



Designation: D7913/D7913M – 14 (Reapproved 2020)

Standard Test Method for Bond Strength of Fiber-Reinforced Polymer Matrix Composite Bars to Concrete by Pullout Testing¹

This standard is issued under the fixed designation D7913/D7913M; 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 determination of the bond strength of fiber-reinforced polymer (FRP) composite bars used as reinforcing bars or pre-stressing tendons in concrete.

1.2 Two procedures for casting test specimens are provided. The first procedure aligns the bar with the concrete casting direction. The second procedure aligns the bar's transverse to the concrete casting direction.

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 are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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

- A944** Test Method for Comparing Bond Strength of Steel Reinforcing Bars to Concrete Using Beam-End Specimens
- C33/C33M** Specification for Concrete Aggregates

¹ This test method is under the jurisdiction of ASTM Committee D30 on Composite Materials and is the direct responsibility of Subcommittee D30.10 on Composites for Civil Structures.

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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.

- C39/C39M** Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C143/C143M** Test Method for Slump of Hydraulic-Cement Concrete
- C150/C150M** Specification for Portland Cement
- C192/C192M** Practice for Making and Curing Concrete Test Specimens in the Laboratory
- C293/C293M** Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading)
- C511** Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
- C617/C617M** Practice for Capping Cylindrical Concrete Specimens
- D792** Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
- D883** Terminology Relating to Plastics
- D3878** Terminology for Composite Materials
- D5229/D5229M** Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials
- D7205/D7205M** Test Method for Tensile Properties of Fiber Reinforced Polymer Matrix Composite Bars
- D7705** Test Method for Alkali Resistance of Fiber Reinforced Polymer (FRP) Matrix Composite Bars used in Concrete Construction
- E4** Practices for Force Verification of Testing Machines
- E6** Terminology Relating to Methods of Mechanical Testing
- E83** Practice for Verification and Classification of Extensometer Systems
- E122** Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process
- E456** Terminology Relating to Quality and Statistics
- E1012** Practice for Verification of Testing Frame and Specimen Alignment Under Tensile and Compressive Axial Force Application
- F2203** Test Method for Linear Measurement Using Precision Steel Rule

3. Terminology

3.1 Terminology in **D3878** defines terms relating to high modulus fibers and their composites. Terminology in **D883**