



Standard Test Method for Determining Poisson's Ratio of Honeycomb Cores¹

This standard is issued under the fixed designation D6790/D6790M; 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 the determination of the sandwich honeycomb core Poisson's ratio from the anticlastic curvature radii, see Fig. 1.

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

D2711/C2711M Test Method for Density of Sandwich Core Materials

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

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

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.

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 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:* c = chord measurement

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

d = depth measurement

R_a = anticlastic curvature radius

R_c = cylinder radius

S_{n-1} = standard deviation statistic of a sample population for a given property

x_i = test result for an individual specimen from the sample population for a given property

$\bar{x}$ = mean or average (estimate of mean) of a sample population for a given property

ν = Poisson's ratio

4. Summary of Test Method

4.1 This test method determines the Poisson's ratio of sandwich honeycomb core by bending the core around a cylinder and taking measurements of the anticlastic curvature that occurs.

5. Significance and Use

5.1 Certain sandwich panel analyses require the Poisson's ratio of the honeycomb core. It is not possible to measure the honeycomb's Poisson's ratio by conventional methods.

5.2 This test method provides a standard method of determining the Poisson's ratio of honeycomb core materials for design properties, material specifications, research and development applications, and quality assurance.

5.3 Factors that influence the Poisson's ratio of honeycomb core materials and shall therefore be reported include the following: core material, methods of material fabrication, core geometry, core thickness, core thickness uniformity, cell wall thickness, specimen geometry, specimen preparation, and specimen conditioning.