



Designation: ~~D7000~~—~~11~~ **D7000 – 11 (Reapproved 2017)**

# Standard Test Method for Sweep Test of Bituminous Emulsion Surface Treatment Samples<sup>1</sup>

This standard is issued under the fixed designation D7000; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method measures the curing performance characteristics of bituminous emulsion and aggregates by simulating the brooming of a surface treatment in the laboratory.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 A precision and bias statement for this standard has not been developed at this time. Therefore, this standard should not be used for acceptance or rejection of a material for purchasing purposes.

1.4 *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.*

1.5 *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:*<sup>2</sup>

C127 Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate

D8 Terminology Relating to Materials for Roads and Pavements

D75 Practice for Sampling Aggregates

D140 Practice for Sampling Bituminous Materials

D226 Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing

D977 Specification for Emulsified Asphalt

D2397 Specification for Cationic Emulsified Asphalt

2.2 *ISSA Document:*<sup>3</sup>

ISSA Technical Bulletin No. 100 Test Method for Wet Track Abrasion of Slurry Surfaces

## 3. Summary of Test Method

3.1 The sweep test is effective for defining the film formation stage of bituminous emulsions. A brush (designed to closely replicate the sweeping action of a broom) exerts a force on the aggregate used on surface treatments. Bituminous emulsion is applied to an asphalt felt disk. Aggregate is applied and embedded into the bituminous emulsion. The sample is then conditioned at a prescribed temperature and time period before testing. A mixer abrades the surface of the sample using a nylon brush. After one minute of abrasion, the test is stopped, any loose aggregate is removed, and the percent mass loss is calculated.

## 4. Significance and Use

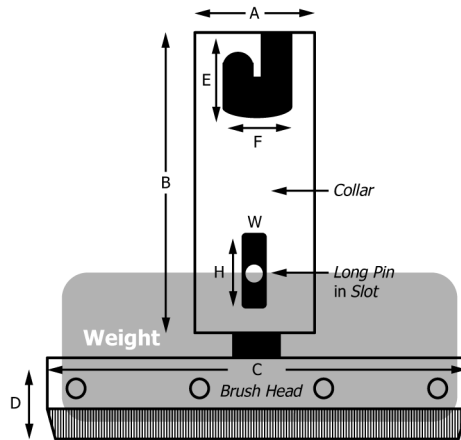
4.1 This test method is useful for classifying rapid-setting bituminous emulsions and is applicable to surface treatments that require a quick return to traffic. It has the capability to predict surface treatment performance in the formative stage using

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.24 on Bituminous Asphalt Surface Treatments.

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<sup>2</sup> 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.

<sup>3</sup> Available from International Slurry Surfacing Association (ISSA), 3 Church Circle, PMB 250, Annapolis, MD 21401, http://www.slurry.org.



Dimensions		
ID	Name	mm
A	Collar diameter	36
B	Collar height	76
C	Brush head length	128
D	Overall brush head height	19
E	Groove height	17
F	Groove width	18
H	Slot height	19
W	Slot width	7

FIG. 1 Brush Holder

construction components. This performance test is intended to evaluate the potential curing characteristics of a binder-aggregate combination to ensure that the surface treatment is sufficiently cured before allowing traffic onto the seal.

## 5. Apparatus

5.1 *Mixer*<sup>4</sup>—Use to abrade the sample.

5.2 *Quick-clamp Quick-Clamp Mounting Base*<sup>5</sup>—This base must be an adequate and level support for clamping the sample in place. The test sample should not move during abrasion.

5.3 *Pan*—An appropriate pan will contain the test sample on the mixer and hold dislodged aggregate.

5.4 *Oven*—The conditioning oven shall be a constant temperature ~~forced-draft~~ forced-draft oven meeting the following requirements containing shelves with at least 65 % voids. The shelves shall be placed at least 120 mm apart and 100 mm away from the top and floor.

Oven Type	Forced-draft oven
Oven Type	Forced-draft oven
Min Inside D × W × H	460 × 460 × 460 mm
Accuracy	±1.0°C
Accuracy	±1.0 °C

5.5 *Balance*—A balance capable of weighing 800 g or more to within ±0.1 g. A minimum platform length and width of ~~240 mm~~ 240 mm is required.

5.6 *Removable Brush Holder*—The brush holder shall be attachable to the mixer and capable of a ~~free floating~~ free-floating vertical movement of 19 ± 1 mm having the dimensions listed in Fig. 1. A drawing of this apparatus can be seen in Fig. 1. The total weight of the brush head and the attached weight shall weigh 1500 ± 15 g. The collar and nylon strip brush are not included in this weight. The brush clamping system shall hold the nylon strip brush in place so that it will not move or dislodge during testing.

<sup>4</sup> The sole source of supply of the Hobart Mixer 1/3 H.P. Fixed Speed Motor, model A 120, apparatus known to the committee at this time is Hobart Corporation, 701 S. Ridge Ave., Troy, OH 45374, <http://www.hobartcorp.com>. 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,<sup>1</sup> which you may attend.

<sup>5</sup> The sole source of supply of the Wet Track Abrasion Tester (ISSA TB100) apparatus known to the committee at this time is Mastrad Limited, Finch House, 25 Finch Road, Douglas, United Kingdom IM1 2PS, <http://www.mastrad.com>. 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,<sup>1</sup> which you may attend.

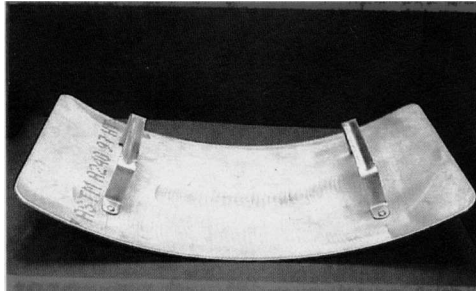


FIG. 2 Sweep Test Compactor

5.7 *Nylon Strip Brush*<sup>6</sup>—The brush shall conform to the following specifications.

Overall Trim	25.4 mm
Overall Length	127 ± 1 mm
Backing Size	#7
Fill Material	Crimped black nylon
Nylon Type	6.0
Fill Diameter	0.254 mm
Weight	35 ± 2 g

5.8 *Strike-off/Strike-Off Template*—The template should consist of a flat, stainless steel metal plate. It shall include a 280 ± 3 mm diameter cut out with a flush edge. A 16-gage U.S. Standard (~~Plate~~(plate and ~~Sheet Metal~~)sheet metal) will suffice in most cases.

NOTE 1—Emulsion mass may vary according to emulsion viscosity and applied ~~strike-off~~strike-off pressure. Alternative gages may be necessary for emulsion mass correction for varying aggregate sizes and shapes.

5.9 *Strike-off/Strike-Off Rod*—The 750 ± 100 mm rod shall be made of ~~17-20~~17–20 mm electrical conduit for striking off emulsion from the template surface.

5.10 *Sweep Test Compactor*—A suitable compaction device with a minimum curved surface radius of 550 ± 30 mm and shall weigh 7500 ± 500 g. A picture of this apparatus can be seen in Fig. 2.

## 6. Materials

6.1 *Bituminous Emulsion*—The bituminous emulsion should meet all applicable specifications for the surface treatment application. The bituminous emulsion shall be equilibrated to a temperature of 60°C ± 0.5°C for sample production.

6.2 *Aggregates*—The job aggregates should be sampled and split according to Practice D75. They shall be placed in an oven and dried to a constant weight. The aggregates shall be dry sieved to obtain a test sample that has 100 % passing the 9.5-mm sieve and <1 % passing the 4.75-mm sieve. The amount of aggregate used for each specimen shall be in accordance to the equation below and can be seen by the example in Table 1. The aggregate amount shall be interpolated between values when necessary, and with a tolerance of ±1 %.

$$\frac{A (202.1X - 15.8)}{100} + \frac{B (146.4X - 4.7)}{100} = Y \quad (1)$$

where:

- A = % of aggregate from 9.5 to 6.3 mm,
- B = % of aggregate from 6.3 to 4.75 mm,
- X = bulk specific gravity (BSG), and
- Y = amount of aggregate needed for the sweep test, g.

6.3 *Asphalt Felt Disk*—Produce sample disks from 30 lb asphalt felt paper, Specification D226, Type II. The asphalt felt discs shall not have breaks, cracks, tears, protuberances, indentations, or splices. The felt shall be cut to make 300 ± 10-mm-10 mm diameter disks. The disks shall be placed in a 50°C ± 0.5°C oven for 24 to 72 h to flatten. Manipulate the disks until they are flat and store at room temperature at least three days before use.

## 7. Test Specimens

7.1 Weigh the asphalt felt disk to the nearest 0.1 g and record as the asphalt sample disk weight. Place the asphalt felt disk on a flat table. Manipulate the felt disk so that it lies flat against the surface. Replace the disk if the edges curl or bubble or the disk contains foreign matter. Pre-weigh the aggregate and record as aggregate weight (see Table 1 for proper amounts of aggregate).

<sup>6</sup> The sole source of supply of the Nylon Strip Brush Part #MB7006 apparatus known to the committee at this time is Tanis Incorporated, 3660 Kettle Court E., Delafield, WI 53018, <http://www.tanisinc.com>. 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,<sup>1</sup> which you may attend.