



Designation: D 3791 – 96

Standard Practice for Evaluating the Effects of Heat on Asphalts¹

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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:

D 5 Test Method for Penetration of Bituminous Materials²

D 36 Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)³

D 140 Practice for Sampling Bituminous Materials²

D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials³

D 2170 Test Method for Kinematic Viscosity of Asphalts (Bitumens)²

D 2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer²

D 4402 Test Method for Viscosity Determinations of Unfilled Asphalts Using the Brookfield Thermosel Apparatus³

E 1 Specification for ASTM Thermometers⁴

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens⁵

3. Terminology

3.1 *Definitions*—Definitions of terms used in this practice can be found in Terminology D 1079.

4. Summary of Practices

4.1 A sample of asphalt in a loosely covered container is heated to a temperature chosen by the investigator for a period

of $5 \text{ h} \pm 10 \text{ min}$. 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 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 E 145, capable of maintaining temperatures up to 572°F (300°C), and with a chamber at least 12 by 12 by 12 in. (300 by 300 by 300 mm).

6.2 *Thermometer*—ASTM Low-Distillation Thermometer, having a range from 30 to 580°F or from -2 to $+300^\circ\text{C}$ and conforming to the requirements for Thermometers 7C or 7F as prescribed in Specification E 1.

6.3 *Containers*, triple-seal, friction-top, 1-qt (1-litre) and 1-pt (0.5-litre) cans with lids, free of any interior resinous or lacquer coatings.⁶

6.4 *Laboratory Timer*.

6.5 *Hot Plate*.

7. Sampling

7.1 Sample the asphalt in accordance with Practice D 140.

8. Test Specimen and Sample

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

¹ This practice is under the jurisdiction of ASTM Committee D-8 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.03 on Surfacing and Bituminous Materials for Membrane Waterproofing and Built-Up Roofing.

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

³ *Annual Book of ASTM Standards*, Vol 04.04.

⁴ *Annual Book of ASTM Standards*, Vol 14.03.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.

⁶ “Triple-Tite” cans, available from Continental Can Co., 633 3rd Ave., New York, NY, or equivalent, have been found suitable.