



Standard Test Method for Determining Fatigue Failure of Compacted Asphalt Concrete Subjected to Repeated Flexural Bending¹

This standard is issued under the fixed designation D7460; 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 provides procedures for determining a unique failure point for estimating the fatigue life of 380 mm (14.96 in.) long by 50 mm (1.97 in.) thick by 63 mm (2.48 in.) wide asphalt concrete beam specimens sawed from laboratory or field compacted asphalt concrete, which are subjected to repeated flexural bending.

1.2 The between-laboratory reproducibility of this test method is being determined and will be available on or before June 2013. Therefore, this test method should not be used for acceptance or rejection of a material for purchasing purposes.

1.3 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.

1.4 *Units*—The values stated in SI units are to be regarded as standard. Other units of measurement included in this standard are for information only.

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

2. Referenced Documents

2.1 *ASTM Standards*:²

D75 Practice for Sampling Aggregates

D140 Practice for Sampling Bituminous Materials

D979 Practice for Sampling Bituminous Paving Mixtures

D2041 Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

D3203 Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures

D3549 Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens

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

D5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 *AASHTO Standards*:³

T 321 Standard Method of Test for Determining the Fatigue Life of Compacted Hot-Mix Asphalt (HMA) Subjected to Repeated Flexural Bending

PP 3 Preparing Hot-Mix Asphalt (HMA) Specimens by Means of the Rolling Wheel Compactor

R 30 Standard Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA)

3. Terminology

3.1 *Definitions*:

3.1.1 *beam modulus*—Flexural Beam Stiffness, as determined in 10.1.3.

3.1.2 *failure point*—the number of cycles to failure, N_f , which corresponds to the maximum or peak Normalized Modulus $\times$ Cycles (Fig. 13) when plotted versus Number of Cycles.

3.1.3 *initial beam modulus*—Flexural Beam Stiffness determined at approximately 50 load cycles.

3.1.4 *normalized modulus $\times$ cycles*—see Rowe and Bouldin (1):⁴

$$\frac{(\text{Beam Stiffness} \times \text{Cycle Number})}{(\text{Initial Beam Modulus} \times \text{Cycle of Initial Beam Modulus})}$$

4. Summary of Test Method

4.1 The four-point flexural bending test method is conducted on compacted beam specimens to evaluate the fatigue

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.

³ 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>.

⁴ The boldface numbers in parentheses refer to the list of references at the end of this standard.