
Test Procedure for**IDEAL RUTTING TEST****TxDOT Designation: Tex-253-F****Effective Date: April 2025**

1. SCOPE

- 1.1 This test method determines the rutting tolerance index (RT_{Index}) of compacted bituminous mixtures.
- 1.2 The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.
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2. APPARATUS

- 2.1 Apparatus used in [Tex-207-F](#).
- 2.2 Apparatus used in [Tex-227-F](#).
- 2.3 Apparatus used in [Tex-241-F](#).
- 2.4 Temperature Chamber, Heating Oven, or Water Bath, capable of attaining a temperature of at least 77°F and 122°F with a stability of 2°F.
- 2.5 Loading Press, capable of applying a compressive load with a capacity of at least 6,000 lb. at a controlled deformation rate of 2 in. per minute.
- 2.6 Load Cell, with a resolution of 2 lb. and a capacity of at least 6,000 lb.
- 2.7 Loading Strip and Supporting Cradle, consisting of 0.75 × 0.75 in. square steel upper bar and supporting cradle with a concave surface having a radius of curvature equal to the nominal radius of the test specimen.
Note 1— For specimens with a nominal diameter of 5.9 in. (150 mm), the length of the loading strips must exceed the specimen thickness by at least 0.2 in. (5 mm), and the outer edges of the bottom supporting cradle should feature a fillet to eliminate sharp edges (see Figure 1).
- 2.8 Displacement Measuring Device, capable of measuring the displacement with a resolution of ± 0.4 mils (± 0.01 mm). The displacement data measured during the test may need some correction for compensating system compliance.
- 2.9 Data Acquisition System, time, load, and displacement data are collected at a minimum of 40 sampling data points per second to obtain a smooth load-displacement curve.
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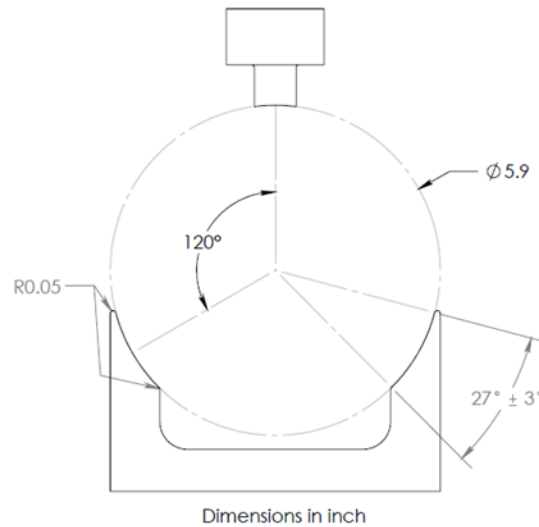


Figure 1. IDEAL Rutting Test Schematic

3. SPECIMENS

- 3.1 *Laboratory-Molded Specimens*—Prepare four specimens in accordance with [Tex-241-F](#). Specimen diameter must be 5.9 in. (150 mm), and height must be 2.4 ± 0.1 in. (62 ± 2 mm).
- 3.1.1 Density of test specimens must be $93 \pm 0.5\%$, except for Permeable Friction Course (PFC) and Crack Attenuating Mix (CAM).
- Note 1** — Mixture weights for laboratory-molded specimens that achieve the density requirement typically vary between 2400 and 2600 g.
- 3.1.2 For PFC mixtures, mold test specimens to 50 gyrations (Ndesign).
- 3.1.3 Density of the test specimen must be $95 \pm 0.5\%$ for CAM mixtures.
- 3.2 *Core Specimens*—Specimen diameter must be 6 in., and height must be a minimum of 1 1/2 in. There is not a specific density requirement for core specimens.

4. PROCEDURE

- 4.1 *Laboratory-Molded Mixtures:*
- 4.1.1 Mold four specimens in accordance with Section 3.1.
- 4.1.2 Calculate the density of the specimens in accordance with [Tex-207-F](#) and [Tex-227-F](#).
- 4.1.3 Allow the specimens to stand at room temperature ($75 \pm 5^\circ\text{F}$) for a minimum of 24 hr. before testing.
- 4.1.4 Test laboratory-molded specimens within three days of molding.
- 4.1.5 Proceed to Section 4.3.
- 4.2 *Roadway Cores:*

- 4.2.1 Obtain roadway cores in accordance with [Tex-251-F](#), Part I, meeting the requirements of Section 3.2.
- 4.2.2 Trim the bottom or top of the core only when necessary in accordance with [Tex-251-F](#), Part II. Remove any foreign matter and provide a level and smooth surface for testing.
- 4.3 Record the density, height, and diameter of each molded specimen or roadway core.
- 4.4 *Condition specimens:*
- 4.4.1 For Hot-Mixed Cold-Laid mixtures, place the specimens or cores in the temperature chamber or oven long enough to ensure a consistent temperature of $77 \pm 2^\circ\text{F}$ ($25 \pm 1^\circ\text{C}$) throughout the specimen before testing.
Note 2 — For room temperature specimens, 1.5 hr. conditioning in a temperature chamber of 77°F or a minimum of 30 min. conditioning in a water bath of 77°F is required.
- 4.4.2 For all other mixtures, place the specimens or cores in the temperature chamber or oven long enough to ensure a consistent temperature of $122 \pm 2^\circ\text{F}$ ($50 \pm 1^\circ\text{C}$) throughout the specimen before testing. Do not leave the specimens or cores in the temperature chamber or oven for more than 24 hr.
Note 3 — For room temperature specimens, 3 hr. conditioning in a temperature chamber of 122°F or a minimum of 45 min. conditioning in a water bath of 122°F is required.
- 4.5 Calibrate the loading press to use a deformation rate of 2 in. per minute.
- 4.6 Carefully place one specimen on the lower supporting cradle with uniform contact and ensure the specimen is centered.
- 4.7 Slowly lower top loading strip into light and uniform contact with the specimen.
- 4.8 Apply the load at a controlled deformation rate of 2 in. per minute. The test may be terminated 5 sec. after the peak load. During the testing, record the time, load, and displacement at a minimum sampling rate: 40 data points per second.
Note 4 — Testing a specimen must be completed in 3 min. or less after removal from the environmental chamber to maintain a uniform specimen temperature.
- 4.9 Repeat Sections 4.6–4.9 for each specimen.

5. CALCULATIONS

- 5.1 Calculate the shear strength of asphalt mixture from the measured maximum load:

$$\tau_f = 0.356 \times \frac{P_{max}}{t \times w} \quad (1)$$

where:

τ_f = Shear strength, psi

P_{max} = Measured maximum load, lbs.

t = Specimen thickness, in.

w = Width of Upper Loading Strip (0.7519 in.)

Calculate the shear strength of asphalt mixture from the measured maximum load:

$$RT_{Index} = 0.4575 \times \frac{\tau_f}{1 \text{ psi}} \quad (2)$$

where:

RT_{Index} = Rutting tolerance index

τ_f = Shear strength from Eq 1, psi

Note 5 — 1 psi is a unit cancelation factor and 0.4575 is a scale factor.

6. REPORT

6.1 Report the following for each specimen:

- density,
- thickness,
- diameter,
- rutting tolerance index, and
- shear strength.

6.2 Report the average rutting tolerance index and the average shear strength of the tested specimens or cores to the nearest whole number.