



Designation: D5113 – 97 (Reapproved 2021)

Standard Test Method for Determining Adhesive Attack on Rigid Cellular Foam¹

This standard is issued under the fixed designation D5113; 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 a practical means of measuring the degree of rigid cellular polystyrene (RCPS) foam cavitation damage when an adhesive is used to bond this substrate.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

C578 Specification for Rigid, Cellular Polystyrene Thermal Insulation
D907 Terminology of Adhesives

3. Terminology

3.1 *Definitions:*

3.1.1 Many terms in this standard are defined in Terminology D907.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *cavitation damage, n*—as related to rigid cellular polystyrene foam, the pitting and wearing away of the surface.

¹ This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.10 on Working Properties.

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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.

3.2.1.1 *Discussion*—Damage may include loss of material, surface deformation, or any other changes in microstructure, properties, or appearance.

3.3 *Abbreviations:*

3.3.1 RCPS—Rigid cellular polystyrene.

4. Summary of Test Method

4.1 This test method consists of testing two RCPS sections bonded by adhesive and allowed to set for 24 h. Before evaluation, the degree of cavitation is measured and recorded.

5. Significance and Use

5.1 Rigid foam such as RCPS is used in the building construction industry. Because it is sensitive to certain components contained in adhesives which cause it to dissolve, it is important to have a test method to determine whether an adhesive is compatible with RCPS foam. This test method would help the end user decide which adhesive to use with RCPS foam by quantitatively measuring the amount of cavitation formed by the components contained in the adhesive.

6. Apparatus

6.1 *Circular Template*, with an inside diameter of 25 mm (1.0 in.) and a depth of 6 mm ($\frac{1}{4}$ in.).

6.2 *Circulating Air Oven*, for elevated temperature testing, capable of being held at $40 \pm 1^\circ\text{C}$ ($104 \pm 2^\circ\text{F}$).

7. Materials

7.1 For the test, use Type IV RCPS foam with a nominal thickness of 25 mm (1.0 in.).

7.2 If another type is used, record the type, thickness and density.

8. Conditioning

8.1 Unless otherwise agreed upon by the purchaser and the manufacturer, condition the test specimen and adhesive 24 h prior to testing at $23 \pm 1^\circ\text{C}$ ($73 \pm 2^\circ\text{F}$) and $50 \pm 5\%$ relative humidity.

9. Procedure

9.1 Prepare enough specimens so that two assemblies are tested at both temperatures.

9.1.1 For each test, cut two sections of RCPS into 76 mm (3 in.) by 76 mm (3 in.) specimens.

9.1.2 Place the template in the center of one of the specimens.

9.1.3 Fill the template with the desired adhesive, taking care to strike off any excess with a flat edge spatula.

9.1.4 Immediately remove the template and superimpose the second piece of foamboard on top of the first one. Squeeze the assembly together until the adhesive can be seen squeezing out from between the assembly.

9.1.5 Wrap the assembly in a 305 mm (12.0 in.) by 305 mm (12.0 in.) piece of aluminum foil.

9.2 Condition the assemblies for 24 h at the desired temperatures, room temperature and 40°C (128°F) or any other requested temperatures.

9.3 After conditioning, unwrap the assemblies and cut them in half (corner to corner to allow a greater cross-sectional area).

9.4 Use a ruler to measure the maximum depth of the foam's cavitation to the nearest millimetre. Report cavitation as half the total depth of the two glued specimens.

9.5 Record cavitation in millimetres (inches).

10. Report

10.1 Report the following information:

10.1.1 Complete identification of the adhesive tested including type, source, manufacturer's code number, date of test, date of manufacture, etc.

10.1.2 Temperature used for testing.

10.1.3 Maximum depth of cavitation.

10.1.4 Complete identification of the foam.

11. Precision and Bias

11.1 No precision and bias exists for this test method, as the necessary resources have not been forthcoming.

12. Keywords

12.1 adhesive; attack; cavitation; foam; rigid cellular polystyrene (RCPS)

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