Designation: D 1190 – 97

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

This standard is issued under the fixed designation D 1190; 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 joint sealants of the hot-poured type intended for use in sealing joints and cracks in portland cement concrete and asphaltic concrete pavements.

1.2 This standard does not purport to cover the properties required of sealants for use in areas of portland cement concrete pavement subject to jet fuel or other fuel spillage, such as aircraft refueling and maintenance areas.

1.3 The values in inch-pound units are the standard.

2. Referenced Documents

2.1 *ASTM Standards:*

D 1985 Practice for Preparing Concrete Blocks for Testing Sealants, for Joints and Cracks[2]

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 sealant 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 temperature. The material shall be capable of being brought to a uniform application consistency suitable for completely filling the joints without inclusion of large air holes or discontinuities and without damage to the material.

4. Physical Requirements

4.1 *Pour Point* shall be at least 20°F (11°C) lower than the safe-heating temperature, which is the maximum temperature to which the material may be heated and still conform to this specification's requirements.

4.2 *Cone Penetration, Non-immersed* at 77°F (25°C), 150 g, 5 s, shall not exceed 90.

4.3 *Flow*—at 140°F (60°C) shall not exceed 5 mm when tested for 5 h.

4.4 *Bond, Non-immersed*—The sealant shall be tested at 0°F (−17.8°C) for five complete cycles. The development at any time during the test procedure of a crack, separation, or other opening that at any point is over ¼ in. (6.4 mm) deep, in the sealant or between the sealant and the concrete block, shall constitute failure of the test specimen. The depth of the crack, separation, or opening shall be measured perpendicular to the side of the sealant showing the defect. At least two test specimens in a group of three representing a given sample of sealant shall meet this requirement for bond.

5. Sampling and Heating

5.1 *Sampling*

5.1.1 Samples may be taken at the plant or warehouse prior to delivery or at the time of delivery, at the option of the purchaser. If sampling is done prior to shipment, the inspector representing the purchaser shall have free access to the material to be sampled. The inspector shall be afforded all reasonable facilities for inspection and sampling which shall be conducted so as not to interfere unnecessarily with the operation of the works.

5.1.2 Samples shall consist of one of the manufacturer's original sealed containers selected at random from the lot or batch of finished material. A batch or lot 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.

5.1.3 Obtain the sealant portion for testing from the selected manufacturer's original sealed container in accordance with Practice D 5167. The sample portion added to and heated in the melter shall weigh 800 ± 50 g.

5.2 *Heating*—Heat the material in accordance with Practice D 5167.

5.2.1 The oil bath in the melter shall be heated to a temperature between the sealant's safe heating temperature and 75°F (41.7°C) above the sealant's safe heating temperature. (Never allow the oil temperature to exceed 550°F (288°C)).

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[1] This specification is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.33 on Formed-In-Place Sealants for Joints and Cracks in Pavements.

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

Add the sealant to the melter according to the instructions in Practice D 5167. After the sample has been added to the melter, regulate the oil temperature within the above listed temperature limits while raising the sealant's temperature to the manufacturer's recommended pouring temperature within the required 1 h of time, as stated in Practice D 5167. Pour samples for testing immediately after reaching the recommended pouring temperature.

6. Test Methods

6.1 *Specimen Curing*—Cure all specimens at standard laboratory conditions for 24 ± 4 h as specified in Test Methods D 5329 prior to beginning any testing.

6.2 *Cone Penetration, Non-immersed*—Use Test Method D 5329 for cone penetration, non-immersed.

6.3 *Flow*—Use Test Method D 5329 for flow.

6.3.1 Test the specimen at 140 ± 2°F (60 ± 1°C) for 5 h.

6.4 *Bond, Non-immersed*—Use Test Method D 5329 for bond, non-immersed.

6.4.1 Prepare six 1 by 2 by 3 in. concrete blocks according to Practice D 1985.

6.4.2 After final scrubbing and blotting specified in Test Methods D 5329, air dry the blocks standing on their 1 by 2 in. ends at standard laboratory conditions for 24 ± 2 h. There shall be no free moisture on any of the block surfaces when bond specimens are prepared. If necessary, blotting may be done with an oil-free, clean, soft absorbent cloth or paper.

6.4.3 Immediately after conditioning, assemble the blocks with spacers specified in Test Methods D 5329 so the opening between the blocks forms a cured sealant block which is 1.000± 0.005 in. wide.

6.4.4 After conditioning, trim off the excess material and condition the specimens at 0 ± 2°F (−17.8 ± 1°C) for not less than 4 h, then immediately extend ½ in. at 0.125 in./h. This results in a 50 % extension.

6.4.5 Recompress and re-extend for four additional cycles for a total of five cycles as described in Test Methods D 5329. The five required cycles shall be completed within a 7 day period.

7. Packaging and Marking

7.1 The sealing compound shall be delivered in the manufacturer's original containers. Each container shall be legibly marked with the name of the manufacturer, the trade name of the sealant, the manufacturer's batch number or lot, the pouring temperature, and the safe heating temperature.

8. Keywords

8.1 elastic type; hot-applied; joint sealant

APPENDIX

(Nonmandatory Information)

X1. PRECAUTIONS ON USE AND APPLICATION OF HOT-APPLIED SEALANT, FOR JOINTS AND CRACKS IN ASPHALTIC AND PORTLAND-CEMENT CONCRETE PAVEMENTS

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. Thermostatic control for the heat transfer medium shall be provided and shall have sufficient sensitivity to maintain sealant temperature within the manufacturer's specified application temperature range. Temperature indicating devices shall have intervals no greater than 5°F (2.8°C) and shall be calibrated as required to ensure accuracy. The melter shall have a continuous sealant agitation and mixing system to provide uniform viscosity and temperature of material being applied. If equipped with an application system to deliver sealant to the pavement, the melter shall incorporate a recirculation pump or other means of maintaining sealant temperature in the delivery system. Sealant that has been damaged due to overheating, reheating or prolonged heating may experience poor adhesion, softening or bleeding, difficult application, or jelling in the melter. 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 20 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 cleaned, blown free 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 sealing 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 cleaned, 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 backer 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. Backer materials and bond breakers should be compatible with the material, should be compressible without extruding the sealant, and should recover to maintain contact with the joint facefnrs when the joint is open. Due to the elevated temperature of the application of material covered by this specification, care should be taken in the selection of suitable backer materials. Refer to Specification D 5249 for recommended backer materials.

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. (5 mm) below the adjacent pavement surface.