



Standard Test Method for Determining the Complex Shear Modulus (G^*) Of Bituminous Mixtures Using Dynamic Shear Rheometer¹

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1. Scope

1.1 This test method covers the determination of the complex shear modulus of bituminous mixtures using torsion rectangular geometry on a dynamic shear rheometer (DSR). It is applicable to bituminous mixtures having complex shear modulus values greater than 1×10^4 Pa when tested over a range of temperatures from 10°C to 76°C at frequencies of 0.01 to 25 Hz and strains of 0.001 % to 0.1 %. The determination of complex shear modulus is typically determined at 20°C to 70°C at 0.01% strain at 10 discrete frequency values covering 0.01 to 10 Hz. From these data, temperature or frequency master curves can be generated as required. This test method is intended for determining the complex shear modulus of bituminous mixtures as required for specification testing or quality control of bituminous mixture production.

1.2 This test method is appropriate for laboratory prepared and compacted mixtures, field produced and laboratory compacted mixtures or field cores, regardless of binder type or grade and regardless of whether RAP is used in the mixture. Due to the geometry of the specimens being tested this test method is not applicable to open-graded or SMA mixtures. It has been found to be appropriate for dense-graded mixtures, whether coarse- or fine-graded, with 19 mm or smaller nominal maximum aggregate size.

1.3 The between-laboratory reproducibility of this test method is being determined and will be available on or before June 2012. Therefore, this test method should not be used for acceptance or rejection of materials for purchasing purposes.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:²

- C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
- D140 Practice for Sampling Bituminous Materials
- D2041 Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
- D2726 Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
- D3203 Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
- D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- D6752 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
- D6857 Test Method for Maximum Specific Gravity and Density of Bituminous Paving Mixtures Using Automatic Vacuum Sealing Method
- D6925 Test Method for Preparation and Determination of the Relative Density of Asphalt Mix Specimens by Means of the Superpave Gyrotory Compactor
- D6926 Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
- D7175 Test Method for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer
- D7312 Test Method for Determining the Permanent Shear Strain and Complex Shear Modulus of Asphalt Mixtures Using the Superpave Shear Tester (SST)
- E77 Test Method for Inspection and Verification of Thermometers
- E563 Practice for Preparation and Use of an Ice-Point Bath as a Reference Temperature

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 service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.