Designation: D7113/D7113M – 10

StandardTest Method for Density of Bituminous Paving Mixtures in Place by the Electromagnetic Surface Contact Methods[1]

This standard is issued under the fixed designation D7113/D7113M; 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 procedures for determining the in-place density and relative compaction of bituminous concrete pavement paving mixtures by an electromagnetic surface contact device by measuring changes in the electromagnetic field resulting from the compaction process.

1.2 The equipment referenced in this method is a surface contact device, which must accommodate surface moisture and temperature variation in the range typically encountered in paving applications. This can be accomplished by design parameters that reduce the device's sensitivity to surface moisture and temperature variation or by measurements and algorithms to account for surface moisture and temperature variance in the rolling pattern.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *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 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

D1188 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

D2726 Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures

D3665 Practice for Random Sampling of Construction Materials

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

D5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing

D6752 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method

3. Significance and Use

3.1 The test method described is useful as a rapid, nondestructive technique for determining the in-place density or relative compaction of compacted bituminous mixtures.

3.2 The test method can be used to establish the proper rolling effort and pattern to achieve the required density.

3.3 The non-destructive nature of the test allows repetitive measurements to be made at a single test location between roller passes or at multiple locations across the mat to monitor changes in density.

3.4 The density results obtained by this test method are relative. Device calibration (correlation with other test methods] is required to convert the results obtained using this method to actual density. Section 6 of this test method describes a method that has proven to be acceptable for correlation.

NOTE 1—The personnel and equipment used in performing this test can be evaluated in accordance with Specification D3666.

NOTE 2—Research and evaluation of devices used in this test method has been conducted. Reference is made to "Evaluation of Non-Nuclear Gauges to Measure Density of Hot-Mixed Asphalt Pavements," a pooled fund study, Pedro Romero, Ph.D., P.E., July 2002.

4. Interferences

4.1 Electromagnetic force fields such as high-tension power lines, or large metal objects in close proximity may interfere with the device reading.

4.2 The chemical composition of the material being tested may significantly affect the measurement and adjustments may

[1] This test method is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.21 on Specific Gravity and Density of Bituminous Mixtures.

Current edition approved Dec. 1, 2010 Published December 2010. Originally approved in 2005. Last previous edition approved in 2009 as D7113 – 09. DOI: 10.1520/D7113_D7113M-10.

[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.