



Designation: D3791 – 04

Standard Practice for Evaluating the Effects of Heat on Asphalts¹

This standard is issued under the fixed designation D3791; 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.

1. Scope

1.1 This practice covers a procedure for evaluating some of the effects on asphalts of heating in the presence of little or no air.

1.2 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- D5 Test Method for Penetration of Bituminous Materials
- D36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- D140 Practice for Sampling Bituminous Materials
- D1079 Terminology Relating to Roofing and Waterproofing
- D2170 Test Method for Kinematic Viscosity of Asphalts (Bitumens)
- D2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer
- D4402 Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
- E1 Specification for ASTM Liquid-in-Glass Thermometers
- E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

3. Terminology

3.1 *Definitions*—Definitions of terms used in this practice can be found in Terminology D1079.

4. Summary of Practice

4.1 A sample of asphalt in a loosely covered container is heated to a temperature chosen by the investigator for a period of 5 h \pm 10 min. Certain characteristics of the asphalt after heat

exposure at the test temperature chosen are then compared with those characteristics before exposure.

NOTE 1—A set temperature is required when this practice is used as part of a specification. Historically, a temperature of 204°C (400°F) has been used.

5. Significance and Use

5.1 When asphalts are maintained at elevated temperatures in the presence of air, their characteristics may change. Certain blown asphalts also soften when maintained near, and particularly above, their final blowing temperatures under virtually air-free conditions. This may happen if the asphalt is overheated for application purposes. This practice provides a uniform heat-treatment procedure and methods for evaluating the effect of this treatment on some of the characteristics of asphalts. Changes observed when asphalts are overheated are not indicative of changes to be expected when asphalts are heated to normal application temperatures.

6. Apparatus

6.1 *Oven*—A forced-ventilation oven conforming to the requirements for Type IIA as prescribed in Specification E145, capable of maintaining temperatures up to 300°C (572°F), and with a chamber at least 300 by 300 by 300 mm (12 by 12 by 12 in.).

6.2 *Thermometer*—ASTM Low-Distillation Thermometer, having a range from -1 to $+300^{\circ}\text{C}$ (30 to 580°F) and conforming to the requirements for Thermometers 7C or 7F as prescribed in Specification E1.

6.3 *Containers*, triple-seal, friction-top, 1-L (1-qt) and 0.5-L (1-pt) cans with lids, free of any interior resinous or lacquer coatings.³

6.4 *Laboratory Timer*.

6.5 *Hot Plate*.

7. Sampling

7.1 Sample the asphalt in accordance with Practice D140.

8. Test Specimen and Sample

8.1 Heat a minimum of 1 L (1 qt) of the asphalt on the hot plate. Stir occasionally to prevent local overheating. Keep

¹ This practice is under the jurisdiction of ASTM Committee D08 on Roofing and Waterproofing and is the direct responsibility of Subcommittee D08.03 on Surfacing and Bituminous Materials for Membrane Waterproofing and Built-Up Roofing.

Current edition approved Jan. 1, 2004. Published January 2004. Originally approved in 1979. Last previous edition approved in 1996 as D3791 – 96. DOI: 10.1520/D3791-04.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ "Triple-Tite" cans, available from Continental Can Co., 633 3rd Ave., New York, NY, or equivalent, have been found suitable.