
Standard Practice for

Sample Preparation and Polishing of Asphalt Mixture Specimens for Dynamic Friction Testing

AASHTO Designation: PP 104-21 (2024)¹

Technically Revised: 2021

Reviewed but Not Updated: 2024

Technical Section: 1c, Aggregates



**American Association of State Highway and Transportation Officials
555 12th Street NW, Suite 1000
Washington, DC 20004**

Standard Practice for

Sample Preparation and Polishing of Asphalt Mixture for Dynamic Friction Testing

AASHTO Designation: PP 104-21 (2024)¹

Technically Revised: 2021Reviewed but Not Updated: 2024

Technical Section: 1c, Aggregates

AASHTO

1. SCOPE
- 1.1.

This method covers the sample preparation and polishing of asphalt mixtures for dynamic friction testing using a three-wheel polishing device (TWPD). This standard is to be used with compacted asphalt mixture slab specimens. Other specimen preparation procedures would be needed for assembling a group of gyratory cylinders to be polished using a TWPD.
- 1.2.

The values stated in SI units are to be regarded as the standard. Other units are presented for informational purposes. SI units shall be used when determining results to be used in Equation 1.
- 1.3.

This standard practice 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.

2. REFERENCED DOCUMENTS
- 2.1.

AASHTO Standards:

■

M 231, Weighing Devices Used in the Testing of Materials

■

R 30, Mixture Conditioning of Asphalt Mixtures

■

R 47, Reducing Samples of Asphalt Mixtures to Testing Size

■

R 97, Sampling Asphalt Mixtures
- 2.2.

ASTM Standard:

■

ASTM E1911, Standard Test Method for Measuring Surface Frictional Properties Using the Dynamic Friction Tester

3. SIGNIFICANCE AND USE
- 3.1.

This test method simulates the polishing of asphalt pavement surfaces caused by vehicular traffic.

4. TERMINOLOGY

- 4.1. *initial friction value*—Initial friction measurement on the asphalt mixture test specimens before they are polished in the TWPDP.
- 4.2. *terminal friction value*—Friction measurement on the asphalt mixture test specimens at the point at which additional cycles of polishing in the TWPDP will have negligible effects on the resulting friction value of the surface.

5. APPARATUS

- 5.1. *Sample Compaction Device*—A machine capable of uniformly compacting an asphalt mixture within a rigid mold to a specified height to achieve a specified density. This may be accomplished using linear kneading compaction, plate compaction, or manual impact compaction.
- 5.2. *Specimen Mold*—A rigid specimen mold with dimensions that permit the compaction of a 508 × 508 mm (20 × 20 in.) asphalt mixture slab specimen. In some cases, a dynamic friction tester (DFT) will accommodate a smaller sample, in which case, the resulting compacted asphalt mixture slab specimen shall be no less than 400 mm (16 in.) wide.
- 5.3. *Non-Stick Paper*—Paper or other material that does not readily adhere to an asphalt mixture.
- 5.4. *Metal Partition*—For full-scale slab specimens, a metal partition capable of dividing the asphalt mixture into four quadrants.
- 5.5. *Transfer Funnel*—A metal device with a tapered end capable of transferring an asphalt mixture from pans into the four quadrants created by the splitter.
- 5.6. *Thermometers*—Armored, glass, or dial type thermometers with metal stems for determining the temperature of aggregates, binder, and asphalt mixtures up to 204°C (400°F) and readable to 2°C (5°F).
- 5.7. *Balance*—A balance meeting the requirements of M 231, Class G 5, for determining the mass of aggregates, binder, and asphalt mixtures.
- 5.8. *Oven*—An oven thermostatically controlled to $\pm 3^{\circ}\text{C}$ (5°F), for heating aggregates, binder, asphalt mixtures, and equipment as required. The oven shall be capable of maintaining the temperature required for asphalt mixture conditioning in accordance with R 30.
- 5.9. *Three-Wheel Polishing Device (TWPDP)*—A polishing device that has three patterned pneumatic tires and is capable of exerting 0.65 ± 0.02 kN (146 ± 5 lb) through the tires to the test surfaces. The device's height shall be adjustable to accommodate sample heights of 25 mm (1.0 in.) to 50 mm (2.0 in.).
- 5.9.1. The tire size shall be 2.80/2.50-4 and shall maintain a pressure of 240 ± 34 kPa (35 ± 5 psi) and a tread depth of no less than 2 mm (0.1 in.). The tire tread shall have a ribbed pattern. The tire tread shall be free of any visible contamination. When replacement is necessary, all tires shall be replaced at the same time.

Note 1—Several tire manufacturers supply a 2.80/2.50-4 pneumatic tire. The rubber compound chemistry and tread style are unique for each manufacturer. For consistent polishing for each test surface, always replace the tires with the same tire from the same manufacturer. To validate whether performance will be comparable between batches of tires from the same manufacturer, it is suggested to perform comparison tests prior to exhausting supply of the previous batch.