



Designation: D7958/D7958M – 17

Standard Test Method for Evaluation of Performance for FRP Composite Bonded to Concrete Substrate using Beam Test¹

This standard is issued under the fixed designation D7958/D7958M; 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 describes the apparatus and procedure for evaluating the performance of wet lay-up or pultruded Fiber-Reinforced Polymer (FRP) composite systems adhesively bonded to a flat concrete substrate. The test determines the maximum force that an FRP system can bear before detaching from a concrete beam tested in flexure. Failure will occur along the weakest plane within the system composed of the FRP composite, adhesive, and concrete substrate.

1.2 This test method is used for assessment and comparison of FRP systems subject to environmental conditioning. This test method is not intended for job approval or product qualification purposes.

1.3 This test method is intended for use with adhesive-applied FRP systems and is appropriate for use with FRP systems having any fiber orientation or combination of ply orientations comprising the FRP composite, although the test condition only considers forces in the direction parallel to the beam longitudinal axis.

1.4 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 exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.4.1 Within the text, the inch-pound units are shown in brackets.

1.5 *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 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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1.6 *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:

- C31/C31M Practice for Making and Curing Concrete Test Specimens in the Field
- C33/C33M Specification for Concrete Aggregates
- 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
- C78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
- C125 Terminology Relating to Concrete and Concrete Aggregates
- C150/C150M Specification for Portland Cement
- C192/C192M Practice for Making and Curing Concrete Test Specimens in the Laboratory
- C511 Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes
- C617 Practice for Capping Cylindrical Concrete Specimens
- D883 Terminology Relating to Plastics
- D3039 Test Method for Tensile Properties of Polymer Matrix Composite Materials
- D3878 Terminology for Composite Materials
- D7565 Test Method for Determining Tensile Properties of Fiber Reinforced Polymer Matrix Composites Used for Strengthening of Civil Structures
- E4 Practices for Force Verification of Testing Machines
- E6 Terminology Relating to Methods of Mechanical Testing
- E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process