Designation: C1245/C1245M – 12

Standard Test Method for Determining Relative Bond Strength Between Hardened Roller Compacted Concrete Lifts (Point Load Test)[1]

This standard is issued under the fixed designation C1245/C1245M; 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 is intended for testing roller-compacted concrete specimens and covers determination of the relative bond between layers of roller-compacted concrete or other hardened concrete in multiple-lift forms of construction. It is applicable to all types of layered roller-compacted concrete where the total depth is sufficient to meet the minimum specimen length and diameter requirements of this test method. This test method is not intended to provide tensile strength results of the material tested.

1.2 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.

1.3 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 this 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 and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C39/C39M Test Method for Compressive Strength of Cylindrical Concrete Specimens

C42/C42M Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete

C125 Terminology Relating to Concrete and Concrete Aggregates

C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory

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

C1176/C1176M Practice for Making Roller-Compacted Concrete in Cylinder Molds Using a Vibrating Table

C1435/C1435M Practice for Molding Roller-Compacted Concrete in Cylinder Molds Using a Vibrating Hammer

D1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3))

3. Terminology

3.1 Refer to Terminology C125 for definitions of terms used in this test method.

4. Significance and Use

4.1 This test method is used to measure the relative bond strength of roller-compacted concrete to other roller-compacted concrete by using a point load test at the joint (see Note 1). Relative bond strength is determined using drilled cores or cast cylindrical specimens in which the bond surface is essentially normal to the longitudinal axis at approximately the mid-length of the specimen. A splitting tensile stress normal to the bond surface is produced by applying a point load at the joint.

4.2 The test results in a value that can be compared to that obtained by testing other specimens which are made from the same materials and by the same process. Results can be used for the purpose of comparing the relative bond strength of various joint conditions, joint treatments, or bonding materials applied to the joint.

4.3 The test results are not to be taken as a true bond strength. Values of cohesion or tensile strength shall be determined by methods other than this test method.

4.4 This test method may be used either for laboratory investigation by casting individual composite cylinders or by coring prototype structures or assemblies (Test Method C42/C42M).

NOTE 1—This test may be used for testing the relative bond of other

[1] This test method is under the jurisdiction of ASTM Committee C09 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.45 on Roller-Compacted Concrete.

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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.

*A Summary of Changes section appears at the end of this standard

hardened hydraulic cement-based materials other than RCC.

5. Apparatus

5.1 *Testing Machine*—The testing machine shall conform to the requirements of Test Method C39/C39M.

5.2 *Testing Apparatus*—The testing apparatus shall be constructed of steel and allow the testing of both 100 and 150-mm [4 and 6-in.] diameter specimens. The test schematic is given in Fig. 1. The testing apparatus shall permit the positioning of a specimen such that the joint of the bonded surfaces is oriented as closely as possible parallel to the direction of loading. Figs. 2-5 provide the information necessary to construct the apparatus for 100 and 150-mm [4 and 6-in.] diameter specimens. Anvil rods (Fig. 2 and Fig. 3) shall have a hardness of not less than 55 HRC (Rockwell hardness number of 55 on the C scale) and shall be plane on the bearing surfaces to within ±0.025 mm [0.001 in.]. The alignment post shall ensure that the anvil rods are kept parallel to each other in the vertical plane. The system is easily adaptable to most testing machines.

6. Test Specimens

6.1 Test specimens shall be cast cylinders or cores. Cylinders shall be cast in accordance with Practice C1176/C1176M, Practice C1435/C1435M, or Test Method D1557 and be 100 or 150 mm [4 or 6 in.] in diameter. Cores shall be obtained in accordance with Practice C42/C42M and be 100 or 150 mm [4 or 6 in] in diameter. Cut specimen to ensure that the plane best describing the bond surface is oriented at 90 ± 15° to the long axes of the specimens.

6.2 Cure molded test specimens in accordance with Practice C192/C192M (laboratory specimens). Drilled cores shall be moisture conditioned in accordance with Test Method C42/C42M.

NOTE 2—Test results are not affected significantly by specimen surfaces

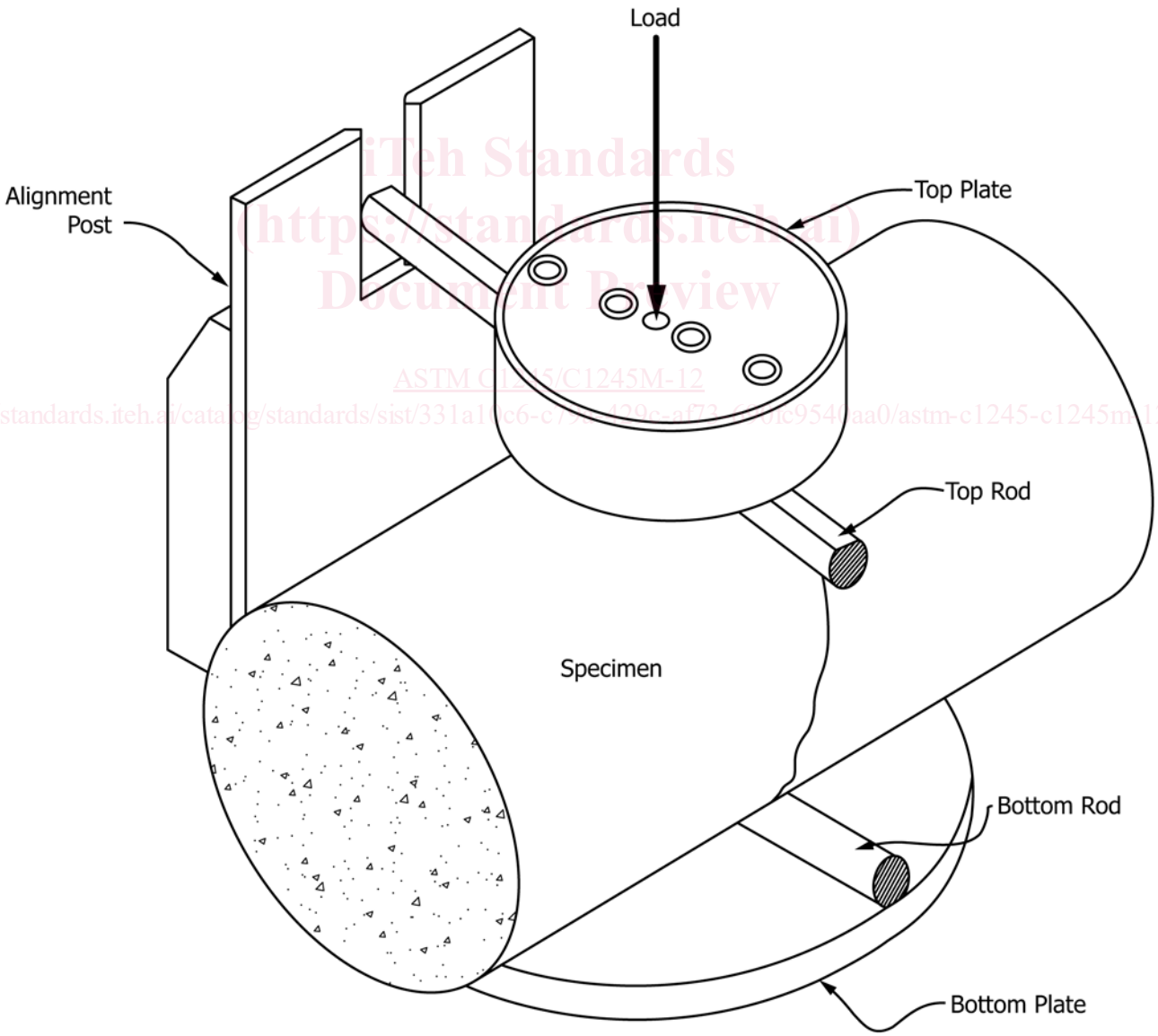
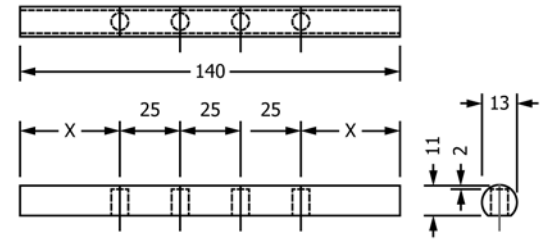
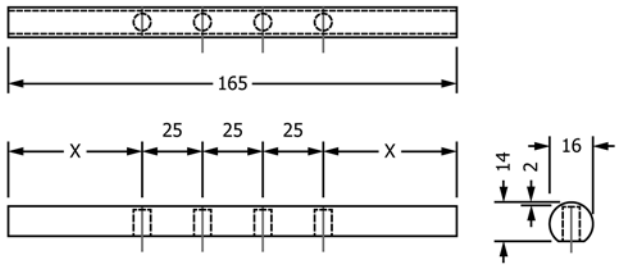


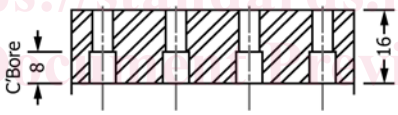
FIG. 1 Schematic of Loading Method

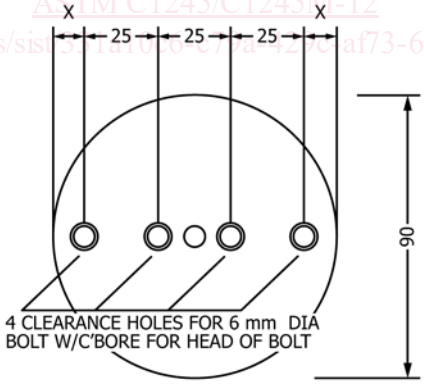


Rod for 100 mm Diameter Specimens



Rod for 150 mm Diameter Specimens





NOTE 1—Dimensions are shown in mm, refer to Table 1 for values in inches.

NOTE 2—x = $\frac{(L-75)}{2}$, where L is the length of the anvil rod or diameter of the top plate.

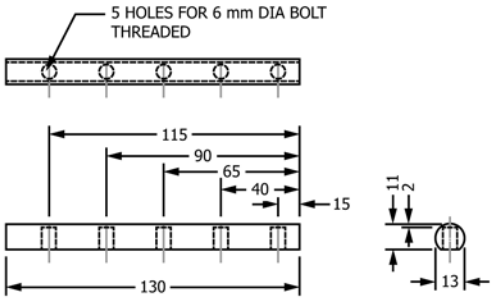
FIG. 2 Top Plate and Anvil Rod

obtained with normal coring operations. The ends of cores need not be trimmed.

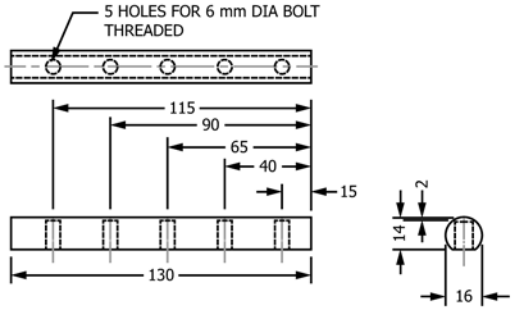
NOTE 3—Where the bond surface undulates grossly, that is, the surface has a local texture exceeding 15 mm [0.5 in.] in amplitude, 150-mm [6-in.] diameter cores are preferable. No information is available on the relative results of 150-mm [6-in.] versus 100-mm [4-in.] diameter specimens.

7. Procedure

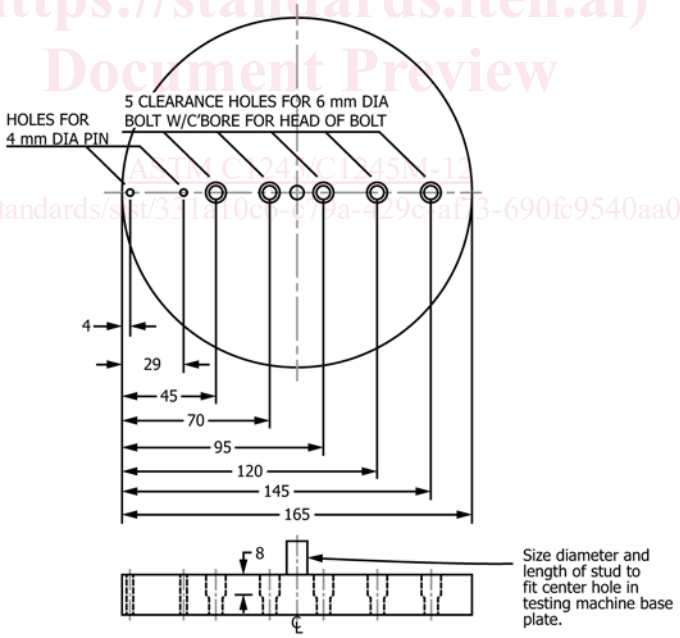
7.1 *Measurements*—Determine the diameter of the test specimens by averaging three diameters measured on the bond surface. Visually identify the bond surface by color, texture, or



ROD for 100 mm Diameter Specimens



Rod for 150 mm Diameter Specimens



NOTE 1—Dimensions are shown in mm, refer to Table 1 for values in inches.

FIG. 3 Base Plate and Anvil Rod

material contrasts. Measure diameters to the nearest 2.5 mm [0.1 in.]. Determine the length of each section of the bonded specimens to the nearest 2.5 mm [0.1 in.], and use these lengths to determine the section length-to-diameter ratios. Specimens must have a minimum length-to-diameter ratio of 1.2 if the bond plane is at mid-length (within ±5 mm [0.25 in.]) of the specimen. If the bond plane is not at mid-length of the specimen, the section on each side of the bond plane shall be