



Designation: D7405 – 24

Standard Test Method for Multiple Stress Creep and Recovery (MSCR) of Asphalt Binder Using a Dynamic Shear Rheometer^{1,2}

This standard is issued under the fixed designation D7405; 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 percent recovery and non-recoverable creep compliance of asphalt binders by means of multiple stress creep and recovery (MSCR) testing. The MSCR test is conducted using the dynamic shear rheometer (DSR) at a specified temperature.

1.2 This standard is appropriate for unaged material, material aged in accordance with Test Method D2872 (RTFOT), material aged in accordance with Practice D6521 (PAV), and material aged in accordance with both Test Method D2872 and Practice D6521.

NOTE 1—The majority of development work on this test method was performed on material aged in accordance with Test Method D2872 (RTFOT).

1.3 The percent recovery is intended to provide a means to determine the presence of elastic response and stress dependence of polymer-modified and unmodified asphalt binders.

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 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 as requirements of the standard.

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:³

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

D8 Terminology Relating to Materials for Roads and Pavements

D2872 Test Method for Effect of Heat and Air on a Moving Film of Asphalt Binder (Rolling Thin-Film Oven Test)

D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

D5801 Test Method for Toughness and Tenacity of Asphalt Materials

D6084/D6084M Test Method for Elastic Recovery of Asphalt Materials by Ductilometer

D6373 Specification for Performance-Graded Asphalt Binder

D6521 Practice for Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV)

D7175 Test Method for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer

2.2 AASHTO Standards:⁴

M 332 Specification for Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR) Test

T 350 Method of Test for Multiple Stress Creep Recovery (MSCR) Test of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)

3. Terminology

3.1 *Definitions*—For definitions of general terms used in this standard, refer to Terminology D8.

¹ This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.44 on Rheological Tests.

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² This test method is based on a work product of the Federal Highway Administration. A similar standard is published as AASHTO TP 70.

³ 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.

⁴ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.