



Standard Test Method for Transverse Shear Strength of Fiber-reinforced Polymer Matrix Composite Bars¹

This standard is issued under the fixed designation D7617/D7617M; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This test method specifies the test requirements for (FRP) composite smooth round rods and textured bars for determining the transverse shear strength via a double shear fixture. FRP rods and bars are often loaded in transverse shear when these elements are used as dowels in concrete pavements, as stirrups in concrete beams, or as shear reinforcements in glued-laminated wood beams, for example.

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.

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

1.3 *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

A615/A615M Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

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

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

E456 Terminology Relating to Quality and Statistics

3. Terminology

3.1 Terminology in **D3878** defines terms relating to high-modulus fibers and their composites. Terminology in **D883** defines terms relating to plastics. Terminology in **E6** defines terms relating to mechanical testing. Terminology in **E456** defines terms relating to statistics and the selection of sample sizes. In the event of a conflict between terms, Terminology in **D3878** shall have precedence over the other terminology standards.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *bar, n*—a linear element, with a substantially round cross section, often with surface undulations or a coating of particles that promote mechanical interlock with concrete.

3.2.2 *double shear fixture, n*—a test fixture that results in the desired shear force being applied to two distinct sections of the specimen.

3.2.3 *failure, n*—cleavage of the bar under test into three pieces or into two pieces where the second non-cleaved shear plane is highly damaged.

3.2.4 *nominal cross sectional area, n*—a measure of cross sectional area of a bar, determined over at least one representative length, used to calculate stress.

3.2.5 *projected outer diameter, n*—the smallest diameter of a circle through which a bar, with its undulations or coatings, will pass. The bar may touch the circle but must pass through without undue force.

3.2.6 *rod, n*—a bar with a smooth circular cross section and no texture or deformations.

3.2.7 *standard cross sectional area, n*—the cross sectional area of a standard numbered steel concrete reinforcing bar as given in **A615/A615M**, Table 1.

3.2.8 *surface undulation, n*—variation in the area, orientation, or shape of cross section of a bar along its length,

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.