
1. PURPOSE

- 1.1 The purpose of this document is to establish uniform procedures for applying TREMproof® PUMA in asphalt overlay 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 TREMproof PUMA 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. Depending on the condition of the concrete, one or more types of surface preparations may be required. Refer to ICRI's Technical Guideline No. 310.2R-2013 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repairs for best practices on selecting the appropriate method of concrete preparation. TREMproof PUMA applications require 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 CONCRETE SURFACES

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 4.5% as measured by a Tramex CME 4 Moisture Meter. 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 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 – In situ
- 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. Because jobsite conditions vary, it is recommended that you contact Tremco 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 to provide positive drainage. Drains should be detailed as instructed below:

- Cut a 1/4" wide x 1/2" 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, solvent washing and/or 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

Recommended materials and their use are as follows:

Dymonic® 100: A one-part, moisture-curing, gun grade polyurethane sealant for use in sealing cracks, control joints, drain detailing, and in forming cants.

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

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.

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

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

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

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 wearing course that can also be used with sand to level out uneven areas in the concrete.

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 TREMproof PUMA 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 reactive catalyst in the form of a white powder used to cure all resins of TREMproof PUMA.

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

Aggregate: 0.3 to 0.6 mm (30-50 mesh)-sized silica sand is used in the primer. 2.3 to 3.4 mm-sized silica sand is used for 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 nonmoving 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.

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 concrete surface.) Proper depth of sealant is as follows:

- For joints 1/4" (6.4 mm) to 1/2" (12.7 mm) wide, the width to depth ratio should be equal.
- Joints 1/2" (12.7 mm) wide or greater that are not expansion joints 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. A full line of expansion joint solutions is available from Tremco Construcitons Products Group companies. For treatment of expansion joints, contact your local Tremco Sales Representative.
- 5.4 Allow sealant to cure overnight.

6. PRIMING CONCRETE SURFACE

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

Note: For projects with vapor drive, caused by moisture in concrete, contact Tremco Technical Service.

- 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 – 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 20 ft²/gal to yield 80 wet mils (2.0 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. WEAR COAT APPLICATION

- 9.1 Mix Tremco PUMA WC for 1 to 2 min prior to the addition of Tremco PUMA Filler Powder or Tremco PUMA Initiator+.
- 9.2 Thoroughly mix Tremco PUMA Filler Powder and Tremco PUMA WC at a ratio of (1) 55 lb bag of Filler Powder to (6) Gallons of PUMA WC prior to the addition of Tremco PUMA Initiator+.
- 9.3 Tremco PUMA WC is thoroughly mixed together with the Tremco PUMA Initiator+ in accordance with Table 3 and is based on the amount of Tremco PUMA WC before the addition of Tremco PUMA Filler Powder. Amount of Tremco PUMA Initiator+ is dependent on the ambient temperature. Please see Table 3 for addition amounts.
- 9.4 Apply Tremco PUMA WC at 53 ft²/gal to yield 30 mils (0.6 mm) thick to the entire area. The recommended method of application is with a roller or soft squeegee.
- 9.5 Immediately following the application of Tremco PUMA WC, broadcast to refusal 2.3 to 3.5 mm-sized silica sand into the wear coat at a rate of 7 to 9 lb/10 ft².

10. TACK COAT APPLICATION

- 10.1 Sweep and vacuum any excess aggregate from the cured PUMA WC.
- 10.2 Apply tack coat according to manufacturer's instructions to the cured and fully sanded Tremco PUMA WC before application of asphalt overlay.

11. CLEAN UP

- 11.1 Immediately clean all adjacent areas to remove any stains or spills with Tremco PUMA Cleaner before material cures.
- 11.2 Immediately clean tools or equipment with Tremco PUMA Cleaner to remove curing material. Intermittent cleaning during application is recommended.
- 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 (2.2 M²/L) will yield a mil thickness of 17 wet mils.

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

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

Tremco PUMA BC, BC LM or BC R: When applied at 20 ft²/gal (0.5 M²/L) will yield a mil thickness of 80 wet mils.

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.

Tremco PUMA WC: When applied at 53 ft²/gal (1.3 M²/L) will yield a mil thickness of 30 wet mils.

Tremco PUMA Filler Powder: Ratio of Tremco PUMA Filler Powder to Tremco PUMA WC is (1) 55-lb. bag of Filler Powder to (6) gallons of PUMA WC.

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

Aggregate: Apply 30-50 mesh silica sand at a rate of 0.7 lb/10 ft² immediately after the Tremco PUMA Primer application. Apply 2.3 to 3.4 mm-sized silica sand at a rate of 7 to 9 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 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	80	45 min	20
Wear Coat	Tremco PUMA WC w/ Tremco PUMA Filler Powder	30	1 hr	53

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 or BC LM	80	45 min	20
Wear Coat	Tremco PUMA WC w/ Tremco PUMA Filler Powder	30	1 hr	53

TABLE 3: Temperature Chart

TEMPERATURE °F	TEMPERATURE °C	Tremco PUMA Initiator + GRAMS OR OUNCES/GALLON
68 to 95	20 to 35	37.5 g or 1.38 oz of initiator/gal resin
50 to 68	10 to 20	75 g or 2.75 oz of initiator/gal resin
32 to 50	0 to 10	150 g or 5.5 oz of initiator/gal resin
14 to 32	-10 to 0	225 g or 8 oz of initiator/gal resin

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

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tremcosealants.com | 800.321.7906



Construction Products Group

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