Designation: D7403 – 09 (Reapproved 2017)

Standard Test Method for Determination of Residue of Emulsified Asphalt by Low-Temperature Vacuum Distillation[1]

This standard is issued under the fixed designation D7403; 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 method covers the quantitative determination of residue in emulsified asphalts composed principally of a semisolid or liquid asphaltic base, water, and an emulsifying agent. The emulsified asphalts will generally contain polymeric materials. It is especially suitable for emulsified asphalt residue properties that may be altered at the high-temperature 260 °C (500 °F) distillation. Since there is currently not a precision statement for this procedure, it is recommended to the user that this procedure not be used for buy/sell purposes at the present time.

1.2 The values stated in SI units are to be regarded as the standard. Values in parentheses in inch-pound units are provided for informational purposes only.

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 appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D6997 Test Method for Distillation of Emulsified Asphalt

E1 Specification for ASTM Liquid-in-Glass Thermometers

3. Significance and Use

3.1 This test method can be used for quantitative determination of residue in emulsified asphalts at a temperature of 135 °C (275 °F) with a 60-min distillation test using current distillation apparatus. This method is suitable to obtain residues for service evaluation, quality control, and research. This distillation method is not intended to produce residues equivalent to the Test Method D6997 260 °C (500 °F) distillation procedure.

4. Apparatus

4.1 *Aluminum Alloy Still,* conforming to Test Method D6997 except that a 13-mm (½-in.) diameter hole is drilled between the two existing 13-mm (½-in.) thermometer holes for the connection of a vacuum gauge (see Fig. 1). The joint between the still and lid shall be airtight with the gasket in place. Other heating devices may be used provided they employ the intended control of temperature during the distillation procedure.

4.2 *Connection Apparatus,* Test Method D6997, with modifications as shown in Fig. 2. Connection tubing may be of suitable materials provided the intended vacuum, temperature, and method are maintained. Other forms of condensers may be used provided they have an equivalent or greater interior surface area for condensation of distillate.

NOTE 1—Silicone rubber stoppers are recommended.

4.3 *Thermometric Device,* ASTM 7C (7F) thermometers, or thermocouple devices calibrated at 135 °C (275 °F). The thermocouple probe, Type T with exposed junction, should be of sufficient length (approximately 300 mm (12 in.)) to be positioned approximately 6 mm (0.25 in.) off the bottom of the assembled still. Use of equivalent thermometric devices is permitted.

4.4 *Balance,* capable of weighing 3500 g to ±0.1 g.

4.5 *Vacuum Pump,* rotary vane type, capable of maintaining a vacuum of 88 kPa below gauge pressure or greater.

NOTE 2—88 kPa below gauge pressure is equal to 26 in. Hg (660 mm) below atmospheric pressure.

4.6 *Gasket,* of silicone rubber, 3 mm (⅛ in.) thick, cut to fit flanged opening on still. Other gasket materials may be used provided they withstand the maximum temperature reached

[1] This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.42 on Emulsified Asphalt Test.

Current edition approved Oct. 1, 2017. Published October 2017. Originally approved in 2009. Last previous edition approved in 2009 as D7403 – 09. DOI: 10.1520/D7403-09R17.

[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.

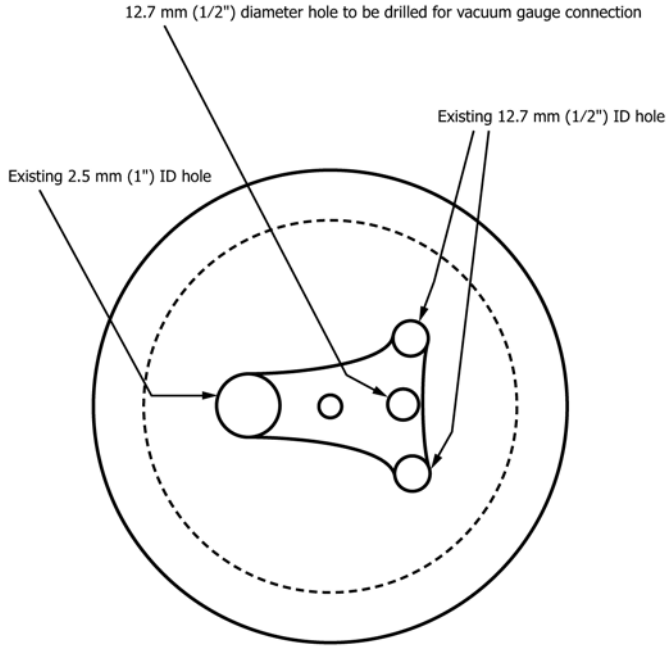

FIG. 1 Aluminum Alloy Still Lid Showing Location of the Hole for Vacuum Gauge Connection

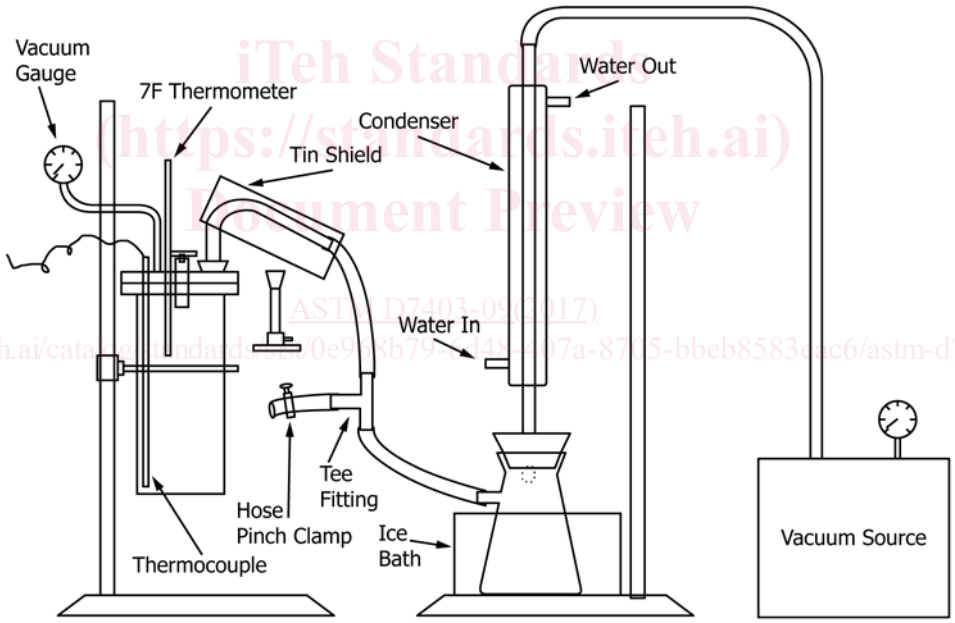

FIG. 2 Connection Apparatus Schematic

during distillation and are able to maintain the specified vacuum within the still.

4.7 *Vacuum Gauges,* dial type or other suitable type connected to vacuum tubing and/or fittings to allow attachment to both vacuum pump and to still apparatus and capable of reading a minimum vacuum of 88 kPa below gauge pressure (660 mm or 26 in. Hg below atmospheric pressure).

4.8 *Freezer,* maintained at approximately –10 °C.

4.9 *Disposable Plastic Drink Cups,* of convenient size and make to serve as a container during freezing of emulsified asphalt.

5. Hazards

5.1 **Warning—**Mercury has been designated by the United States Environmental Protection Agency (EPA) and many state agencies as a hazardous material that can cause central nervous