Designation: D 6847 – 02

Standard Test Method for Quantitative Extraction and Recovery of Asphalt Binder from Asphalt Mixtures[1]

This provisional standard is issued under the fixed designation D 6847; the number immediately following the designation indicates the year of original adoption.

1. Scope

1.1 This test method covers a procedure for the extraction and recovery of asphalt binder from asphalt mixtures—both HMA (hot mix asphalt) and RAP (reclaimed/recycled asphalt pavement)—having a minimal effect on the physical properties of the asphalt binder recovered. It is primarily intended for use when the physical properties of the recovered asphalt are to be determined. It can also be used to determine the quantity of asphalt binder in the HMA or RAP. Recovered aggregate may be used for sieve analysis. This may also be accomplished through Test Methods D 2172.

1.2 The values stated in SI units are regarded as the standard. Values in parentheses are for informational use.

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.*

NOTE 1—It is suggested that agency and personnel performing this test meet the requirements of Specification D 3666.

2. Referenced Documents

2.1 *ASTM Standards:*

D 75 Practice for Sampling Aggregates[2]

D 979 Practice for Sampling Bituminous Paving Mixtures[2]

D 1461 Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures[2]

D 2172 Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures[2]

D 2939 Test Methods for Emulsified Bitumens Used as Protective Coatings[3]

D 3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials[2]

D 4753 Specification for Evaluating, Selecting, and Specifying Balances and Scales for Use in Testing Soil, Rock, and Related Construction Materials[4]

D 5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing[2]

D 5444 Test Method for Mechanical Size Analysis of Extracted Aggregate[2]

E 11 Specification for Wire Cloth and Sieves for Testing Purposes[5]

3. Summary of Test Method

3.1 The asphalt mixture is repeatedly washed and filtered with solvent in an extraction/filtration apparatus. Each filtrate is distilled under vacuum in a rotary evaporator with the asphalt remaining in the flask. After recovery of the final filtrate, the solution is concentrated to about 300 mL and centrifuged to remove aggregate fines. The decanted solution is distilled under vacuum to remove the extraction solvents. Nitrogen gas is introduced during the final phase of distillation to drive off any remaining traces of solvents. The quantity of asphalt binder in the asphalt mixture is calculated (optional) and the recovered asphalt (distillation residue) sample is subjected to further physical testing as required. The recovered aggregate can then be used for sieve analysis, if desired.

4. Significance and Use

4.1 This standard is used to extract and recover asphalt binder from an asphalt mixture sample. The recovered mixture components (asphalt binder and aggregates) can then be subjected to further physical tests.

5. Apparatus

5.1 *Extraction Vessel*—The extraction vessel shall be a device as shown in Fig. 1, and shall have a 130-mm long piece of 150-mm I.D. Schedule 80 Aluminum or Schedule 80, Grade 304 stainless steel pipe (see Fig. 2), with removable top and bottom plates (13-mm thickness). The top plate (see Fig. 3) shall have a mixing motor mount and 19-mm port for adding solvent. The bottom plate (see Fig. 4) shall be equipped with a quick connect fitting. Four 100-mm by 25-mm baffles (see Fig. 5) shall be mounted in the extraction vessel along with the following inserts in order as shown in Fig. 1: a 3-mm aluminum or stainless steel ring, sieve cloth, 2.00 mm (No.10)

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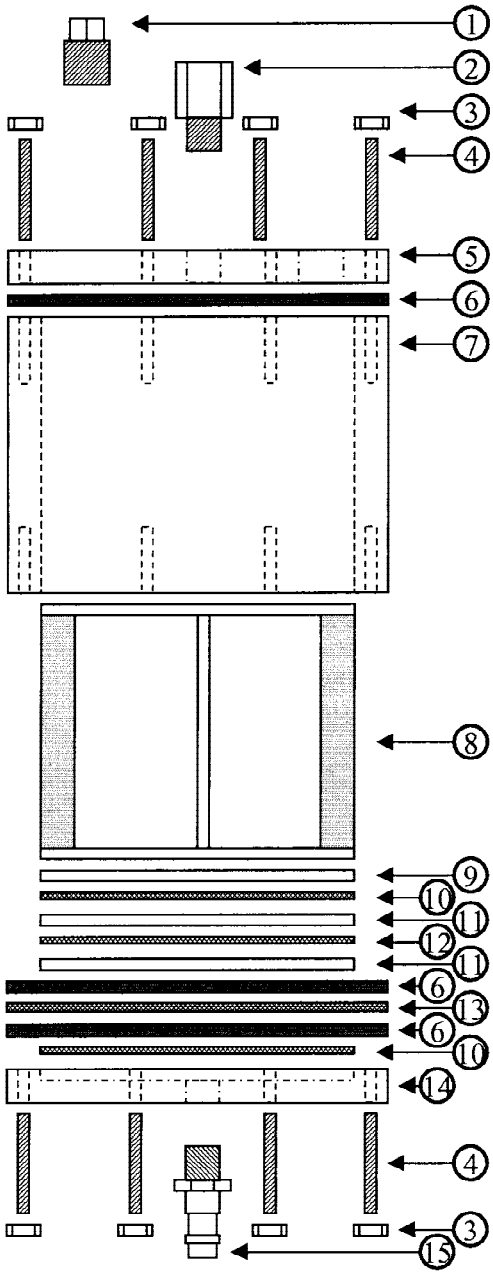
[2] *Annual Book of ASTM Standards*, Vol 04.03.

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

[4] *Annual Book of ASTM Standards*, Vol 04.08.

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



1- 1- ISO 12RT (3/4 in. NPT) plug
2- ISO 8RT (1/2 in. NPT) fitting with I.D. hole for motor shaft
3- 12 M5 x 0.5 nuts
4- 12 M5 x 0.5 x 50 mm studs
5- extraction vessel top
6- 3 Viton gaskets 3 mm thick, 16 mm width with holes to fit over studs
7- extraction vessel housing
8- baffle
9- metal ring 3-mm thick 148-mm O.D., 10 mm width
10- stainless steel #10 screen
11- metal spacers
12- # 50 screen
13- # 200 screen
14- extraction vessel bottom
15- ISO 4RT (1/4 in. NPT) quick connect fitting

FIG. 1 Extraction Vessel

openings;spacer (see Fig. 6); sieve cloth, 300mm (No. 50) openings; another spacer (see Fig. 6); a 3-mm gasket; sieve cloth, 75 mm (No. 200) openings; another 3-mm gasket; another sieve cloth, 2.00 mm (No. 10) openings.

NOTE 2—All references to stainless steel materials should be Grade 304 stainless steel to assure corrosion resistance. Sieve cloth should meet Specification E 11 specifications. Brass sieve cloth is acceptable, however, brass will require replacement more often due to wear from aggregate.

NOTE 3—If aluminum is used for the vessel several blank tests should be run to condition the aluminum. After this conditioning the vessel should never be polished to a bright shiny finish. If vessel is polished, recondition before running any tests.

5.2 *In-line Filter*—The in-line filter apparatus shall be a cartridge type with 20-mm retention and at least 820-cm^3 effective filter area. The filter apparatus shall be removable to accommodate weighing before and after the procedure. The filter shall be capable of withstanding heat up to 135°C (275°F), without degradation in order to accommodate oven drying of the filter apparatus.

NOTE 4—Whatman Polycap 75 HD catalog number 6703-7521 or equivalent is a suitable filter.

5.3 *Filtrate Vacuum Flasks*—Two (2) filtrate vacuum flasks, 1000 mL.

5.4 *Round Bottom Flask*—Round Bottom recovery flask (1000 mL).

5.5 *Flowmeter*—Gas flowmeter, capable of indicating a gas flow up to 1000 mL/min.