



Standard Test Method for Microcellular Urethanes—High-Temperature Sag¹

This standard is issued under the fixed designation D 3769; 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 the procedure and apparatus for measuring high-temperature sag of microcellular urethane materials.

1.2 The values stated in SI units are to be regarded as the 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—There is no similar or equivalent ISO standard to this test method.

2. Referenced Documents

2.1 ASTM Standards:

D 3040 Practice for Preparing Precision Statements for Standards Related to Rubber and Rubber Testing²

E 145 Specification for Gravity-Convection and Forced-Ventilation Ovens³

E 691 Practice for Conducting and Interlaboratory Study to Determine the Precision of a Test Method³

3. Significance and Use

3.1 This test method is used to indicate the deformation tendency of microcellular materials that may occur during paint application in an assembly plant operation. Since a standard specimen is used, heat sag measurements cannot be assumed to be exactly those which will occur on a part during or after the paint application and baking operation of an assembly process.

3.2 Before proceeding with this test method, reference should be made to the specification of the material being tested.

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 Materials—Plastics and Elastomers.

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This revision includes the addition of the following: an ISO equivalency statement, a material specifications statement, and a keyword section. This revision also includes a change in the minimum height requirement of the test fixture, an expanded description of the test figure, a change in the oven specification, a change in the accuracy requirement for the scaled rule, and a change in the measuring procedure.

² Discontinued—see 1986 Annual Book of ASTM Standards, Vols 09.01 and 09.02.

³ Annual Book of ASTM Standards, Vol 14.02.

Any test specimen preparation, conditioning, or dimensions, or combination thereof, and testing parameters covered in the materials specification shall take precedence over those mentioned in these test methods. If there are no material specifications, then the default conditions apply.

NOTE 2—This test method may be applied to solid urethanes.

4. Apparatus

4.1 *Test Fixture*, capable of holding the specimens in a fixed cantilever position for the duration of the entire test procedure. The test fixture shall be constructed from a material such as aluminum or steel that exhibits a low coefficient of linear thermal expansion and therefore allows the test fixture's height to be considered constant through the test. See Fig. 1.

4.2 *Oven*, conforming to the specifications for a Type I laboratory oven in accordance with Specification E 145.

4.3 *Scaled Rule*, accurate to 1.0 mm.

4.4 *Thickness Indicator*, accurate to 0.25 mm.

5. Test Specimens

5.1 The test specimen shall have a minimum length of 125 mm, and be 25 mm in width by the nominal thickness of the plaque or part. The recommended standard test specimen is 4 mm in thickness. Thinner specimens may be used, but shall not be less than 3 mm.

5.2 Three specimens to each material shall be tested.

NOTE 3—If test specimens are cut from parts, the specimens must be cut from areas that are of constant thickness; that is, no ribs, bosses, holes, or other section changes are allowed.

6. Conditioning

6.1 Unless otherwise specified, condition the specimens and fixture a minimum of 1 h at $23 \pm 2^\circ\text{C}$ and $50 \pm 5\%$ relative humidity before testing.

7. Procedure

7.1 Measure the thickness in the clamping area of the test specimen to the nearest 0.25 mm.

7.2 Clamp the specimen in the fixture with a 100-mm unsupported overhang. Primed or painted surfaces are to be mounted facing up.

7.3 After $5 \text{ min} \pm 10 \text{ s}$, measure the distance between the base and the unsupported end of the specimen as shown in Fig. 1 and call this A_o .

7.4 Place the clamped specimen in an air-circulating oven at