



Designation: D7196 – 23

Standard Test Method for Raveling Test of Cold-Mixed Emulsified Asphalt Samples¹

This standard is issued under the fixed designation D7196; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method measures the resistance to raveling characteristics of emulsified asphalt and field aggregates or recycled asphalt pavement (RAP) mixtures by simulating an abrasion similar to early return to traffic.

1.2 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.

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

1.4 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.5 *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.*

1.6 *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

- D75/D75M Practice for Sampling Aggregates
- D977 Specification for Emulsified Asphalt
- D979/D979M Practice for Sampling Asphalt Mixtures

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.27 on Cold Mix Asphalts.

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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.

D2397/D2397M Specification for Cationic Emulsified Asphalt

D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

D3910 Practices for Design, Testing, and Construction of Slurry Seal

D4753 Guide for Evaluating, Selecting, and Specifying Balances and Standard Masses for Use in Soil, Rock, and Construction Materials Testing

D6372 Practice for Design, Testing, and Construction of Microsurfacing

D6925 Test Method for Preparation and Determination of the Relative Density of Asphalt Mix Specimens by Means of the Superpave Gyrotory Compactor

2.2 ISSA Document:

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

3. Summary of Test Method

3.1 An aggregate or RAP, or both, is mixed together with a preset amount of additives (if shown to be necessary), water (if necessary), and emulsified asphalt. This may be a field-blended mixture (Method A) or a laboratory-blended mixture (Method B). The mixture is compacted in a gyrotory compactor and cured at the specified conditions for a designated period of time. After the assigned curing time, a rotating rubber hose exerts an abrasion force on the specimen for a preset time period and the abraded loss of material is calculated.

4. Significance and Use

4.1 This test is useful for classifying the curing and formulation of cold-mixed emulsified asphalt samples through ravel testing of compacted specimens. This performance test should be used to rank the mix conditions and approximate curing time for return to traffic and resistance to weather damage.

NOTE 1—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Specification D3666 are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Specification D3666 alone does not completely ensure reliable results. Reliable results depend on many factors; following the suggestions of Specification D3666 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

5. Apparatus

5.1 *Hobart Mixer*—The 1/3 H.P. Fixed Speed Motor, model A 120 will be used to abrade the sample.

5.2 *Raveling Test Adapter Base*—This base must fit the Hobart mixer in 5.1 and be an adequate and level support for clamping the test specimen in place. The test specimen should not move during abrasion. A picture of the base can be seen in Fig. 1.³

5.3 *Raveling Test Abrasion Head with Hose*—The abrasion head should be free floating over the sample and have a mass of 600 ± 15 g. This mass shall include the rubber hose. The rubber hose shall be a Parker 7094 Hose (7094-75304) or equivalent. The hose shall be 19 mm ID by 6.25 mm wall thickness and cut to 127 mm in length. The rubber hose shall be easily removed so that it may be rotated or changed prior to testing to ensure a clean surface for abrasion.⁴

5.4 *Oven or Environmental Chamber*—If required for other than ambient laboratory curing conditions, the oven shall be a constant temperature forced draft oven. The shelves in the oven shall be placed at least 150 mm apart and 100 mm away from the top and floor.

5.5 *Balance*—A balance capable of weighing 3000 g or more to within ± 0.1 g and conforming to the requirements of Guide D4753, Class GP2. A minimum platform length and width of 200 mm is required.

³ The sole source of supply of the Raveling Test Adapter Base known to the committee at this time is Bergkamp, Inc., Salina, Kansas. 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,¹ which you may attend.

⁴ An abrasion head similar to that used in the Wet Track Abrasion of Slurry Surfaces (Practices D3910, D6372, and ISSA TB-100) may meet the requirements with the ring weight removed.

The sole source of supply of the abrasion head known to the committee at this time is Bergkamp, Inc., Salina, Kansas. 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,¹ which you may attend.

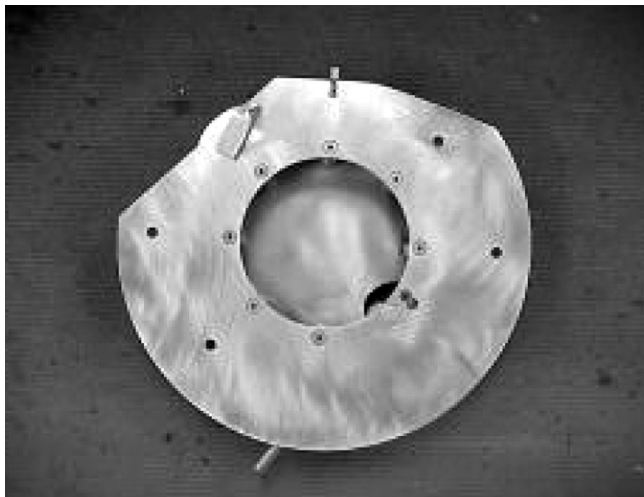


FIG. 1 Raveling Test Adapter Base

5.6 *Gyratory Compactor*—A gyratory compactor meeting the requirements of Test Method D6925.

5.7 *Mechanical Mixer*—A mixer capable of mixing up to 3000 g of the cold emulsified asphalt mixture.

5.8 *100 to 150 mm Fine Bristle Paint Brush*—A fine bristled paint brush capable of sweeping loose material from abraded sample without damaging surface.

6. Materials

6.1 *Emulsified Asphalt*—The emulsified asphalt should meet all applicable specifications for the required project. The emulsion specifications shall be provided by the agency or requirements such as those given in Practice D977 or Specification D2397/D2397M. The emulsified asphalt shall be brought to equilibrium to the specified temperature, if other than laboratory ambient, for a minimum of 1 h prior to mixing with the aggregates or RAP.

6.2 *Aggregates/RAP*—The job aggregates or RAP, or both, for Method B should be sampled and split according to Practice D75/D75M.

6.3 *Cold Bituminous Paving Mixture*—The job mixture for Method A should be sampled according to Practice D979/D979M.

6.4 *Additives*—Any additional additives that are shown to be necessary must meet the specifications required by the agency and mixed or blended with the materials as recommended by the agency or as recommended by the additive supplier if the agency does not specifically detail the method of mixing or blending.

7. Test Specimens

7.1 *Method A (Field-Blended Cold Bituminous Paving Mixture)*:

7.1.1 Make sure that sample integrity was maintained while transferring from the field to the testing facility. Loss of moisture and excessive curing time will affect the results of the test.

7.1.2 Scalp the mixture sample through a 25.0 mm sieve and split out two samples to a quantity of 2750 g in mass. The 2750 g is an approximate mass to give 70 ± 5 mm of height after compaction.

NOTE 2—A test mix for compaction may be necessary to get appropriate mass of sample.

7.2 *Method B (Lab-Blended Mixture)*:

7.2.1 Split out two samples of aggregate/RAP from the 25.0 mm scalped design gradation to a quantity of 2700 g in mass. The 2700 g is an approximate mass to yield a 70 ± 5 mm high cylinder after compaction.

NOTE 3—A test mix for compaction may be necessary to get appropriate mass of sample.

7.2.2 Place the sample into a container of adequate size for mixing.

7.2.3 Add the additive or water contents, or both, to each of the samples and mix with the mechanical mixer for 60 s.

7.2.4 Add the emulsion to the sample and mix with the mechanical mixer for 60 s.