
Special Specification 4110

Railroad Bridge Waterproofing Membrane



1. DESCRIPTION

Furnish and install a cold liquid-applied elastomeric membrane on the deck of a railroad underpass structure.

2. MATERIALS

2.1 **Membrane.** Membrane must be a spray-applied, 100% solids, rapid cure, high build system meeting AREMA Cold Liquid–Applied Elastomeric Membrane, Chapter 8, Section 29 and this specification. The minimum dry film thickness must not be less than 80 mils.

2.2 **Primer.** As required by the membrane manufacturer.

2.3 Product Manufacturers.

Provide material from an approved vendor listed on the plans meeting the requirements shown in Table 1.

1. Bridge Preservation LLC.
686 South Adams Street
Kansas City, KS 66105
(913) 321-9000
info@bridgepreservation.com
www.bridgepreservation.com
2. D.S. Brown
300 East Cherry Street
North Baltimore, OH 45872
(419) 257-3561
dsb@dsbrown.com
http://dsbrown.com

Table 1 - Cold Liquid-Applied Elastomer Requirements

Property	Requirements	Test Method
Water Vapor Transmission	Equal to or less than 0.2 perms. which is 0.1 grains/ft ² /h	ASTM E96, procedure B or BW
Elongation at Break	Greater than 250%	ASTM D638
Minimum Tensile Strength	930 psi	ASTM D639
Adhesion to Steel	290 psi	ASTM D4541
Adhesion to Concrete	100 psi	ASTM D4541
Crack Bridging	Meet the low temperature flexibility and crack bridging requirements of 10 cycles of 1/8 in. at -15°F	ASTM C836
Gel Time	Less than 10 Sec.	
Tack Free	Less than 30 Sec.	
Open to Light Traffic	1 hr.	
Shore Hardness	Greater than 40 D	ASTM D2240
Tear Strength (Die C)	Greater than 390 pli	ASTM D624
Tabor Abrasion, mg. Loss (1000 gm, 1000 rev, H-18)	Less than 250	ASTM D4060
North American Ballast Impact Test	Pass	2,000,000 cycles

2.4 **Certification.** Manufacturer must furnish certification from an approved independent testing agency that the supplied material meets designated test performance requirements. Manufacturer, if requested, must supply the infrared spectrometer analysis (finger print) of the product from which the tests were conducted. The owner may, for quality assurance purposes, wish to corroborate material tested versus material received by means of sampling and further Infrared Spectrometer mapping.

2.5 **Submittals.**

- Product datasheets and installation specification.
- SDS for products used in the work.
- Substrate preparation requirements.
- Shop drawings prepared specifically for this project showing locations and extent of waterproofing, tie-in details, and termination details.
- Installer Approval from Manufacturer: Submit certificate signed by the Manufacturer certifying that Installer is an approved installer of Manufacturer's products. Submit reference list from the waterproofing installer ("Installer") that include specific projects previously completed which have utilized the principal materials submitted for this project. The list must include rail references.
- Samples of proposed membrane. Minimum of 2 4-in. square samples that are representative of the finished surface, thickness, texture, and color of proposed membrane system.

- 2.6 **Quality Assurance.** The manufacturer's authorized representative for the contractor must be on the jobsite at all times to observe the installation of each portion of the membrane system. The on-site representative upon consultation with the Engineer, may suspend any item of work that is suspect and does not meet the requirements of this specification or manufacturer. Resumption of work will only occur after the on-site representative and Engineer are satisfied that appropriate remedial action has been taken by Installer.
- 2.6.1 **Installer Qualifications.** Engage an experienced Installer who is authorized in writing by Manufacturer for installation of the specified waterproofing system. The Installer must be an established firm regularly engaged in satisfactory installations of similar materials on projects similar in nature and complexity.
- 2.7 **Pre Installer Meeting.** Installer must schedule and hold a pre-installation meeting to review installation schedule, shut down, and restricted access procedures. Indicate project owner's representative, manufacturer's on-site representative and installer's superintendent.

3. CONSTRUCTION

- 3.1 **Installation.** Installer must follow the manufacturer's published procedures for preparation, delivery, storage, handling and installation.

Manufacturer's on-site representative must inspect and approve the surface prior to application of primer. The weather conditions, including temperature and dew point must meet the manufacturer's requirements for installation of the product.

Apply primer and membrane coat in accordance with manufacturer's published data.

Manufacturer's on-site representative must record all readings and test results into a daily quality control log. The log must include a record of environmental condition readings at least once every four (4) hr., when ambient conditions significantly change, or immediately prior to Installer performing new task (prior to installing primer, primer to installing base membrane, etc.), whichever is more frequent. The log must also include a record of material batch numbers, processing information, and quantity of each material used. A copy of each log must be submitted to the Engineer at the end of each day.

Perform dry film thickness test of the membrane in accordance with SSPC-PA2 or SSPC-PA9.

- If on-site representative uses magnetic test equipment, testing must be performed in accordance with SSPC-PA2 Measurement of Dry Coating Thickness with Magnetic Gages.
- If on-site representative uses ultrasonic test equipment, testing must be performed in accordance with SSPC-PA9 Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages.
- Destructive or stroke per gal. methods to verify dry film thickness may be acceptable if submitted and approved during the submittals stage.
- Repair destructive testing areas by respraying.

Perform adhesion strength testing of primer bond to substrate and membrane bond to primer in accordance with ASTM D4541. On concrete surfaces, the minimum adhesion value is 150 psi or failure in the concrete. On metal surfaces, the minimum adhesion value is 300 psi.

Manufacturer's on-site representative must perform visual inspections throughout installation process. Holes or other defects in the waterproofing system must be marked and repaired.

Cure, protect and clean the membrane in accordance with manufacturer's published data.

4. MEASUREMENT

Work and accepted materials of "Railroad Bridge Waterproofing Membrane" will be measured by the Lump Sum.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Railroad Bridge Waterproofing Membrane" which price will be full compensation for surface preparation, furnishing and placing all materials and for all labor, tools, equipment, and incidentals necessary to complete the work.