



# Standard Test Method for Facing Properties of Sandwich Constructions by Long Beam Flexure<sup>1</sup>

This standard is issued under the fixed designation D7249/D7249M; 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 covers determination of facing properties of flat sandwich constructions subjected to flexure in such a manner that the applied moments produce curvature of the sandwich facing planes and result in compressive and tensile forces in the facings. 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 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.*

NOTE 1—Alternate procedures for determining the compressive strength of unidirectional polymer matrix composites materials in a sandwich beam configuration may be found in Test Method [D5467/D5467M](#).

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[C393](#) Test Method for Flexural Properties of Sandwich Constructions  
[D3878](#) Terminology for Composite Materials

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee [D30](#) on Composite Materials and is the direct responsibility of Subcommittee [D30.09](#) on Sandwich Construction.

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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.

[D5229/D5229M](#) Test Method for Moisture Absorption Properties and Equilibrium Conditioning of Polymer Matrix Composite Materials

[D5467/D5467M](#) Test Method for Compressive Properties of Unidirectional Polymer Matrix Composite Materials Using a Sandwich Beam

[D7250/D7250M](#) Practice for Determining Sandwich Beam Flexural and Shear Stiffness

[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

[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. 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 Symbols:

|             |                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------|
| $b$         | = specimen width                                                                              |
| $c$         | = core thickness                                                                              |
| $CV$        | = coefficient of variation statistic of a sample population for a given property (in percent) |
| $d$         | = sandwich total thickness                                                                    |
| $D^{F,nom}$ | = effective sandwich flexural stiffness                                                       |
| $E^f$       | = effective facing chord modulus                                                              |
| $\epsilon$  | = measuring strain in facing                                                                  |
| $F^u$       | = facing ultimate strength (tensile or compressive)                                           |
| $F_s$       | = core shear allowable strength                                                               |
| $F_c$       | = core compression allowable strength                                                         |
| $k$         | = core shear strength factor to ensure facing failure                                         |
| $l$         | = length of loading span                                                                      |
| $L$         | = length of support span                                                                      |
| $l_{pad}$   | = length of loading pad                                                                       |
| $n$         | = number of specimens                                                                         |