



Designation: D8666 – 26

# Standard Test Method for Determination of Rutting Resistance Using High Temperature Indirect Tensile (HT-IDT) Strength of Asphalt Mixtures<sup>1</sup>

This standard is issued under the fixed designation D8666; 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 procedures for preparing, testing, and measuring asphalt mixture rutting resistance at high temperatures using cylindrical laboratory-prepared asphalt mixture specimens or pavement cores. The test method describes the determination of the high temperature indirect tensile (HT-IDT) strength. The HT-IDT strength can be used to evaluate the resistance of asphalt mixtures to rutting.

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

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, health, and environmental 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>

**C670** Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

**D8** Terminology Relating to Materials for Roads and Pavements

**D979/D979M** Practice for Sampling Asphalt Mixtures

**D3203/D3203M** Test Method for Percent Air Voids in Compacted Asphalt Mixtures

**D3549/D3549M** Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens

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

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

**D6926** Practice for Preparation of Asphalt Mixture Specimens Using Marshall Apparatus

**D6927** Test Method for Marshall Stability and Flow of Asphalt Mixtures

**D8055** Guide for Selecting an Appropriate Electronic Thermometer for Replacing Mercury Thermometers in D04 Road and Paving Standards

**E1** Specification for ASTM Liquid-in-Glass Thermometers

### 2.2 AASHTO Standards:<sup>3</sup>

**R 30** Practice for Short-Term Laboratory Conditioning of Asphalt Mixtures

**T 312** Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor

**T 324** Method for Hamburg Wheel-Track Testing of Compacted Asphalt Mixtures

**T 340** Method for Determining Rutting Susceptibility of Asphalt Mixtures Using the Asphalt Pavement Analyzer (APA)

**T 378** Method for Determining the Dynamic Modulus and Flow Number of Asphalt Mixtures Using the Asphalt Mixture Performance Tester (AMPT)

**T 410** Method for Rutting and Fatigue Resistance of Asphalt Mixtures Using Incremental Repeated Load Permanent Deformation (IRLPD)

<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 D04.26 on Fundamental/Mechanistic Tests.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [www.astm.org/contact](http://www.astm.org/contact). 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 American Association of State Highway and Transportation Officials (AASHTO), 555 12th St., NW, Suite 1000, Washington, DC 20004, <http://www.transportation.org>.

### 3. Terminology

#### 3.1 Definitions:

3.1.1 For definitions of terms used in this standard, refer to Terminology D8.

#### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *dwelt time, n*—the time between laboratory compaction and the start of conditioning for a selected asphalt mixture test.

3.2.2 *HT-IDT strength, n*—rutting resistance index, the value used to evaluate mixture resistance to rutting.

3.2.3 *lag time, n*—the time between an asphalt mixture sampling event at the production facility or paving site and laboratory compaction.

### 4. Summary of Test Method

4.1 The HT-IDT strength test is conducted by applying a monotonic compressive load along a vertical diametral plane of a cylindrical specimen of asphalt mixture centered in the testing apparatus at the test temperature. The load is applied such that an average constant load-line displacement (LLD) rate of  $50.8 \pm 2.0$  mm/min is obtained and maintained for the duration of the test. The peak load at failure is recorded and used to calculate the HT-IDT strength of the specimen.

### 5. Significance and Use

5.1 The values of HT-IDT strength may be used to evaluate the relative quality of asphalt mixtures in conjunction with laboratory mix design testing and for estimating the potential for rutting. The results can also be used to determine the potential for field pavement moisture damage when results are obtained on both moisture-conditioned and unconditioned specimens.

NOTE 1—The quality of the results produced by this standard is 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.

### 6. Apparatus

6.1 *Test Apparatus*—An HT-IDT test apparatus consists of an axial loading device, a load cell, one upper loading strip and a lower loading strip, and a data acquisition system.

6.2 *Loading Device*—Mechanical or servo-hydraulic testing machine with an electronic load cell, in accordance with Test Method D6927, capable of applying a compressive load at a controlled deformation rate while measuring the load. The loading device shall have a compressive loading capacity of at least 15 kN and be capable of maintaining a constant deformation rate of  $50.8 \pm 2.0$  mm/min. The electronic load cell shall have a capacity of at least 25 kN and a resolution of 10 N. The loading device may be equipped with a displacement measurement device, but one is not required.

6.3 *Loading Strips*—Steel loading strips with a concave surface having a radius of curvature equal to the nominal radius of the test specimen. For specimens with nominal diameter of 150 mm, the loading strips shall be  $19.05 \pm 0.30$  mm wide. The length of the loading strips shall exceed the thickness of the specimen. The outer edges of the loading strips shall be beveled slightly to remove sharp edges.

6.3.1 The loading strips shall be part of a test fixture similar to that shown in Figs. 1 and 2, in which the lower loading strip is mounted on a base having two perpendicular guide rods or posts extending upward. The upper loading strip shall be clean and freely sliding on the posts. Guide sleeves in the upper segment of the test fixture shall be in such a position as to direct the two loading strips together without appreciable binding or loose motion in the guide rods.

6.4 *Temperature-Controlled Bath*—A water bath capable of maintaining specimens at the target high test temperature  $\pm 1.0$  °C for conditioning before testing.

6.5 *Gyratory Compactor*—A gyratory compactor and associated equipment for preparing laboratory specimens in accordance with Test Method D6925 or AASHTO T 312 are needed.

6.6 *Saw*—A laboratory saw capable of trimming field cores, if needed.

6.7 *Specimen Measurement Device*—A caliper accurate to  $\pm 0.1$  mm shall be used to measure specimen thickness and diameter.

6.8 *Thermometer*—A calibrated thermometer suitable for a range of temperatures from at least 25 °C to 85 °C and capable of accuracy within a tolerance of  $\pm 0.1$  °C.

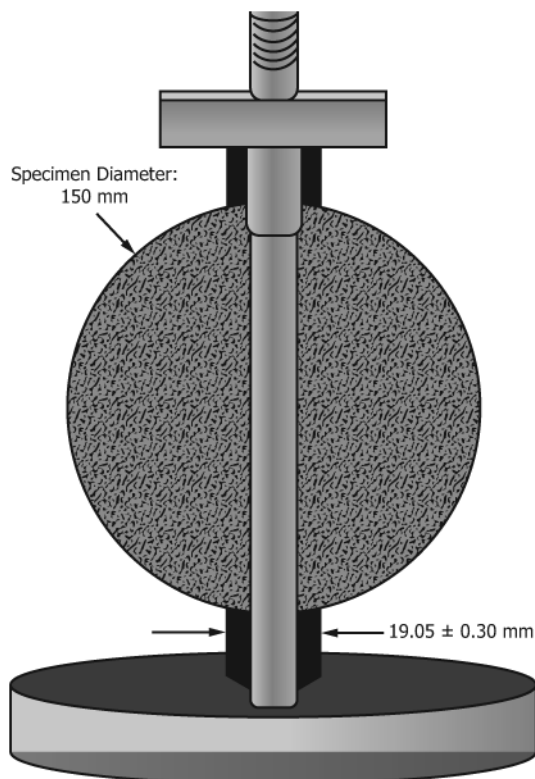


FIG. 1 Diagram of an HT-IDT Strength-Loading Fixture