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. Scope
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 Repair for best practices on selecting the appropriate method of concrete preparation. TREMproof PUMA 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
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 the concrete construction and job site location, additional concrete testing may be required. Please contact your local Tremco Sales or Technical Representative for specific design requirements prior to installing materials.

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 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs
• ASTM F2659- Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete Using a Non-Destructive Electronic Moisture Meter

3.3 All concrete surfaces must be shot/track blasted 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.

4. Jobsite Materials
4.1 Recommended materials 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 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 32º F (0º C).
Tremco PUMA BC T: A thixotropic version of Tremco PUMA BC, used for ramps, vertical rises, 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 modified coating used with sand to level out uneven areas in the concrete.

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 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 benzoyl peroxide-based initiator used to react to all components of TREMproof PUMA.

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

Aggregate: 0.4 to 0.8 mm (20-40 mesh)-sized silica sand is used in the primer. 2.3 to 3.4 mm-sized silica sand is used for the wear coat.

TREMprime HR Primer: A solvent-based modified bituminous primer for use in preparing porous and non-porous surfaces for application of hot-applied asphaltic fluids.

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 moving joints when applied at the recommended thickness, noted in Section 8. Tremco PUMA BC and BC LM are 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 the 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:

5.2a. For joints 1/4" (6.4 mm) to 1 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
Note: When detailing cracks with Tremco PUMA BC or BC LM, the surface must be primed but cracks must not be filled with Tremco PUMA Primer.

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

6.2 Mix Tremco PUMA Primer thoroughly together with Tremco PUMA Primer 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, followed by a roller to backroll the material. Application below 17 wet mils will result in the primer not curing.

6.4 Once primer is rolled out evenly, lightly broadcast 20 - 40 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 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.

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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.

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 to 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 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 at 20 ft²/gal to yield 80 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 or Tremco PUMA BC LM, or Tremco PUMA BC R immediately to release all air bubbles from the coating.

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 (0.64 mm) thick to the entire area. The recommended method of application is with a roller or soft squeegee.

9.4 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 Apply TREMprime HR Primer by brush, short nap roller or airless spray system at 150 to 300 ft²/gal to the entire area. Coverage rates will vary depending on the size of aggregate. When spraying TREMprime HR primer, take necessary precautions to prevent overspray. Full coverage is necessary.

10.2 TREMprime HR Primer should be left to cure a minimum of 12 hours. Blow off the surface of the TREMprime HR Primer to remove any unseen condensation/moisture prior to the asphaltic pavement application. Contact your Tremco Technical Representative should an alternate tack coat be entertained.

Do not over-prime. Application of excessive amounts will increase cure time and may lead to installation issues such as slippage, poor adhesion or staining/bleed-through.

11. Clean Up

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

11.2 Immediately clean tools or equipment with Tremco PUMA Cleaner after the material cures.

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:

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

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

Tremco PUMA BC T: For a 1 inch cant bead at a 45° angle in a horizontal to vertical transition, 1 gal of Tremco PUMA BC T for every 38.5 ft (11.74M) 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.

Aggregate: Apply 20-40 mesh silica sand at a rate of 0.7 lb/10 ft² immediately after the Tremco PUMA Primer application. Apply 2.3mm to 3.4mm sized silica sand at a rate of 7 to 9 lb/10 ft² immediately after the Tremco PUMA WC application.

TREMPprime HR Primer: Applied at 150 to 300 ft²/gal to the entire area.

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 recoating 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 temperatures below 115°F.
Table 1: Quick Reference Application Chart

<table>
<thead>
<tr>
<th>Layer</th>
<th>Product</th>
<th>Wet Mils</th>
<th>Cure Time</th>
<th>Square Feet Per Gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primer</td>
<td>Tremco PUMA Primer</td>
<td>17</td>
<td>15 min</td>
<td>90</td>
</tr>
<tr>
<td>Base Coat</td>
<td>Tremco PUMA BC or BC LM</td>
<td>75</td>
<td>45 min</td>
<td>20</td>
</tr>
<tr>
<td>Wear Coat</td>
<td>Tremco PUMA WC</td>
<td>30</td>
<td>1 hr</td>
<td>64</td>
</tr>
</tbody>
</table>

Table 2: Quick Reference Application Chart (Ramps)

<table>
<thead>
<tr>
<th>Layer</th>
<th>Product</th>
<th>Wet Mils</th>
<th>Cure Time</th>
<th>Square Feet Per Gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primer</td>
<td>Tremco PUMA Primer</td>
<td>17</td>
<td>15 min</td>
<td>90</td>
</tr>
<tr>
<td>Base Coat</td>
<td>Tremco PUMA BC R</td>
<td>80</td>
<td>45 min</td>
<td>20</td>
</tr>
<tr>
<td>Top Coat</td>
<td>Tremco PUMA WC</td>
<td>45</td>
<td>1 hr</td>
<td>64</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Temperature °F</th>
<th>Temperature °C</th>
<th>Grams or ounces/gallon</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 to 95</td>
<td>20 to 35</td>
<td>75 g or 2.75 oz of initiator/gal resin</td>
</tr>
<tr>
<td>50 to 68</td>
<td>10 to 20</td>
<td>150 g or 5.5 oz of initiator/gal resin</td>
</tr>
<tr>
<td>32 to 50</td>
<td>0 to 10</td>
<td>300 g or 11 oz of initiator/gal resin</td>
</tr>
<tr>
<td>14 to 32°*</td>
<td>-10 to 0°*</td>
<td>450 g or 16 oz of initiator/gal resin</td>
</tr>
</tbody>
</table>

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