Designation: ~~D3549/D3549M – 11~~ D3549/D3549M – 17

Standard Test Method for
Thickness or Height of Compacted ~~Bituminous Paving~~ Asphalt Mixture Specimens[1]

This standard is issued under the fixed designation D3549/D3549M; 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 determination of the thickness (or height) of compacted ~~bituminous paving~~ asphalt mixture specimens.

1.2 *Units*—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~~ nonconformance with the standard.

1.2.1 Section ~~6.4~~7.4 specifies SI units because they are the units used in the equations for ~~ASTM D 1188~~ Test Methods D1188 and ~~D2726~~ D 2726. Performing calculations without first converting any measurements made in inch-pound units to SI units in ~~Section~~7.4 6.4 will result in ~~non-conformance~~ nonconformance with the standard.

1.3 *This standard does not purport to address all of the safety ~~problems,~~ concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate ~~safety~~ safety, health, and ~~health~~ environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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 Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D8 Terminology Relating to Materials for Roads and Pavements
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 Asphalt Mixtures
D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
D5361/D5361M Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing

3. Terminology

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

4. Significance and Use

4.1 The thickness of a compacted ~~bituminous paving~~ asphalt mixture is often used as a construction check to ensure that the proper quantity of materials has been placed on a project, and to correct strength measurement on constant diameter specimens with varying heights.

NOTE 1—The text of this test method 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 test method.

NOTE 2—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of ~~Standard Practice~~ Specification D3666 are generally considered capable of competent and objective ~~testing/sampling/inspection/etc.~~ testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with ~~Practice~~Specification D3666 alone does not completely ~~assure~~ensure reliable results. Reliable results depend on many factors; following

the suggestions of ~~Practice~~Specification D3666 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

5. Apparatus

5.1 Any of the following apparatus may be used to measure the dimensions of test specimens to the nearest 0.1 cm ~~[1/16~~(¹⁄₁₆ ~~in.]:~~in.):

NOTE 3—The specifying agency may establish alternate unit requirements for measurement.

5.1.1 A metal tape or rule.

5.1.2 A set of calipers.

5.1.3 A measurement jig or other device, fabricated in such a manner that it is capable of measuring specimen thicknesses in accordance with this procedure.

6. Test Specimens

6.1 Test specimens shall be laboratory compacted or from compacted ~~bituminous~~asphalt pavements.

6.2 Pavement test specimens shall be taken with a core drill, diamond or carborundum saw, or by other suitable means.

6.2.1 Thickness measurements shall not be made on any specimen that has been distorted or cracked in removal from the pavement, removal from laboratory compaction molds, or during storage prior to measuring.

6.2.2 Specimens shall be free of foreign materials such as seal coat, foundation material, soil, paper, or foil.

6.2.3 Where desirable, specimens may be separated from other layers ~~by sawing, shearing~~according to Practice D5361/ D5361M~~or other suitable means, provided a well-defined construction plane is achieved.~~.

7. Procedure

7.1 The thickness of specimens shall be determined either directly through measurement using a tape, rule, calipers, measurement jig, or other suitable device (Method A) or through a combination of measurements of surface area and calculations using density as determined according to Test Method D1188 or D2726 (Method B).

~~Method~~METHOD A

7.2 Thickness of specimens with relatively plane horizontal surfaces or layers with ~~well defined,~~ well-defined, uniform lines of demarcation may be measured with a tape, rule, or calipers in accordance with the following:

7.2.1 Measure the thickness of the specimen or layer using any of the apparatus described in ~~4.1~~5.1. Make thickness measurements approximately perpendicular to the upper plane of the specimen. Measure between upper and lower surfaces, between a well-defined construction demarcation line and either the upper or lower surface, or between two well-defined construction demarcation lines.

7.2.2 Make four measurements at approximately quarter points on the periphery of cores or at the approximate midpoint of each of the four sides of rectangular, sawed specimens. Record the average of these measurements as the thickness of the specimen.

7.3 Alternatively, the average thickness of specimens with relatively plane horizontal surfaces may be measured by means of measurement jig or other suitable device, provided the device yields results consistently within ~~± 0.3~~±0.3 cm [±¹⁄₈ ~~1/8~~in.] of those obtained in accordance with ~~6.2~~7.2.

~~Method~~METHOD B

7.4 Specimens of ~~dense bituminous paving~~ dense-graded asphalt mixtures (less than 10 % air voids) with uniform vertical boundaries may have the thickness determined by dividing the volume of the specimen by its cross-sectional area in accordance with the following procedure:

NOTE 4—Examples are laboratory-compacted test specimens prepared for Marshall test and pavement cores or specimens cut with diamond core drills or diamond rotary saw blades.

NOTE 5—Specimens cut from the pavement with ~~hand-held~~handheld or power-operated chisels should be trimmed by abrasion or diamond sawing to remove any distorted areas prior to measuring.

7.4.1 Determine the area in square centimeters of a horizontal plane through the specimen approximately equidistant from the upper and lower surface and approximately perpendicular to the vertical sides of the specimen.

7.4.2 Determine the volume in cubic centimeters of the specimen by either Test Method D1188 or D2726.

NOTE 6—The following equations represent the volume determinations of the specimens in Test ~~Methods~~Method D1188 or D2726, respectively:

$$\text{Volume cm}^3 = \frac{D - E - (D - A)/F}{1} \text{ or } \frac{B - C}{1} \tag{1}$$

where:

A = mass of the dry specimen in air, g,

B = mass of the saturated surface-dry specimen in air, g,