



**Designation: D8337/D8337M – 21**

## **Standard Test Method for Evaluation of Bond Properties of FRP Composite Applied to Concrete Substrate using Single-Lap Shear Test<sup>1</sup>**

This standard is issued under the fixed designation D8337/D8337M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### **1. Scope**

1.1 This test method describes the apparatus and procedure to evaluate the lap shear bond properties of wet lay-up or shop-fabricated (for example, pultruded) fiber-reinforced polymer (FRP) composite systems adhesively applied to a flat concrete substrate. The test determines the plateau force that an FRP system can bear before complete debonding from a concrete prism tested using a direct single-lap shear test. This plateau force is reported as bond capacity and may be different from the maximum applied force. The plateau force is then used to determine the interfacial fracture energy and the cohesive material law.

1.2 This test method is not intended for job approval or for product qualification purposes unless an external agency adopts the test method for those purposes.

1.3 This test method is intended for use with adhesive-applied or wet lay-up 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 prism longitudinal axis.

1.4 *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 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.

1.4.1 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.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standard-*

*ization 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:<sup>2</sup>**

- 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**
- 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**
- C496/C496M Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens**
- 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**
- D883 Terminology Relating to Plastics**
- D3039/D3039M Test Method for Tensile Properties of Polymer Matrix Composite Materials**
- D3878 Terminology for Composite Materials**
- D5229/D5229M Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials**
- D7565/D7565M Test Method for Determining Tensile Properties of Fiber Reinforced Polymer Matrix Composites Used for Strengthening of Civil Structures**
- D7958/D7958M Test Method for Evaluation of Performance**

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.