
Standard Method of Test for

Polymer Content of Polymer-Modified Emulsified Asphalt Residue and Asphalt Binders

AASHTO Designation: T 302-22

Technically Revised: 2022

Technical Subcommittee: 2a, Emulsified Asphalts



American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This test method is used to determine the percent concentration of a Styrene-Butadiene-Rubber (SBR), Styrene-Butadiene (SB), or Styrene-Butadiene-Styrene (SBS) polymer in a polymer-modified asphalt binder or emulsified asphalt residue. By using the infrared spectrum and the principles of Beer's Law, the polymer content of the asphalt material can be determined.
- 1.2. *This standard involves hazardous materials, operations, or equipment. This standard does not purport to address all of the safety concerns 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.*
- 1.3. *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.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- M 231, Weighing Devices Used in the Testing of Materials
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
 - R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - T 59, Emulsified Asphalts
- 2.2. *ASTM Standards:*
- E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
 - E230/E230M, Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples
 - E879, Standard Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements

- E1137/E1137M, Standard Specification for Industrial Platinum Resistance Thermometers
- E2877, Standard Guide for Digital Contact Thermometers

2.3. *International Electrotechnical Commission Standards:*

- IEC 60584-1: 2013 Thermocouples - Part 1: EMF Specifications and Tolerances
- IEC 60751: 2008 Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. APPARATUS

3.1. *Balance*—Conforming to the requirements of M 231, Class G 1.

3.2. *Containers*—For blending the asphalt material with polymer–metal 1-pt (0.47-L) cans with lids are suitable.

3.3. *Variable-Speed Shearing Mixer.*

3.4. *Heating Coil with Variable Rheostat.*

3.5. *Oven*—An oven of sufficient size, capable of maintaining a uniform temperature of up to $170 \pm 1^\circ\text{C}$ ($338 \pm 1.8^\circ\text{F}$). Oven(s) shall be capable of operation at the temperatures required, as corrected, if necessary, by standardization. More than one oven may be used, provided each is used within its proper operating temperature range. The thermometer for measuring the temperature of materials shall meet the requirements of M 339M/M 339 with a temperature range of at least 20 to 170°C (68 to 338°F), and an accuracy of $\pm 0.25^\circ\text{C}$ ($\pm 0.45^\circ\text{F}$) (see Note 1).

Note 1—Thermometer types suitable for use include ASTM E1 mercury thermometers; ASTM E879 thermistor thermometer; ASTM E1137/E1137M Pt-100 RTD platinum resistance thermometer, Class A; or IEC 60751: 2008 Pt-100 RTD platinum resistance thermometer, Class AA.

3.6. *High-Temperature Vacuum Oven* (if necessary for removal of residual moisture)—A vacuum oven of sufficient size, capable of maintaining a uniform temperature of up to $110 \pm 2^\circ\text{C}$ ($230 \pm 3.6^\circ\text{F}$). Oven(s) shall be capable of operation at the temperatures required, as corrected, if necessary, by standardization. More than one oven may be used, provided each is used within its proper operating temperature range. The thermometer for measuring the temperature of materials shall meet the requirements of M 339M/M 339 with a temperature range of at least 100 to 110°C (212 to 230°F), and an accuracy of $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$) (see Note 2).

Note 2—Thermometer types suitable for use include ASTM E1 mercury thermometers; ASTM E2877 digital metal stem thermometer; ASTM E230/E230M thermocouple thermometer, Type T, Special Class; or IEC 60584 thermocouple thermometer, Type T, Class 1.

3.7. *Infrared Spectrophotometer or Fourier Transform Infrared Spectrometer*—Capable of recording spectra in the $1800\text{-to-}600\text{-cm}^{-1}$ region.

3.8. *Infrared Windows*—Polished sodium chloride or potassium chloride windows, or other suitable medium for casting of infrared specimens. If testing by use of the attenuated total reflectance (ATR) method, an ATR accessory and the appropriate crystal are necessary.

3.9. *Testing by Solvent-Diluted Method:*

3.9.1. *Glass Vial with Leak-Resistant Top.*

3.9.2. *Eyedroppers.*