



Designation: C481 – 99 (Reapproved 2005)

## Standard Test Method for Laboratory Aging of Sandwich Constructions<sup>1</sup>

This standard is issued under the fixed designation C481; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method covers the determination of the resistance of sandwich panels to severe exposure conditions as measured by the change in selected properties of the material after exposure. The exposure cycle to which the specimen is subjected is an arbitrary test having no correlation with natural weathering conditions.

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:*<sup>2</sup>

**C273** Test Method for Shear Properties of Sandwich Core Materials

**C297/C297M** Test Method for Flatwise Tensile Strength of Sandwich Constructions

**C363** Test Method for Delamination Strength of Honeycomb Core Materials

**C364** Test Method for Edgewise Compressive Strength of Sandwich Constructions

**C365/C365M** Test Method for Flatwise Compressive Properties of Sandwich Cores

**C393** Test Method for Flexural Properties of Sandwich Constructions

**D1781** Test Method for Climbing Drum Peel for Adhesives

<sup>1</sup> This specification 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.

### 3. Significance and Use

3.1 Most sandwich panels are subjected to various temperature and humidity environments. This laboratory aging test determines the selected panel property degradation under simulated conditions.

3.2 These test methods provide a standard method of obtaining simulated environmental degradation data for quality control, acceptance specification testing, and research and development; however, these laboratory aging test procedures do not have any correlation with natural weathering conditions.

### 4. Apparatus

4.1 *Water tank, steam sprayer, oven, and freezer*, all capable of maintaining the required environment.

4.2 *Test apparatus*, shall conform to the appropriate ASTM Test Method listed in Section 2.

### 5. Test Specimens

5.1 The test specimens shall conform to the appropriate ASTM Test Method listed in Section 2.

### 6. Aging Test Procedures

6.1 Subject each specimen to six complete cycles of laboratory aging, using either Cycle A (more severe) or Cycle B (milder). The time interval between cycles shall not exceed 30 min.

6.2 *Cycle A:*

6.2.1 Totally immerse the specimen horizontally in water at  $50 \pm 2^\circ\text{C}$  ( $120 \pm 3^\circ\text{F}$ ) for 1 h.

6.2.2 Spray with steam and water vapor at  $95 \pm 3^\circ\text{C}$  ( $200 \pm 5^\circ\text{F}$ ) for 3 h.

6.2.3 Store at  $-12 \pm 3^\circ\text{C}$  ( $10 \pm 5^\circ\text{F}$ ) for 20 h.

6.2.4 Heat at  $100 \pm 2^\circ\text{C}$  ( $210 \pm 3^\circ\text{F}$ ) in dry air for 3 h.

6.2.5 Spray again with steam and water vapor at  $95 \pm 3^\circ\text{C}$  ( $200 \pm 5^\circ\text{F}$ ) for 3 h.

6.2.6 Heat in dry air at  $100 \pm 2^\circ\text{C}$  ( $210 \pm 3^\circ\text{F}$ ) for 18 h.

6.3 *Cycle B:*

6.3.1 Totally immerse the specimen horizontally in water at  $50 \pm 3^\circ\text{C}$  ( $120 \pm 5^\circ\text{F}$ ) for 1 h.

6.3.2 Heat in dry air at  $70 \pm 3^\circ\text{C}$  ( $160 \pm 5^\circ\text{F}$ ) for 3 h.