

Section 888—Waterproofing Membrane Materials

888.1 General Description

This section includes the requirements for waterproofing materials that serve as a barrier between the concrete bridge deck and the overlay of asphaltic concrete. The membranes included herein are for bridge decks, pavement joints and cracks, and retaining wall joints.

888.1.01 Related References

A. Standard Specifications

[Section 106—Materials Certification](#)

B. Referenced Documents

ASTM D 146

ASTM D 412 (Die C)

ASTM D 882 (Method A)

ASTM E 96 Procedure B

ASTM E 154

[GDT 69](#)

[QPL 22](#)

888.2 Materials

888.2.01 Waterproofing Membrane Material for Bridge Decks

A. Requirements

1. Use a water-resistant primer adhesive that is supplied by the manufacturer of the membrane or other approved equal compatible with the membrane.
2. Use an approved sealant compatible with the membrane and primer as mastic.
3. Provide certified results from the manufacturer of the membrane system of the tests in [Subsection 888.2.01.C](#).
4. Re-submit the certified test results each time the product's formulation is changed.
5. For a list of sources, see [QPL 22](#).

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the membrane system with [GDT 69](#) and meet these requirements:

Characteristic	Requirement
Bond	No break in bond, curled edges, bubbles, or pinholes
Water permeability	Above 500,000 ohms/ft ² (5.4 megaohms/m ²), measured indirectly in ohms per square foot (meter)
Heat resistance	Withstand 300 °F (150 °C) and retain an electrical resistance above 500,000 ohms/ft ² (5.4 megaohms/m ²)
Resistance to aggregate	Retain an electrical resistance above 500,000 ohms/ft ² (5.4 megaohms/ m ²) after granite

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Characteristic	Requirement
penetration	chip creep damage test for 20 hours at 140 °F (60 °C)
Resistance to freeze-thaw cycles	After 10 cycles of freezing and thawing, the test membrane shall have the tensile strength of similar samples of the same membrane unfrozen
Chemical resistance	Remain intact and in good condition when immersed for 30 days in each of the following inorganic acids, alkalies, and salts: <ul style="list-style-type: none"> • 5% sulfuric acid • 5% hydrochloric acid • 5% sodium hydroxide • 25% sodium chloride • 25% calcium chloride
Resistance to shear	Have a shear resistance of 100 lbs (45 kg), or pass the Department’s evaluation of where and how the shear failure took place.
Waterproofing effectiveness	The membrane system does not displace; retain an electrical resistance above 500,000 ohms/ft ² (5.4 megohms/m ²)

See [OPL 22](#) for membranes that meet the requirements of this Specification.

888.2.02 Waterproofing Membrane for Pavement Joints and Cracks

A. Requirements

1. Use waterproofing membrane that incorporates a high-strength, heat-resistant woven fabric embedded in a layer of self-adhesive rubberized asphalt.

Ensure that the membrane contains at least 14 percent synthetic rubber by weight.

Ensure that the combined amount of asphalt and plasticizer oils is at least 60 percent of the total weight of the membrane. The total weight of the membrane for this purpose does not include the weight of any reinforcement or fabric.

2. Get primer from the membrane manufacturer or some approved equal compatible with the membrane.
3. Use membrane with the following physical properties:

Thickness of rubber-asphalt membrane	0.065 in (1.65 mm) minimum
Water permeability	500,000 ohms/ft ² (5.4 megaohms/m ²)
Breaking factor	50 lbs/in (8.75 kN/m) minimum
Heat resistance	300 °F (150 °C) minimum without membrane damage and retain minimum 500,000 ohms/ft ² (5.4 megaohms/ m ²) resistivity
Puncture resistance (mesh)	200 lbs (900 N) minimum
Elongation of mesh	15 to 60% minimum
Pliability 1/4 in (6 mm) Mandrel 180° bend at – 15 °F, ± 2 °F (-26 °C, ± 1 °C)	No cracks in the membrane

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Test as follows:

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Test	Method
Water permeability	GDT 69
Breaking factor	ASTM D 882 (Method A)
Heat resistance	GDT 69
Puncture resistance	ASTM E 154
Elongation of mesh	ASTM D 882
Pliability ¼ in (6 mm) mandrel, 180° bend at – 15 °, ± 2 °F (-26 °, ± 1 °C)	ASTM D 146

- See [QPL 22](#) for membranes that meet the requirements of this Specification.
- The Department will remove from the list any membrane that meets this Specification but fails in actual use.

D. Materials Warranty

General Provisions 101 through 150.

888.2.03 Waterproofing Membrane for Retaining Wall Joints

A. Requirements

- Use these waterproofing barriers for concrete and other masonry surfaces at locations shown on the plans.
- Use waterproofing membrane that incorporates a cross-laminated, high density polyethylene film, adhered to a flexible, self-adhesive, rubberized asphalt.
- Get primer from the membrane manufacturer or an approved equal compatible with the membrane.
- Use membranes that meet the following requirements when tested with the required test method:

Thickness	0.060 in (1.5 mm) minimum
Thickness of polyethylene film	0.004 in (100 µm) minimum
Tensile strength	250 psi (1.7 MPa) minimum
Ultimate elongation	200% minimum
Permeance-perms grains/ft ² /hr/in Hg (ng/s · m ² · Pa)	0.1 (5.7) maximum
Cycling over crack at –15 °F (–26 °C)	No effect 100 cycles
Puncture resistance	40 lbs (180 N) minimum
Pliability (180° bend over 1 in (25 mm) mandrel at –25 °F (–32 °C))	No cracks

- Submit a certification from the manufacturer that the physical properties of the membrane meet the Specification according to [Subsection 106.05, “Materials Certification.”](#)

B. Fabrication

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C. Acceptance

Test as follows:

Test	Method
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Tensile strength	ASTM D 412 (Die C)
Ultimate elongation	ASTM D 412 (Die C)
Permeance	ASTM E 96 Procedure B
Puncture resistance	ASTM E 154
Pliability	ASTM D 146
Cycling over crack	Apply and roll membrane across two primed concrete blocks with no separation between the blocks. Open and close the crack from 0 to 1/4 in (6 mm).

See [QPL 22](#) for membranes that meet the requirements of this Specification.

D. Materials Warranty

General Provisions 101 through 150.