
Standard Method of Test for

Measuring Adhesion of Hot-Poured Asphalt Crack Sealant Using Direct Adhesion Tester

AASHTO Designation: T 370-22¹

Technically Revised: 2022

Technical Subcommittee: 4e, Joints and Bearings



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. The direct adhesion test is used to determine the adhesion strength of hot-poured asphalt crack sealant at the application temperature as specified in M 338 and PP 85.
- 1.2. The adhesion test is a test of fracture. The object of the test is to apply tensile forces to the interface between sealant and aluminum end pieces. Sealant is confined between two half-cylindrical aluminum end pieces. The applied force and displacement can be recorded as functions of time. Energy required to break the bond can be calculated by measuring the area under the load-displacement curve. This energy can be considered a measure of bonding. In addition, the maximum force to failure can be reported as adhesion strength.
- 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 and follow appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.*
- 1.4. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*
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2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 338, Performance-Graded Hot-Poured Asphalt Crack Sealant
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
 - PP 85, Grading or Verifying the Sealant Grade (SG) of a Hot-Poured Asphalt Crack Sealant
 - R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - R 95, Accelerated Aging of Hot-Poured Asphalt Crack Sealant Using a Vacuum Oven
 - T 314, Determining the Fracture Properties of Asphalt Binder in Direct Tension (DT)
- 2.2. *ASTM Standards:*
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- D5167, Standard Practice for Melting of Hot-Applied Joint and Crack Sealant and Filler for Evaluation
- E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
- E77, Standard Test Method for Inspection and Verification of Thermometers
- E879, Standard Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements
- E1137/E1137M, Standard Specification for Industrial Platinum Resistance Thermometers

2.3. *International Electrotechnical Commission Standard:*

- IEC 60751:2008, Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. TERMINOLOGY

3.1. *Definitions:*

3.1.1. *adhesion*—the maximum force and energy required to separate hot-poured asphalt crack sealant from a standard substrate.

3.1.2. *hot-poured asphalt crack sealant*—hot-poured modified asphaltic material used in pavement cracks and joints.

Note 1—Based on the references, hot-poured asphalt crack sealant is typically applied at a temperature of 160°C or above.

4. SUMMARY OF METHOD

4.1. Hot-poured asphalt crack sealant material is homogenized, following the procedure given in ASTM D5167. For each test including four replicates, cut 40 g of sealant and heat to the manufacturer's recommended pouring temperature. Sealant will be poured in the mold placed between the two half-cylindrical aluminum end pieces. The mold confines the sealant at the bottom and between the two aluminum end pieces at the sides.

5. SIGNIFICANCE AND USE

5.1. This procedure is designed to measure the adhesion of hot-poured asphalt crack sealant to aggregate.

5.2. Hot-poured asphalt crack sealant must be homogenized (ASTM D5167) before measuring the adhesion by this method.

6. APPARATUS

6.1. *Direct Tension Test (DTT) Device*—The DTT system consists of two metal grips to hold the specimen, an environment chamber, a loading device, and a control and data acquisition system. The instrument must meet the requirements stated in T 314.

6.2. *Test Chamber*—A calibrated circulated temperature control system having a temperature range from –4 to –40°C. The insulated test chamber shall be capable of maintaining the set temperature within ±0.1°C.