



Designation: ~~D1856-95a (Reapproved 2003)~~ Designation: D 1856 - 09

Standard Test Method for Recovery of Asphalt From Solution by Abson Method¹

This standard is issued under the fixed designation D 1856; 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 test method covers the recovery by the Abson method of asphalt from a solution from a previously conducted extraction. The asphalt is recovered with properties substantially the same as those it possessed in the bituminous mixture and in quantities sufficient for further testing.

1.2

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C 670 [Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials](#) ~~D96 Test Methods for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)~~

D 2172 [Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures](#)

D 2939 [Test Methods for Emulsified Bitumens Used as Protective Coatings](#)

D 4080 [Specification for Trichloroethylene, Technical and Vapor-Degreasing Grade](#)

D 6368 [Specification for Vapor-Degreasing Solvents Based on normal-Propyl Bromide and Technical Grade normal-Propyl Bromide](#)

E 1 [Specification for ASTM Liquid-in-Glass Thermometers](#)

3. Summary of Test Method

3.1 The solution of solvent and asphalt from a ~~prior~~ asphalt mix extraction is distilled under prescribed conditions to a point where most of the solvent has been distilled, at which time carbon dioxide gas is introduced into the distillation process to remove all traces of the extraction solvent. The recovered asphalt (distillation residue) can then be subjected to further testing as required.

4. Significance and Use

4.1 The asphalt should be extracted from the aggregate-asphalt mixture in accordance with Method A of Test Methods D 2172 (centrifuge method) as there is some experimental evidence that the recovered asphalt may have slightly lower penetration values when recovered from solutions obtained from hot extraction methods.

5. Apparatus

5.1 ~~Centrifuge, batch unit capable of exerting a minimum centrifugal force of 770 times gravity, or continuous unit capable of exerting a minimum force of 3000 times gravity. (The apparatus specified in Test Methods D96 may also be used.)~~, batch unit

¹ This method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.25 on Analysis of Bituminous Mixtures.

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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.

capable of exerting a minimum centrifugal force of 770 times gravity or continuous unit capable of exerting a minimum force of 3000 times gravity.

5.2 *Centrifuge Tubes*—A supply of wide-mouth bottles or centrifuge tubes as shown in Fig. 1 or Fig. 2 of Test Methods D96.—A supply of wide-mouth bottles or centrifuge tubes may be used for the batch unit. A tube as illustrated in Fig. 1 has been found satisfactory for the continuous unit.

5.3 *Distillation Assembly*, as shown in Fig. 1 Fig. 2, and consisting of the following items:

5.3.1 *Extraction Flasks*—Two 250-ml, wide-mouth, heat-resistant flasks, one for distillation and the other for the receiver.

5.3.2 *Glass Tubing*— Heat-resistant glass tubing, having 10-mm inside diameter and gooseneck shaped (as shown in Fig. 1 Fig. 2) for connecting the flask to the condenser.

5.3.3 *Inlet Aeration Tube*,³ at least 180 mm in length, having a 6-mm outside diameter with a 10-mm bulb carrying six staggered side holes approximately 1.5 mm in diameter.

5.3.4 *Electric Heating Mantle*, with variable transformer, oil bath, or fluidized sand bath, to fit a 250-ml flask.

5.3.5 *Water-Jacketed Condenser*, Allihn type, with 200-mm minimum jacket length or equivalent.

5.3.6 *Thermometer*— An ASTM Low Distillation Thermometer 7E or 7F, as specified, having a range from –2 to 300°C or 30 to 580°F, respectively, and conforming to the requirements in Specification E 1.

5.3.7 *Gas Flowmeter*,⁴ as shown in Fig. 1 Fig. 2, or any flowmeter capable of indicating a gas flow of up to 1000 ml/min.

5.3.8 *Corks*, No. 20, drilled as shown in Fig. 1 Fig. 2.

5.3.9 *Flexible Elastomeric Tubing*, resistant to chlorinated solvents having sufficient length and size to connect the aeration tube to flowmeter, and equipped with a pinch clamp or stopcock to close aeration tube prior to introducing carbon dioxide.

²Withdrawn.

³The sole source of supply of the apparatus known to the committee at this time is Inlet Aeration Tube, Part No. 226, available from Wm. A. Sales, Ltd., 419 Harvester Court, Wheeling, Ill. 60090; request Part No. 226. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

⁴An "International" No. 2 centrifuge operating at 1900 rpm or an "SMM Continuous Centrifuge" exerting a force of 3000 times gravity at 9000 rpm, have been found satisfactory for this purpose.

⁵The sole source of supply of the apparatus known to the committee at this time is The Monostat Corp. "Flowmeter" No. 9144. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

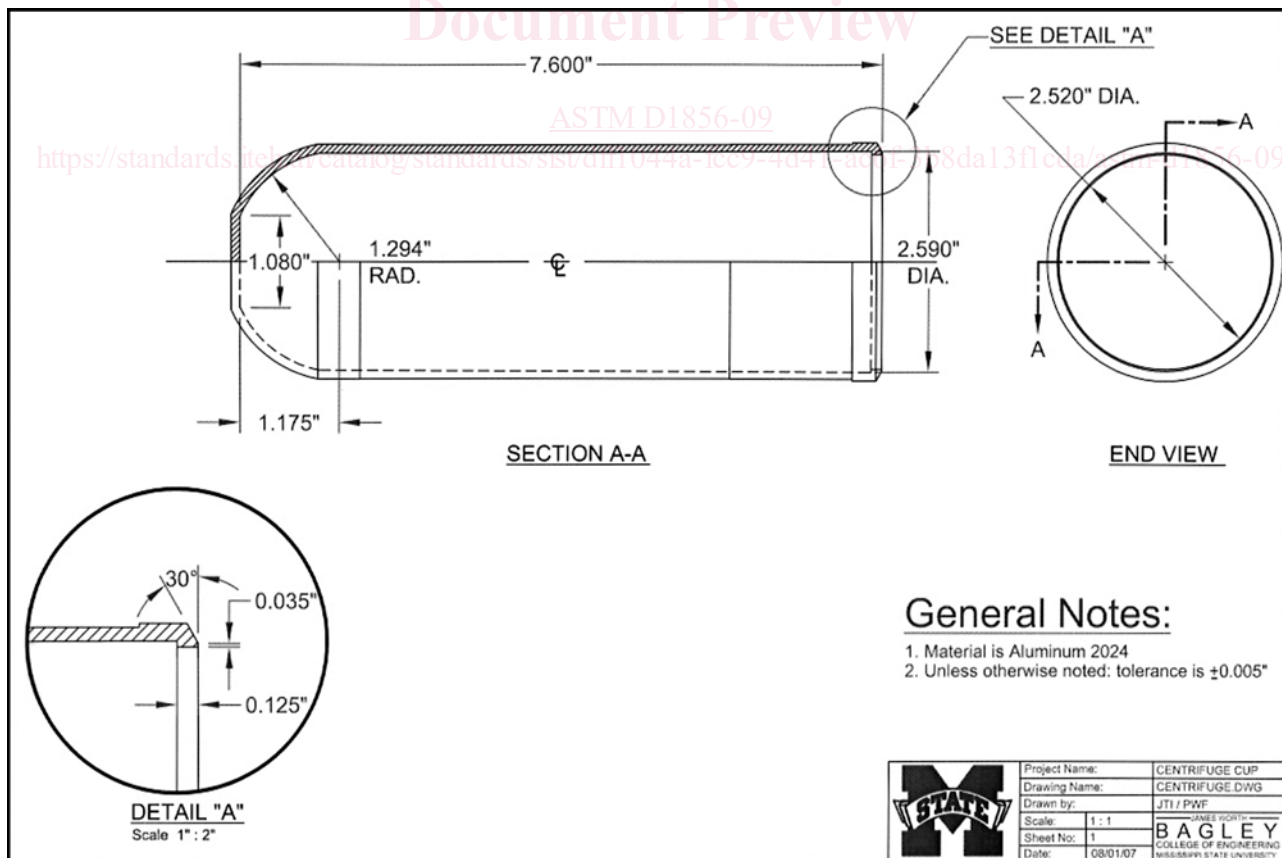


FIG. 1 Centrifuge Tube Example

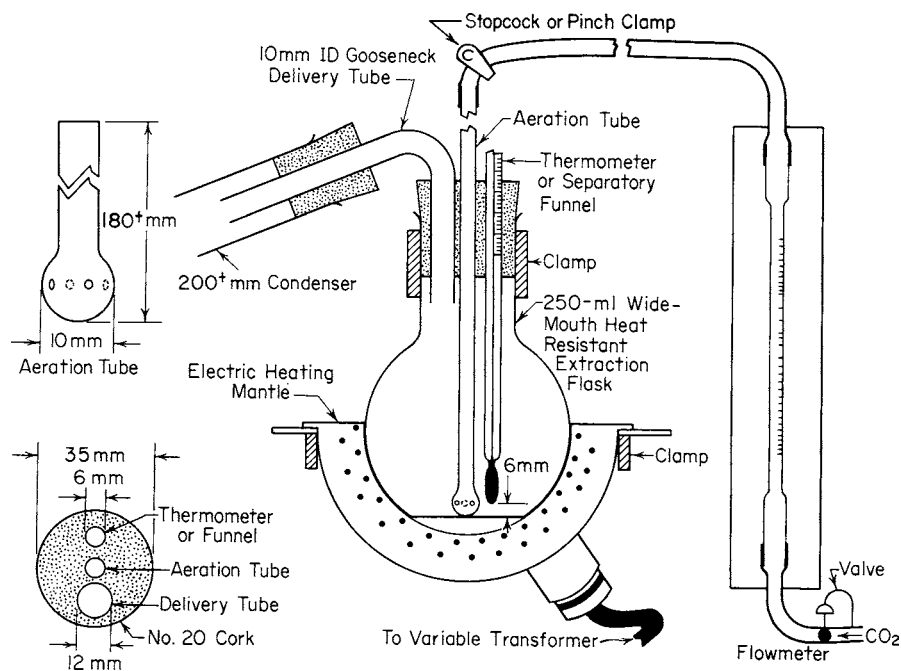


FIG. 1-2 Distillation Assembly for Bitumen Recovery

5.3.10 *Separatory Funnel*,⁵ (Alternative Procedure , see 9.3.1) 125-ml capacity.

6. Reagents and Materials

6.1 *Carbon Dioxide Gas*—A pressurized tank, with pressure-reducing valve or other convenient source.

6.2 The solvent for extracting the asphalt from mixtures should be reagent grade trichloroethylene.

6.2 Solvents

6.2.1 The solvent for extracting the asphalt from mixtures may be trichloroethylene, conforming with Specification D 4080.⁶

6.2.2 The solvent for extracting the asphalt from mixtures may be Normal Propyl Bromides (nPB). This solvent should conform to Specification D 6368.⁷

6.2.3 The solvent for extracting the asphalt from mixtures may be reagent grade Methylene Chloride.⁷

7. Precautions

7.1 **Caution**—The solvent listed in 6.2 should be used only under a hood or with an effective surface exhaust system in a well-ventilated area, since it is toxic to some degree as indicated below:

Solvent	TLV, ppm ^A	STEL, ppm ^B
Trichloroethylene	50	200

^AThreshold limit value (TLV) as established by the American Conference of Governmental Industrial Hygienists (ACGIH), Bldg. D-7, 6500 Glenway Ave., Cincinnati, OH 45211-4438. 1990/1991 values. The TLV is a time-weighted average for an exposure period of 8 h per day, 5 days per week.

^BShort term exposure limit (STEL) as established by ACGIH. 1990/1991 values. Warning—The solvent listed in 6.2 should be used only under a hood or with an effective surface exhaust system in a well-ventilated area, since they are toxic to various degrees. Consult the current Threshold Limit Concentration Committee of the American Conference of Governmental Industrial Hygienists for the current threshold limit values.

7.2 These solvents in the presence of heat and moisture may be hydrolyzed to form acids that are extremely corrosive to certain metals, particularly when subject to contact over lengthy periods of time. Proper precautions should be taken to not allow these solvents to remain in small quantities in the effluent tanks of aluminum vacuum extractors.

7.3 Exposure of these solvents or their vapors to high temperatures such as contact with flames, hot glowing surfaces, or electric arcs can produce decomposition products such as hydrogen chloride. Steel drums containing these solvents should be stored in a

⁵Inlet Aeration Tube, Part No. 226, available from Wm. A. Sales, Ltd., 419 Harvester Court, Wheeling, Ill. 60090; request Part No. 226.

⁶The sole source of supply of the apparatus known to the committee at this time is Kimball separatory funnel No. 29028. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

⁷The Monostat Corp. "Flowmeter" No. 9144 has been found satisfactory for this purpose.

⁸The sole source of supply of the apparatus known to the committee at this time is American Conference of Governmental Industrial Hygienists, Inc. (ACGIH), 1330 Kemper Meadow Dr., Cincinnati, OH 45240, (<http://www.acgih.org>). If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

⁹Kimball separatory funnel No. 29028 has been found satisfactory for this purpose.

¹⁰It is recommended that for each new supply of the solvent a blank should be run on an asphalt of known properties.