3	Tremco PUMA WC	28	45 min	57
Top Coat	Tremco PUMA TC	17-30	1 hr for vehicular traffic	53-90

*Recommended coverage rates are approximate. Varying sand-loading methods and surface profiles may increase the amount of material required to obtain uniform coverage rates.

Table 3: Temperature Chart

Temperature °F	Temperature °C	Grams or Ounces/Gallon
68 to 95	20 to 35	75 g or 2.75 oz of initiator/gal resin
50 to 68	10 to 20	150 g or 5.5 oz of initiator/gal resin
32 to 50	0 to 10	300 g or 11 oz of initiator/gal resin
14 to 32*	-10 to 0*	450 g or 16 oz of initiator/gal resin

*Below 14ºF (-10ºC), please contact Tremco Technical Service for further details.
Minimum 75g of initiator per gallon required.

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