Standard Method of Test for

Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage

AASHTO Designation: T 283-21

Technically Revised: 2021 **Editorially Revised: 2021**

Technical Subcommittee: 2d, Proportioning of Asphalt–Aggregate Mixtures

American Association of State Highway and Transportation Officials
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1. SCOPE

1.1. This method covers preparation of specimens and the measurement of the change of diametral tensile strength resulting from the effects of water saturation and accelerated water conditioning, with a freeze–thaw cycle, of compacted asphalt mixtures. The results may be used to predict long-term stripping susceptibility of the asphalt mixture and evaluate liquid antistripping additives that are added to the asphalt binder or pulverulent solids, such as hydrated lime or portland cement, which are added to the mineral aggregate.

1.2. The values stated in SI units are to be regarded as the standard.

1.3. *This standard may involve hazardous materials, operations, and equipment. 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.*

1.4. *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 R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
- R 30, Mixture Conditioning of Hot Mix Asphalt (HMA)
- R 47, Reducing Samples of Asphalt Mixtures to Testing Size
- R 67, Sampling Asphalt Mixtures after Compaction (Obtaining Cores)
- R 68, Preparation of Asphalt Mixtures by Means of the Marshall Apparatus
- R 97, Sampling Asphalt Mixtures
- T 166, Bulk Specific Gravity (G_{mb}) of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens
- T 167, Compressive Strength of Hot Mix Asphalt

- T 209, Theoretical Maximum Specific Gravity (G_{mm}) and Density of Asphalt Mixtures
- T 245, Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus
- T 247, Preparation of Test Specimens of Hot Mix Asphalt (HMA) by Means of California Kneading Compactor
- T 312, Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor

2.2. *ASTM Standards*:

- D3387, Standard Test Method for Compaction and Shear Properties of Bituminous Mixtures by Means of the U.S. Corps of Engineers Gyratory Testing Machine (GTM)

3. SIGNIFICANCE AND USE

3.1. This method is intended to evaluate the effects of saturation and accelerated water conditioning, with a freeze–thaw cycle, of compacted asphalt mixtures. This method can be used to test: (a) asphalt mixtures in conjunction with mixture design testing (lab-mixed, lab-compacted); (b) asphalt mixtures produced at mixing plants (field-mixed, lab-compacted); and (c) asphalt mixture cores obtained from completed pavements of any age (field-mixed, field-compacted).

3.2. Numerical indices of retained indirect-tensile properties are obtained by comparing the properties of laboratory specimens subjected to moisture and freeze–thaw conditioning with the similar properties of dry specimens.

4. SUMMARY OF METHOD

4.1. Test specimens for each set of mix conditions, such as those prepared with untreated asphalt binder, asphalt binder treated with antistripping agent, or aggregate treated with lime, are prepared. Each set of specimens is divided into subsets. One subset is tested in dry condition for indirect-tensile strength. The other subset is subjected to vacuum saturation and a freeze cycle, followed by a warm-water soaking cycle, before being tested for indirect-tensile strength. Numerical indices of retained indirect-tensile strength properties are calculated from the test data obtained by the two subsets: dry and conditioned.

5. APPARATUS

5.1. Equipment for preparing and compacting specimens from one of the following: R 68, T 167, T 247, T 312, or ASTM D3387.

5.2. Equipment for determining the theoretical maximum specific gravity (G_{mm}) of the asphalt mixture from T 209.

5.3. Balance and water bath from T 166.

5.4. Water bath capable of maintaining a temperature of 60 ± 1°C (140 ± 2°F).

5.5. Freezer maintained at –18 ± 3°C (0 ± 5°F).

5.6. A supply of plastic film for wrapping specimens; heavy-duty, leakproof plastic bags to enclose the saturated specimens; and masking tape.

5.7. 10-mL graduated cylinder.