

HOT MIX ASPHALT (HMA) SPECIMENS BY MEANS OF THE SUPERPAVE GYRATORY COMPACTOR FOP FOR AASHTO T 312

Scope

This procedure covers preparing specimens, using samples of plant produced HMA, for determining the mechanical and volumetric properties of HMA in accordance with AASHTO T 312-12.

Apparatus

- Superpave Gyratory Compactor (SGC) meeting the requirements of AASHTO T 312
- Molds meeting the requirements of AASHTO T 312
- Chute, mold funnel or both (Optional)
- Scale meeting the requirements of AASHTO M 231 Class G 5
- Oven, thermostatically controlled, capable of maintaining set temperature within $\pm 3^{\circ}\text{C}$ ($\pm 5^{\circ}\text{F}$)
- Thermometers accurate to $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$) between 10 and 232°C (50 - 450°F)

Note 1: Non-Contact thermometers are not acceptable.

- Miscellaneous pans, spoons, spatulas, hot pads, gloves, paper discs, markers, etc.

Equipment Requirements

The calibration shall be performed on the SGC per the Manufacturer's instructions. See agency requirements for the calibration frequency.

The mold and base plate dimensions shall be checked every twelve months or 80 hours of operation to determine that they are within the tolerances listed in AASHTO T 312.

Equipment Preparation

Prepare the equipment in accordance with manufacturer's recommendations. At a minimum preparation includes:

- Warm-up gyratory compactor
- Verify machine settings
 - Internal Angle: $1.16 \pm 0.02^{\circ}$
 - Ram Pressure: $600 \text{ kPa} \pm 18 \text{ kPa}$
 - Number of gyrations

Note 2: The number of gyrations (N_{des}) is obtained from the Job Mix Formula (JMF).

- Lubricate bearing surfaces
- Prepare recording device as required
- Pre-heat molds and plates at compaction temperature (minimum of 30 min.) or before reuse reheat (minimum of 5 min.)

Note 3: The use of multiple molds will speed up the compaction process.

- Pre-heat chute, mold funnel, spatulas, and other apparatus (not to exceed compaction temperature)

Sample Preparation

Laboratory Prepared HMA

This is a sample produced during the Mix Design process using aggregate and binder that is combined in the laboratory. When designing HMA mixes using the gyratory compactor refer to AASHTO T 312.

Plant Produced HMA

- Determine initial sample size, number of gyrations (N_{des}), and compaction temperature range from the Job Mix Formula (JMF).
- Obtain the sample in accordance with the FOP for AASHTO T 168.
- Reduce the sample in accordance with the FOP for AASHTO R 47.
- The sample size should be such that it results in a compacted specimen that is 115 ± 5 mm at the desired number of gyrations.

Note 4: Replicate specimens are generally prepared. Refer to agency requirements.

If the material is not in the compaction temperature range:

1. Place the appropriate sample mass into a container.
2. Spread to a depth of 1 to 2 in. for even heating of mixture.
3. Place in the oven until compaction temperature is reached.

Note 5: The material properties may be altered when the times of delivery of the test sample and the placement of the material on the roadway are different.

Compaction Procedure

Follow the manufacturer's recommended loading procedure. This may require the steps below to be performed in a different order. Steps 1 through 8 must be performed before the sample and mold cools below compaction temperature.

1. Remove pre-heated mold and plate(s) from the oven (verify mold and plate(s) has been cleaned if previously used).
2. Place the base plate and paper disc in bottom of mold.
3. Place the mix into the mold in a single lift (care should be taken to avoid segregation or loss of material).
4. Level the mix in the mold.
5. Place a paper disc and the heated upper plate (if required) on top of the leveled sample.
6. Load the mold into the compactor; check settings.
7. Start the compaction process.
 - a. Check the pressure (600 ± 18 kPa).
 - b. Check the angle ($1.16 \pm 0.02^\circ$).
8. Upon completion of the compaction process and record the number of gyrations and specimen height.

Note 6: If the specimen is not 115 ± 5 mm follow agency requirements.
9. Extrude the specimen from the mold; a brief cooling period may be necessary before fully extruding some specimens to ensure the specimens are not damaged.

Note 7: Clean molds after each use.
10. Carefully remove the paper discs.
11. Cool the compacted specimen to room temperature.
12. Identify the specimen with chalk or other marker.

Report

- On forms approved by the agency
- Number of gyrations
- Specimen height

PERFORMANCE EXAM CHECKLIST

**GYRATORY COMPACTION OF HMA MIXTURES
FOP FOR AASHTO T 312**

Participant Name _____ Exam Date _____

Record the symbols "P" for passing or "F" for failing on each step of the checklist.

Procedure Element	Trial 1	Trial 2
1. Angle, pressure and number of gyrations set?	_____	_____
2. Bearing surfaces, rotating base surface, and rollers lubricated?	_____	_____
3. Representative sample obtained according to the FOP for AASHTO T 168?	_____	_____
4. Sample reduced according to FOP AASHTO R 47?	_____	_____
5. HMA heated to compaction temperature?	_____	_____
6. Mold, base plate, and upper plate heated to compaction temperature?	_____	_____
7. Mold, base plate, and upper plate (if required) removed from oven and paper disk placed on bottom of mold?	_____	_____
8. Mix placed into mold in one lift without segregation?	_____	_____
9. Paper disk placed on top of the HMA?	_____	_____
10. Mold placed into compactor and upper plate clamped into place?	_____	_____
11. Pressure applied at 600 kPa ±18 kPa?	_____	_____
12. Specified number of gyrations applied?	_____	_____
13. Proper angle confirmed from display?	_____	_____
14. Compacted specimen removed from mold, paper disc(s) removed, and allowed to cool to room temperature?	_____	_____
15. HMA sample measured to a height of 115 ±5mm at required gyrations?	_____	_____

Comments: First attempt: Pass _____ Fail _____ Second attempt: Pass _____ Fail _____

Examiner Signature _____ WAQTC #: _____

