



Designation: D8541 – 24

Standard Test Method for Determination of Relative Rotation to Evaluate the Workability of Asphalt Mixture Using Wireless Particle-Size Sensors¹

This standard is issued under the fixed designation D8541; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of relative rotation to evaluate the workability of asphalt mixture during compaction using a wireless particle-size sensor. It is applicable to asphalt mixture being compacted using the Superpave Gyratory Compactor (SGC).

1.2 This test method is appropriate for use to determine the relative rotation of laboratory-produced and plant-produced asphalt mixtures, regardless of the type or gradation of the aggregates, and whether reclaimed asphalt pavement (RAP), warm mix asphalt (WMA) additives, or any type of modifiers are used in the asphalt mixture.

1.3 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.4 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered requirements of the standard.

1.5 Since a complete precision and bias statement for this standard has not been developed, the test method is to be used for research and informational purposes only. Therefore, this standard should not be used for acceptance or rejection of a material for purchasing purposes.

1.6 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- D979/D979M Practice for Sampling Asphalt Mixtures
- D3549/D3549M Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens
- D3665 Practice for Random Sampling of Construction Materials
- D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- D6925 Test Method for Preparation and Determination of the Relative Density of Asphalt Mix Specimens by Means of the Superpave Gyratory Compactor

2.2 AASHTO Standards:³

- R 30 Standard Practice for Mixture Conditioning of Hot Mix Asphalt (HMA)
- R 83 Standard Practice for Preparation of Cylindrical Performance Test Specimens Using the Superpave Gyratory Compactor (SGC)

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *average residual rotation, ARR, n* —the average value of the residual rotation between two asphalt mixtures from the initial number of gyrations ($N_{initial}$) to the design number of gyrations (N_{design}).

3.1.2 *global coordinate, n* —the Cartesian coordinate system that is fixed in space and unaffected by the position and orientation of the object.

3.1.3 *local coordinate, n* —the coordinate system that is attached to the sensor and changes with the movement and rotation of the wireless sensor.

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.26 on Fundamental/Mechanistic Tests.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 555 12th St., NW, Suite 1000, Washington, DC 20004, <http://www.transportation.org>.