Designation: D3748 – 14

Standard Practice for Evaluating High-Density Rigid Cellular Plastics[1]

This standard is issued under the fixed designation D3748; 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 practice covers the basic test procedures for determination of the physical properties and reporting of data for high-density rigid cellular plastics.

1.2 The values stated in SI units are to be regarded as standard.

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.*

NOTE 1—This standard and ISO 9054 address the same subject matter, but differ in technical content.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

C518 Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

D570 Test Method for Water Absorption of Plastics

D618 Practice for Conditioning Plastics for Testing

D638 Test Method for Tensile Properties of Plastics

D648 Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position

D695 Test Method for Compressive Properties of Rigid Plastics

D696 Test Method for Coefficient of Linear Thermal Expansion of Plastics Between −30°C and 30°C with a Vitreous Silica Dilatometer

D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D883 Terminology Relating to Plastics

D1622 Test Method for Apparent Density of Rigid Cellular Plastics

3. Terminology

3.1 *Definitions:*

3.1.1 *high density*—greater than 320 kg/m^3 (0.32 g/cm^3) or 20 lb/ft^3 apparent density.

3.1.2 For definitions of other terms used in this practice, refer to Terminology D883.

4. Significance and Use

4.1 This practice provides appropriate testing methods, and a specific data reporting procedure for high-density rigid cellular plastics.

5. Sample Preparation

5.1 Prepare samples in one of two ways:

(a) process samples directly into proper size specimens, or

(b) prepare samples from larger sections as specified in each individual test.

5.2 Report the precise manner of sample preparation.

6. Conditioning

6.1 Condition specimens prior to testing in accordance with Procedure A of Practice D618.

7. Number of Test Specimens

7.1 Cellular plastics are often nonuniform in density distribution; therefore, a minimum of five specimens needs to be tested per testing method to obtain representative values.

8. Test Methods

8.1 Where technically suitable, reference is made to existing ASTM test methods. Otherwise, comments or changes are outlined in accordance with this practice.

8.2 *Apparent Density*—Test Method D1622.

8.3 *Compressive Strength*—Test Method D695.

8.4 *Tensile Properties*—Test Method D638.

[1] This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.22 on Cellular Materials - Plastics and Elastomers.

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[2] For referenced ASTM standards, visit the ASTM Web Site, 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 web site.

***A Summary of Changes section appears at the end of this standard**

8.5 *Coefficient of Linear Thermal Expansion*—Test Method D696.

8.6 *Apparent Flexural Properties*—Test Methods D790.

8.7 *Deflection Temperature*—Test Method D648.

8.8 *Dielectric Breakdown Voltage and Dielectric Strength*—Test Methods D149

8.9 *Thermal Conductivity*—Test Methods C177 or C518.

NOTE 2—Use Test Method C518 only for materials having densities less than 900 kg/m^3.

8.10 *Water Absorption Rate*—Test Method D570.

9. Report

9.1 Report the following information:

9.1.1 Complete identification of the tested material as to material supplier and nomenclature, source of samples, lot or run number, and type of part.

9.1.2 Type of manufacturing process used to make the part, for example, extrusion, injection molding, casting, etc.

9.1.3 Technique used to prepare the test specimens, for example, directly-molded or extruded, cut from larger part and edges tensile cut, etc.

9.1.4 Number of uncut skins on the specimen when in test (refers to skins not cut in sample preparation).

9.1.5 Location of skins (cut and uncut) while the specimen is in test, that is, horizontal, vertical, none, etc.

9.1.6 Dimensions (length, width, thickness) of the specimen.

9.1.7 Apparent density. If the apparent density varies, report the maximum, minimum, average, and density within 12.7 mm (0.5 in.) of the test area.

9.1.8 Conditioning temperature and time.

9.1.9 Date of the test.

10. Keywords

10.1 high density; rigid cellular plastics

SUMMARY OF CHANGES

Committee D20 has identified the location of selected changes to this standard since the last issue (D3748 - 09) that may impact the use of this standard. (March 1, 2014)

(1) Revised Section 3.