



Designation: D6790 – 02 (Reapproved 2007)

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

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

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given may be approximate.

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

C271/C271M Test Method for Density of Sandwich Core Materials

C274 Terminology of Structural Sandwich Constructions

3. Terminology

3.1 *Definitions*—Terminology **C274** defines terms relating to sandwich constructions.

3.2 *Symbols:*

c = chord measurement

d = depth measurement

R_a = anticlastic curvature radius

R_c = cylinder radius

μ = Poisson's ratio

4. Summary of Test Method

4.1 The Poisson's ratio of honeycomb core is determined by bending the core around a cylinder and taking measurements of the anticlastic curvature that occurs.

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.

Current edition approved May 1, 2007. Published June 2007. Originally approved in 2002. Last previous edition approved in 2002 as D6790 - 02. DOI: 10.1520/D6790-02R07.

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.

5. Significance and Use

5.1 Certain sandwich panel finite element programs require the Poisson's ratio of the honeycomb core. It is not possible to measure the honeycomb's Poisson's ratio by standard methods.

6. Interference

6.1 The test method shown here is one means of obtaining the Poisson's ratio of honeycomb. However, this test method has not been widely used, and it is in its conceptual stage.

7. Apparatus

7.1 *Cylinders*, of various diameters. A 610 mm (24 in.) diameter cylinder is recommended.

7.2 *Scale*, capable of measuring accurately to 0.25 mm (0.01 in.).

8. Sampling and Test Specimens

8.1 Test at least five specimens per test condition unless valid results can be gained through the use of fewer specimens, such as in the case of a designed experiment.

8.2 The test specimen shall be square. The length and width should be great enough to obtain an anticlastic curvature when the specimen is bent over the cylinder. A specimen size of 300 by 300 mm (12 by 12 in.) is recommended.

8.3 Various core thicknesses should be tested. A core thickness of 12.7 mm (0.50 in.) is recommended as a starting thickness.

9. Calibration

9.1 The accuracy of all measuring equipment shall have certified calibrations that are current at the time of use of the equipment.

10. Conditioning

10.1 When the physical properties of the core material are affected by moisture, bring the test specimens to constant weight ($\pm 1\%$) before testing, preferably in a conditioning room with temperature and humidity control and make the tests, preferably, in a room under the same condition. A temperature of $23 \pm 3^\circ\text{C}$ ($73 \pm 5^\circ\text{F}$) and a relative humidity of $50 \pm 5\%$ are recommended.