



Standard Test Method for BULK MODULUS OF ELASTICITY OF SYNTACTIC FOAM (PISTON-CYLINDER METHOD)¹

This standard is issued under the fixed designation D 2926; 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.

^{e1} NOTE—Section 2 was added editorially and subsequent sections renumbered in February 1985.

1. Scope

1.1 This test method covers determination of the bulk modulus of elasticity of syntactic foam or other applicable materials.

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

2. Applicable Documents

2.1 ASTM Standards:

D 618 Methods of Conditioning Plastics and Electrical Insulating Materials for Testing²

D 695 Test Method for Compressive Properties of Rigid Plastics²

D 2736 Practices for Determination of Hydrostatic Compression Strength of Rigid Syntactic Foam³

3. Summary of Method

3.1 This test method consists of measuring the volume change of a known volume of distilled water by compressing it in a piston-cylinder apparatus. Then a syntactic foam specimen is inserted into the piston-cylinder apparatus containing the same known volume of distilled water, and the volume change of the water and specimen is measured by compressing the combination in the piston-cylinder apparatus. The desired volume change of the syntactic foam specimen is determined by subtracting the change in volume of the water from the change in volume of the syntactic foam specimen-water combination. Bulk modulus of elasticity is calculated by dividing the hydrostatic pressure in the cylinder by the ratio of volume change to original volume of the syntactic foam specimen.

4. Definition

4.1 *bulk modulus of elasticity*—ratio of stress to volumetric strain; it is a measure of incompressibility of a material when subjected to hydrostatic pressure.

5. Apparatus

5.1 *Cylinder*—A high-grade alloy steel cylinder with a 57.15 ± 0.13 -mm (2.250 ± 0.005 -in.) inside diameter and a 266.70 ± 1.27 -mm (10.500 ± 0.050 -in.) working length; the working pressure of the cylinder shall be 103 MN/m² (15 000 psi).

5.2 *Piston*—A high-grade alloy steel loading piston which fits into the cylinder and rides a rubber O-ring seal; the piston shall be provided with a bleed-off valve.

5.3 *Dummy Specimen Plug*—A solid stainless steel, right circular cylindrical plug, 56.52 ± 0.13 mm (2.225 ± 0.005 in.) in diameter and 239.57 ± 0.13 mm (9.432 ± 0.005 in.) long.

5.4 *Compression Machine*, having a load capacity of at least 27 200 kg (60 000 lb) and a load rate (crosshead motion) capability in the range from 0.005 mm/min (0.0002 in./min) to 12.7 mm/min (0.500 in./min). A test machine, such as described in Test Method D 695, can be used.

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.22 on Cellular Plastics.

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² *Annual Book of ASTM Standards*, Vol 08.01.

³ Discontinued. See 1983 *Annual Book of ASTM Standards*, Vol 08.02.