



Standard Test Method for Determining Adhesive Attack on Rigid Cellular Foam¹

This standard is issued under the fixed designation D 5113; 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 inch pound 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

C 578 Specification for Preformed, Cellular Polystyrene Thermal Insulation²

D 907 Terminology of Adhesives³

3. Terminology

3.1 Definitions:

3.1.1 Many terms in this standard are defined in Terminology D 907.

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.

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 1.0 in. (25.4 mm) and a depth of $\frac{1}{4}$ in. (6.3 mm).

6.2 *Circulating Air Oven*, for elevated temperature testing, capable of being held at $40 \pm 1^\circ\text{C}$ ($104^\circ \pm 1.8^\circ\text{F}$).

7. Materials

7.1 For the test, use Type IV RCPS foam with a nominal thickness of 1.0 in. (25.4 mm).

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 $23 \pm 1^\circ\text{C}$ ($73.4 \pm 1.8^\circ\text{F}$) 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 3 in. (76.2 mm) by 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 12.0 in. (304.8 mm) by 12.0 in. (304.8 mm) piece of aluminum foil.

9.2 Condition the assemblies for 24 h at the desired temperatures, room temperature and 40°C (127.7°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).

¹ This test method is under the jurisdiction of ASTM Committee D-14 on Adhesives and is the direct responsibility of Subcommittee D14.10 on Working Properties.

Current edition approved March 10, 1997. Published April 1998. Originally published as D 5113 – 90. Last previous edition D 5113 – 90.

² *Annual Book of ASTM Standards*, Vol 04.06.

³ *Annual Book of ASTM Standards*, Vol 15.06.

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)

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).