



Designation: D8067/D8067M – 17

Standard Test Method for In-Plane Shear Properties of Sandwich Panels Using a Picture Frame Fixture¹

This standard is issued under the fixed designation D8067/D8067M; 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 determination of apparent in-plane shear strength and stiffness properties of flat sandwich constructions with composite face sheets. Permissible core material forms include those with continuous bonding surfaces (such as balsa wood and foams) as well as those with discontinuous bonding surfaces (such as honeycomb).

1.2 The square test specimen with corner notches is mechanically fastened to a pinned metal frame along each edge. The frame is loaded in uni-axial tension which produces tensile forces in the frame elements at a 45° angle to the applied tension. These tensile forces act along the edges of the specimen to cause a state of predominately shear stress to transfer the applied force through the specimen. Procedure A uses a specimen without edge doublers; Procedure B uses a specimen with four discrete edge doublers; Procedure C uses a specimen with a continuous edge doubler.

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 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.

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

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

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

E4 Practices for Force Verification of Testing Machines

E6 Terminology Relating to Methods of Mechanical Testing

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E251 Test Methods for Performance Characteristics of Metallic Bonded Resistance Strain Gages

E456 Terminology Relating to Quality and Statistics

3. Terminology

3.1 *Definitions*—Terminology D3878 defines terms relating to high-modulus fibers and their composites, as well as terms relating to sandwich constructions. Terminology D883 defines terms relating to plastics. Terminology E6 defines terms relating to mechanical testing. Terminology E456 and Practice E177 define terms relating to statistics. In the event of a conflict between terms, Terminology D3878 shall have precedence over the other terminologies.

3.2 Acronyms:

3.2.1 CV—coefficient of variation statistic of a sample population for a given property (in percent)

3.2.2 F^{su} —face sheet ultimate shear stress

3.2.3 G_f —effective face sheet chord shear modulus

3.2.4 γ —measured engineering shear strain in face sheet

3.2.5 L —length of specimen between doubler edges

3.2.6 n —number of specimens

3.2.7 P —applied force

3.2.8 P_{max} —maximum force carried by test specimen before failure

¹ This test method is under the jurisdiction of ASTM Committee D30 on Composite Materials and is the direct responsibility of Subcommittee D30.09 on Sandwich Construction.

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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.