Standard Practice for

Preparation of Cylindrical Performance Test Specimens Using the Superpave Gyratory Compactor (SGC)

AASHTO Designation: R 83-17[1]

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

Release: Group 3 (August 2017)

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1. SCOPE

1.1. This practice covers the use of a Superpave gyratory compactor (SGC) to prepare 100-mm-diameter by 150-mm-tall cylindrical test specimens for use in a variety of axial compression and tension performance tests. This practice is intended for dense-, gap-, and open-graded asphalt mixtures with nominal maximum aggregate sizes up to 37.5 mm.

1.2. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns 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.*

2. REFERENCED DOCUMENTS

2.1. *AASHTO Standards*:

- R 30, Mixture Conditioning of Hot Mix Asphalt (HMA)
- T 166, Bulk Specific Gravity (G_{mb}) of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens
- T 209, Theoretical Maximum Specific Gravity (G_{mm}) and Density of Hot Mix Asphalt (HMA)
- T 269, Percent Air Voids in Compacted Dense and Open Asphalt Mixtures
- T 312, Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor
- T 342, Determining Dynamic Modulus of Hot Mix Asphalt (HMA)
- T 378, Determining the Dynamic Modulus and Flow Number for Asphalt Mixtures Using the Asphalt Mixture Performance Tester (AMPT)

2.2. *ASTM Standard*:

- D3549/D3549M-11, Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens

3. TERMINOLOGY

3.1. *Definitions*:

3.1.1. *end perpendicularity*—the degree to which an end surface departs from being perpendicular to the axis of the cylindrical test specimen. This configuration is measured using a precision square with the beam touching the cylinder parallel to its axis and the blade touching the highest point on the end of the cylinder. The distance between the blade of the square and the lowest point on the end of the cylinder is checked with 1.0-mm-diameter wire or feeler gauges.

3.1.2. *end planeness*—maximum departure of the specimen end from a plane. This dimension is checked using a straightedge and 0.5-mm-diameter wire or feeler gauges.

3.1.3. *SGC specimen*—a 150-mm-diameter by 160-mm-tall (minimum) cylindrical specimen for compressive tests or a 150-mm-diameter by 180-mm-tall (minimum) cylindrical specimen for tensile or tension tests prepared in an SGC meeting the requirements of T 312. (See Notes 5 and 6.)

3.1.4. *test specimen*—a 100-mm-diameter by 150-mm-tall cylindrical specimen that is sawed and cored from the SGC specimen.

4. SUMMARY OF PRACTICE

4.1. This practice presents methods for preparing 100-mm-diameter by 150-mm-tall cylindrical test specimens for use in a variety of axial compression and tension performance tests.

5. SIGNIFICANCE AND USE

5.1. This practice should be used to prepare specimens for T 342 and T 378.

5.2. This practice may also be used to prepare specimens for other tests requiring 100-mm-diameter by 150-mm-tall cylindrical test specimens.

6. APPARATUS

6.1. *Superpave Gyratory Compactor*—Meeting the requirements of T 312 and capable of preparing 150-mm-diameter specimens that are a height of at least 160 mm.

6.2. *Mixture Preparation Equipment*—Balances, ovens, thermometers, mixer, pans, and other miscellaneous equipment needed to prepare SGC specimens in accordance with T 312, perform bulk specific gravity (G_{mb}) measurements in accordance with T 166, and perform maximum specific gravity (G_{mm}) measurements in accordance with T 209.

6.3. *Core Drill*—An air- or water-cooled, diamond-bit core drill capable of cutting cores to a nominal diameter of 100 mm and meeting the dimensional requirements of Section 9.6.3. The core drill shall be equipped with a fixture for holding 150-mm-diameter SGC specimens.

Note 1—Core drills with fixed and adjustable rotational speed have been used successfully to prepare specimens meeting the dimensional tolerances given in Section 9.6.3. Rotational speeds from 450 to 750 rpm have been used.

Note 2—Core drills with automatic and manual feed-rate control have been used successfully to prepare specimens meeting the dimensional tolerances given in Section 9.6.3.