



# Standard Test Method for Node Tensile Strength of Honeycomb Core Materials<sup>1</sup>

This standard is issued under the fixed designation C363/C363M; 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 the determination of the tensile-node bond strength of honeycomb core materials.

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.

1.3 *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:*<sup>2</sup>

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

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

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 *Symbols:*

3.2.1  $\sigma$ —tensile node strength, MPa [psi].

3.2.2  $P$ —ultimate tensile force, N [lb].

3.2.3  $b$ —initial width of specimen, mm [in.].

3.2.4  $t$ —thickness of specimen, mm [in.].

3.2.5  $\bar{x}$ —sample mean (average).

3.2.6  $S_n - 1$ —sample standard deviation.

3.2.7  $CV$ —sample coefficient of variation (in percent).

3.2.8  $n$ —number of specimens.

3.2.9  $x_j$ —measured or derived property.

## 4. Summary of Test Method

4.1 This test method consists of subjecting a honeycomb construction to a uniaxial tensile force parallel to the plane of the honeycomb. The force is transmitted to the honeycomb through pins, which are placed in cell rows on the top and bottom portions of one specimen.

4.2 The only acceptable failure mode for tensile-node bond strength is the tensile failure of the node-to-node honeycomb bond within the body of the honeycomb specimen. Failure of the honeycomb material at the loading pin location is not a valid failure mode.

## 5. Significance and Use

5.1 The honeycomb tensile-node bond strength is a fundamental property that can be used in determining whether honeycomb cores can be handled during cutting, machining and forming without the nodes breaking. The tensile-node bond strength is the tensile stress that causes failure of the honeycomb by rupture of the bond between the nodes. It is usually a peeling-type failure.

5.2 This test method provides a standard method of obtaining tensile-node bond strength data for quality control, acceptance specification testing, and research and development.

<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.