Standard Practice for

Preparation of Small Cylindrical Performance Test Specimens Using the Superpave Gyratory Compactor (SGC) or Field Cores

AASHTO Designation: PP 99-19 (2021)[1]

First Published: 2019 **Reviewed but Not Updated: 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 practice covers the use of a Superpave gyratory compactor (SGC) or field cores to prepare 38-mm (1.50-in.) diameter by 110-mm (4.33-in.) height performance test specimens for use in a variety of axial compression and tension performance tests. This practice is intended for dense-graded asphalt mixtures with nominal maximum aggregate sizes up to 19.0 mm (0.98 in.).

1.2. *This standard may involve hazardous material, operations, and equipment. This standard does not purport to address all safety problems associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

2. REFERENCED STANDARDS

2.1. *AASHTO Standards*:

- R 30, Mixture Conditioning of Hot Mix Asphalt (HMA)
- R 83, Preparation of Cylindrical Performance Test Specimens Using the Superpave Gyratory Compactor (SGC)
- T 166, Bulk Specific Gravity (G_{mb}) of Compacted Asphalt Mixtures Using Saturated Surface-Dry Specimens
- T 209, Theoretical Maximum Specific Gravity (G_{mm}) and Density of Asphalt Mixtures
- 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 331, Bulk Specific Gravity (G_{mb}) and Density of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing Method
- T 342, Determining Dynamic Modulus of Hot Mix Asphalt (HMA)
- TP 132, Determining the Dynamic Modulus for Asphalt Mixtures Using Small Specimens in the Asphalt Mixture Performance Tester (AMPT)
- TP 133, Determining the Damage Characteristic Curve and Failure Criterion Using Small Specimens in the Asphalt Mixture Performance Tester (AMPT) Cyclic Fatigue Test

2.2. *ASTM Standard*:

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

2.3. *Other Document*:

- NCDOT Report FHWA/NC/2010-01, *Investigation of Primary Causes of Fatigue Cracking in Asphalt Pavement in North Carolina*, March 2015

3. TERMINOLOGY

3.1. *end flatness*—maximum departure of the test specimen end from a plane. This dimension is checked using a straightedge and 0.5-mm (0.20-in.) diameter wire or feeler gauges.

3.2. *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 (0.04-in.) diameter wire or feeler gauges.

3.3. *SGC specimen*—a 150-mm (5.91-in.) diameter by 180-mm (7.09-in.) tall (minimum) cylindrical specimen prepared in an SGC meeting the requirements of T 312.

3.4. *test specimen*—a 38-mm (1.50-in.) diameter by 110-mm (4.33-in.) tall cylindrical specimen cored and sawed from an SGC specimen.

4. SUMMARY OF PRACTICE

4.1. This practice presents methods for extracting 38-mm (1.50-in.) diameter by 110-mm (4.33-in.) tall cylindrical 38-mm (1.50-in.) test specimens from SGC specimens and field cores 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 38-mm (1.50-in.) test specimens for TP 132 and TP 133.

5.2. This practice may also be used to prepare 38-mm (1.50-in.) test specimens for other tests requiring 38-mm (1.50-in.) diameter by 110-mm (4.33-in.) height cylindrical test specimens.

6. APPARATUS

6.1. *Superpave Gyratory Compactor*—Meeting the requirements of T 312 and capable of preparing 150-mm (5.91-in.) diameter SGC specimens that are a height of at least 180 mm (7.09 in.).

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 38 mm (1.50 in.) and meeting the dimensional requirements of Section 9.4.4. The core drill shall be equipped with a fixture for holding the SGC specimens or field cores from which the test specimens are being extracted.