Designation: D 1854 – 02

Standard Specification for Jet-Fuel-Resistant Concrete Joint Sealer, Hot-Applied Elastic Type[1]

This standard is issued under the fixed designation D 1854; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers a jet-fuel-resistant concrete joint sealer, of the hot-applied elastic type, intended for use in sealing joints in concrete pavement in areas exposed to jet fuel spillage. It may be found useful in industrial areas where similar conditions exist (see Appendix X1).

1.2 The values stated in SI units are to be regarded as standard. The values in parentheses are for information only. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance to the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precaution statements are given in Appendix X1.

2. Referenced Documents

2.1 *ASTM Standards:*

D 5167 Practice for Melting of Hot-Applied Joint and Crack Sealant and Filler for Evaluation[2]

D 5249 Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints[2]

D 5329 Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphaltic and Portland Cement Concrete Pavements[2]

3. General Requirements

3.1 The joint sealer shall be composed of a mixture of materials that will form a resilient and adhesive compound capable of effectively sealing joints in concrete against the infiltration of moisture and foreign material throughout repeated cycles of expansion and contraction with temperature changes, and that will not flow from the joint or be picked up by vehicle tires at summer temperatures. These characteristics shall be maintained in the presence or absence of jet fuel or similar solvents. The material shall be capable of being brought to a uniform pouring consistency suitable for completely filling the joints without inclusion of large air holes or discontinuities, and without damage to the material. On sawed joints, special precautions and designs will be required to accept materials covered by this specification.

4. Physical Requirements

4.1 *Maximum Heating Temperature*—This is the maximum temperature to which the material may be heated and still conform to all the requirements specified. It shall be at least 11°C (20°F) higher than the manufacturer's recommended pour point temperature and shall be provided the testing agency prior to testing (see Appendix X1).

4.2 *Nonimmersed Penetration*, at 25 ± 0.1°C (77 ± 0.2°F) and 150 g for 5 s shall be not more than 130.

4.3 *Immersed Penetration*, at 25 ± 0.1°C (77 ± 0.2°F) and 150 g for 5 s shall be not more than 155.

4.4 *Penetration Difference*, between nonimmersed and immersed penetrations shall be not more than 25.

4.5 *Solubility*—The gain or loss in weight on soaking in test fuel shall be not more than ± 2.0 %, and there shall be no apparent defects during the soaking period that will affect the material as a sealing compound.

4.6 *Flow*, after 5 h at 60 ± 1°C (140 ± 2°F) shall be not more than 30 mm.

4.7 *Nonimmersed Bond*— After three cycles at -18 ± 1°C (0 ± 2°F), not more than one specimen out of three shall develop any crack, separation, or other openings in the sealing compound or between the sealing compound and the mortar blocks that at any point is over 6 mm (¼ in.) deep, measured perpendicularly to the side of the sealing compound showing the defect.

4.8 *Fuel-Immersed Bond*— After soaking in test fuel, as specified, not more than one of the three specimens tested on extension at -18 ± 1°C (0 ± 2°F) for three cycles shall show complete cohesive failure of the material and the gross area of bare concrete exposed on the face of any one block shall not

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[2] *Annual Book of ASTM Standards*, Vol 04.03.

exceed an area of 1.6 cm^2 (¼ $in.^2$).

5. Sampling and Heating

5.1 Samples for testing shall each consist of not less than a 5-kg (10-lb) sample from each batch of the joint sealer. A batch shall be considered as all finished material that was manufactured simultaneously or continuously as a unit between the time of compounding and the time of packaging or placing in shipping containers; each package or container shall be marked properly to indicate clearly the batch of which it forms a part. The material shall be sampled in accordance with Practice D 5167. The sample portion for testing, which is added to and heated in the melter, shall weigh approximately 1200 g.

5.2 *Heating*—The oil bath in the melter shall be to the maximum heating temperature of the sealant being tested. Add the sample according to the instructions provided in Practice D 5167. After the sample has been added, the oil bath temperature may be increased to not more than 20°F (11°C) higher than the maximum heating temperature, to raise the sealant temperature to the maximum heating temperature within the time required in Practice D 5167. Heating at the maximum heating temperature shall continue until 90 min have elapsed since the last segment was added to the melter and then the test specimens shall be immediately poured.

6. Test Methods

6.1 *Specimen Curing*— All specimens shall be cured at standard laboratory atmospheric conditions specified in Test Methods D 5329 for 24 ± 2 h prior to beginning any testing.

6.2 *Cone Penetration*:

6.2.1 *Nonimmersed*— Conduct the test in accordance with Test Methods D 5329.

6.2.2 *Immersed*—Conduct the test in accordance with Test Methods D 5329 except immerse the specimen for 48 h at a temperature of 38 ± 1°C (100 ± 2°F).

6.3 *Solubility*—Test the specimen according to Test Methods D 5329.

6.4 *Flow*—Test the specimen at 60 ± 1°C (140 ± 2°F) for 5 h in accordance with Test Methods D 5329:

6.5 *Bond*:

6.5.1 *Bond, Nonimmersed*—Conduct the test in accordance with Test Methods D 5329. The bond specimen shall be 25 ± 0.1 mm (1.000 ± 0.005 in.) in width, extended 50 %, and tested at -18 ± 1°C (0 ± 2°F) for three cycles. Testing shall be completed within 5 days of the start of testing.

6.6 *Bond, Fuel-Immersed*—The test shall be conducted in accordance with Test Methods D 5329 and the procedures listed in 6.5 except an immersion period of 48 ± 2 h at 38 ± 1°C (100 ± 2°F) shall be used.

7. Packaging and Marking

7.1 The joint sealant material shall be packaged in 5-gal (18.9-L) sealed containers. Each container shall be clearly marked with the name and address of the manufacturer, the trade name of the sealant, specification designation, the manufacturer's batch or lot number, recommended pouring temperature, safe heating temperature, and application instructions.

8. Keywords

8.1 hot-applied; jet-fuel; joint sealant; pavement; portland cement concrete

APPENDIX

(Nonmandatory Information)

X1. PRECAUTIONS ON USE AND APPLICATION OF JET-FUEL-RESISTANT JOINT SEALER, HOT-POURED ELASTIC TYPE

X1.1 Some, if not all, of the known materials conforming to this specification may be damaged by heating to too high a temperature, reheating, or by heating for too long a time. Care should be exercised to secure equipment for heating and application that is suitable for the purpose. The material should be heated in a kettle or melter, constructed as a double boiler, with the space between the inner and outer shells filled with oil or other heat transfer medium. Positive temperature control, mechanical agitation, and recirculating pumps should be provided. Other methods of indirect heating satisfactory to the engineer may be used. Direct heating must not be used. As a means of ascertaining whether or not the material covered by this specification is being or has been damaged in the field as a result of overheating, reheating, or prolonged heating, flow panel specimens may be prepared periodically by drawing off sealant directly from the melter-applicator during sealing operations and then tested for flow according to Test Methods D 5329 for materials covered by this specification. Flow in excess of 30 mm would indicate damage to material caused by improper heating procedures.

X1.2 Pavement joints in new construction for application of material covered by this specification should be dry, clean of all scale, dirt, dust, curing compound, and other foreign matter. The sidewalls of the joint space to be sealed should then be thoroughly sandblasted, blown clean of loose sand by high-pressure air, and sealed by use of the melter-applicator described in X1.1.

X1.3 When material covered by this specification is used for maintenance or resealing of joints that have previously contained either similar or dissimilar sealieng material, it is recommended that the joint be dry, cleaned thoroughly with a plow, router, wire brush, concrete saw, or other suitable tool or tools designed for the purpose of neatly cleaning pavement joints. Loose material should be blown out. The sidewalls of the joint space to be sealed should be thoroughly sandblasted,

blown free of loose sand with high-pressure air, and then sealed with material by use of the melter-applicator described in X1.1.

X1.4 The use of a backup material or bond breaker in the bottom of the joint to be filled with material covered by this specification is recommended to control the depth of sealant and achieve the desired shape factor, and to support the sealant against indentation and sag. Backup materials and bond breakers should be compatible with the material, should not adhere to the sealant, should be compressible without extruding the sealant, and should recover to maintain contact with the joint faces when the joint is open. Due to the elevated temperatures of the application of material covered by this specification, care should be taken in the selection of suitable backup materials. The backer material shall meet the requirements of Specification D 5249.

X1.5 Care should be practiced in the application of material covered by this specification to avoid overfilling of the joint space. Joints should be filled in a neat workmanlike manner from flush to 3⁄16 in. (or 5 mm) below the adjacent pavement surface.