



Standard Test Method for Compressive Strength of Bituminous Mixtures¹

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1. Scope

1.1 This test method provides a method for measuring the compressive strength of compacted bituminous mixtures.

1.2 *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.*

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

C 670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials²

D 1075 Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures³

D 2726 Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens³

E 4 Practices for Force Verification of Testing Machines⁴

3. Significance and Use

3.1 The compressive strength of specimens prepared and tested by this test method along with density and voids properties are used for laboratory mix design of bituminous mixtures. One approach is described in ASTM STP 252.⁵

3.1.1 This test method also describes the methods for molding, curing and testing of specimens being evaluated by Test Method D 1075.

3.1.2 When used in conjunction with other mixture physical properties, the compressive strength may contribute to the overall mixture characterization and is one factor determining its suitability for use under given loading conditions and environment as a highway paving material.

3.2 Typical values of minimum compressive strengths for design of bituminous mixtures by this method for different traffic densities are given in Table 401-1 of the “Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects.”⁶ Some state Departments of Transportation and Federal agencies have specific requirements of their own based on their experience with this method. The agencies should be consulted for their specific requirements if work is to meet their standards.

3.3 Reheated mixtures may be used in this test method, but the resulting compressive strengths will be higher than for newly prepared mixtures due to the change in the binder viscosity, an element of the compressive strength as measured under these loading conditions and temperature.⁷ See also Note 1.

4. Apparatus⁸

4.1 *Molds and Plungers*—The molds and plungers shall be in accordance with the following:

4.1.1 *Diameter Tolerances*—The maximum difference between the inside diameter of the mold and the diameter of the plungers shall be 1.27 mm (0.050 in.). There is no minimum difference specified, but it shall be such that the plungers move through the mold without binding.

4.1.2 For specimens 101.6 mm (4 in.) in diameter by 101.6 mm (4 in.) in height, molding cylinders shall be of suitable height with a nominal wall thickness of 6.4 mm (¼ in.) and an inside diameter of 101.6 mm (4 in.) or greater. Both the top and the bottom plungers shall have a diameter, or a plunger face, of less than 101.6 mm (4 in.). The bottom plunger shall be 50.8 ± 3.2 mm (2 ± ⅛ in.) in height. The top plunger shall be of suitable height. Plungers may be of various designs. Plungers of solid construction, hollow cylinders with solid caps of not less than 12.7 mm (½ in.) thickness on each end, or a plunger design which allows the attachment of a plunger face of no less than 12.7 mm (½ in.) in thickness are all acceptable.

¹ This test method is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.20 on Mechanical Tests of Bituminous Mixes.

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² *Annual Book of ASTM Standards*, Vol 04.02.

³ *Annual Book of ASTM Standards*, Vol 04.03.

⁴ *Annual Book of ASTM Standards*, Vol 03.01.

⁵ Goode, J. F., “Use of the Immersion-Compression Test in Evaluating and Designing Paving Mixtures.” *ASTM STP 252*, 1959, pp. 113–129.

⁶ “Asphaltic Concrete Mix Requirements,” *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*, 1985, Federal Highway Administration, Washington, DC 20590, p. 196.

⁷ Welborn, J. Y., Halstead, W. J., and Olsen, R. E., “Relation of Absolute Viscosity of Asphalt Binders to Stability of Asphalt Mixtures,” *Public Roads*, Vol. 32, No. 6, February 1963, FHWA, Washington, DC. (Also “Symposium on Fundamental Viscosity of Bituminous Materials” *ASTM STP No. 328*.)

⁸ These requirements for apparatus are considered to be appropriate for central research and control laboratories. It is realized that, in field laboratories, less elaborate equipment will be available and that the testing machine, especially, is likely to be of much simpler type than that specified in this test method.