Designation: D 1856 – 95a

Standard Test Method for Recovery of Asphalt From Solution by Abson Method[1]

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 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 *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:*

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials[2]

D 96 Test Methods for Water and Sediment in Crude Oil by Centrifuge Method (Field Procedure)[3]

D 2172 Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures[4]

D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings[5]

E 1 Specification for ASTM Thermometers[6]

3. Summary of Test Method

3.1 The solution of solvent and asphalt from a prior 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[7] or continuous unit capable of exerting a minimum force of 3000 times gravity. (The apparatus specified in Test Methods D 96 may also be used.)

5.2 *Centrifuge Tubes*—A supply of wide-mouth bottles or centrifuge tubes as shown in Fig. 1 or Fig. 2 of Test Methods D 96.

5.3 *Distillation Assembly*, as shown in Fig. 1, 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) for connecting the flask to the condenser.

5.3.3 *Inlet Aeration Tube*,[8] 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.

[1] This method is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.25 on Analysis of Bituminous Mixtures.

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[2] *Annual Book of ASTM Standards*, Vol 04.02.

[3] *Annual Book of ASTM Standards*, Vol 05.01.

[4] *Annual Book of ASTM Standards*, Vol 04.03.

[5] *Annual Book of ASTM Standards*, Vol 04.04.

[6] *Annual Book of ASTM Standards*, Vol 14.03.

[7] An "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.

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

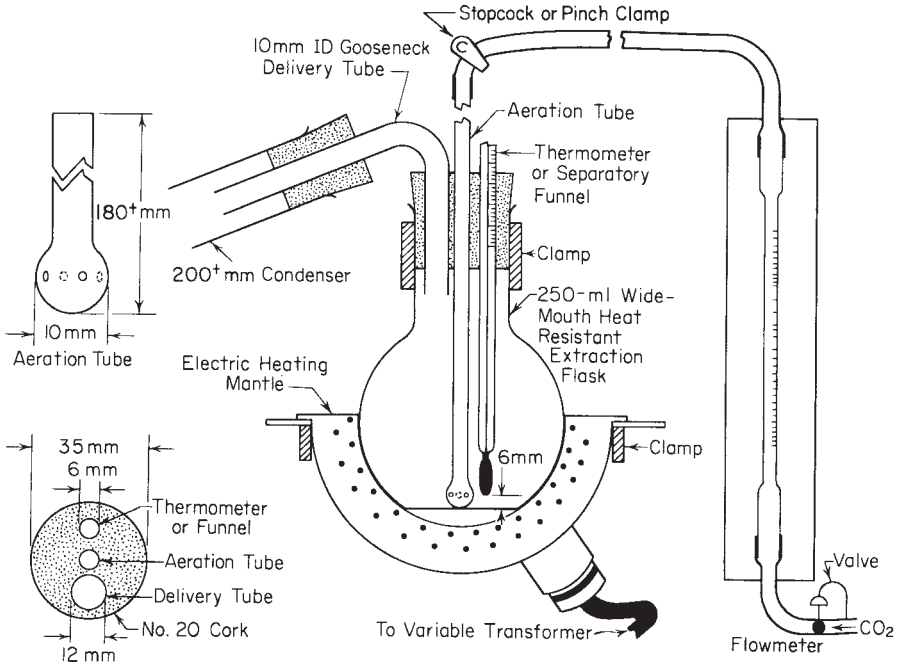

FIG. 1 Distillation Assembly for Bitumen Recovery

5.3.7 *Gas Flowmeter,*[9] as shown in Fig. 1, or any type capable of indicating a gas flow of up to 1000 ml/min.

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

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.

5.3.10 *Separatory Funnel,*[10] (*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.[11]

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

[A] Threshold 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.

[B] Short term exposure limit (STEL) as established by ACGIH. 1990/1991 values.

8. Sample

8.1 The sample shall consist of the solution from a previous extraction by Method A of Test Methods D 2172 of asphalt-aggregate mixture of sufficient quantity to result in 75 to 100 g of recovered bitumen. More or less quantities of bitumen may be recovered; however, the properties of the recovered bitumen may not be in agreement with those recovered of the aforementioned quantities, and in case of a disagreement, 75 to 100 g should be recovered.

8.2 During the extraction process, it is important that all of the asphalt in the mixture be extracted as there could be some selective solvency of the asphalt and the harder, more viscous components of the asphalt might be left in the mixture if extraction is not carried to completion.

8.3 Since heavy petroleum distillates such as mineral spirits or kerosine will affect the properties of the recovered asphalt, it is important to avoid the use of such solvents in cleaning the extraction and recovery apparatus and use only trichloroethylene for cleaning. Residues of heavy petroleum solvents on the equipment may contaminate the recovered asphalt and affect its test properties. It is also necessary to use new filter rings, clean felt pads, or other uncontaminated filtering media in the extraction process to avoid contamination from a previous extraction.

8.4 Generally, the bitumen in mixtures will progressively harden when exposed to air, particularly if the mixtures are in a loose condition. Therefore, it is important to protect bituminous mixtures from exposure to air and preferably to store them in airtight containers at a temperature below 0°C (32°F) until they can be tested. When samples of bituminous mixture

[9] The Monostat Corp. "Flowmeter" No. 9144 has been found satisfactory for this purpose.

[10] Kimball separatory funnel No. 29028 has been found satisfactory for this purpose.

[11] Trichloroethylene, Technical Grade, Type I, Federal Specification O-T-634, latest revision may be used, but it is recommended that for each new supply of the solvent a blank should be run on an asphalt of known properties.