
Standard Method of Test for

Flash Point with Tag Open-Cup Apparatus for Use with Material Having a Flash Point Less Than 93°C (200°F)

AASHTO Designation: T 79-22

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 method covers the procedure for the determination of flash points by the tag open-cup apparatus of cutback asphalts having flash points of less than 93°C (200°F).
The sample is placed in the tester and heated at a slow and constant rate. A small test flame is passed at a uniform rate in a level plane across the cup at specified intervals. The flash point is the lowest temperature at which application of the test flame causes the vapor at the surface of the liquid to flash.
Note 1—Specifications commonly designate the Cleveland Open-Cup method (T 48) for asphalt binders and cutback asphalts having flash points above 79.5°C (175°F).
- 1.2. The values stated in SI units are to be regarded as the standard.
- 1.3. *This test may involve hazardous materials, operations, and equipment. This test does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user to establish appropriate safety and health 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.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
- 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 48, Flash Fire Point of Asphalt Binder by Cleveland Open Cup
- 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. *Tag Open-Cup Tester*—Consisting of the following parts. The parts must conform to the dimensions shown and have the additional characteristics as noted. (See Figure 1.)
- 3.1.1. *Copper Bath*—Equipped with a constant-level overflow placed to maintain the bath liquid level 3.2 mm ($\frac{1}{8}$ in.) below the ridge of the glass cup.
- 3.1.2. *Thermometer Holder*—Supplied with the tester. It shall support the thermometer firmly in a vertical position.
- 3.1.3. *Glass Test Cup*—Constructed of molded clear glass, annealed, heat-resistant, and free from surface defects. (See Figure 2.)
- 3.1.4. *Filling Level Gauge*—For proper adjustment of the liquid level in the cup. This device shall be made of suitable metal at least 3.2 mm ($\frac{1}{8}$ in.) thick, with two projections for adjusting the liquid level in the glass cup to 3.18 ± 0.25 mm (0.125 ± 0.01 in.) below the top edge or rim of the cup. Also, the holes in the leveling device may be used to adjust the size of the test flame and for gauging the height of the taper above the edge of the cup. (See Figure 3.)
- 3.1.5. *“Micro” or Small Gas Burner*—Of suitable dimensions for heating the bath. A screw clamp may be used to help regulate the gas. A small electric heater controlled by a variable power transformer may also be used.
- 3.1.6. *Ignition Taper*—A small, straight, blowpipe-type gas burner. The tip of the taper should be approximately 1.6 mm ($\frac{1}{16}$ in.) in diameter. The ignition taper should be maintained in a fixed horizontal plane above the test cup by means of a swivel device so that the test flame passes on the circumference of a circle having a radius of at least 152 mm (6 in.). A comparison bead, 4.0 mm ($\frac{5}{32}$ in.) in diameter, may be mounted in a convenient spot. If mounted on the ignition taper, a portion of the tip of the taper, 1.6 mm ($\frac{1}{16}$ in.) in diameter, shall extend at least 3 mm ($\frac{1}{8}$ in.) beyond the bead.
- 3.1.7. *Draft Shield*—A suitable shield may be made of two rectangular sheets of noncombustible material, 610 by 710 mm (24 by 28 in.), fastened together along the 710 mm (28 in.) side, preferably by hinges. A triangular sheet, 610 by 610 by 860 mm (24 by 24 by 34 in.), is fastened by hinges to one of the lateral sheets to form a top when the shield is open. The interior of the draft shield shall be painted flat black.