



Standard Test Method for Drop Impact Resistance of Blow-Molded Thermoplastic Containers¹

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1. Scope

1.1 This test method provides measures of the drop impact resistance of blow-molded thermoplastic containers as a summation of the effects of material, manufacturing conditions, container design, and perhaps other factors.

1.2 Three procedures are provided as follows:

1.2.1 *Procedure A, Static Drop Height Method*—This procedure is particularly useful for quality control since it is quick.

1.2.2 *Procedure B, Bruceton Staircase Method*—This procedure is used to determine the mean failure height and the standard deviation of the distribution.

1.3 The values stated in SI units are to be regarded as standard. The inch-pound units given in parentheses are for information only.

NOTE 1—There is no similar or equivalent ISO standard.

1.4 *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:

B 177 Practice for Chromium Electroplating on Steel for Engineering Use²

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

2.2 Society of Plastics Industry Standard:

PBI-4 Test for Drop Impact Resistance of Plastic Bottles⁴

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.20 on Plastic Products.

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² *Annual Book of ASTM Standards*, Vol 02.05.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Available from the Society of the Plastics Industry, Inc., 1295 K Street, N.W., Washington, DC 20005.

3. Terminology

3.1 Definitions:

3.1.1 *failure*—any rupture visible to an observer with the unaided eye and normal eyesight is considered a failure. Any evidence of contained liquid on the outside of the container through any aperture other than the molded opening is also a failure. Container should be squeezed gently after impact to determine any pinhole type failures. If a cap pops off during impact, consider that sample as a NO TEST and replace the sample with another container.

4. Summary of Test Method

4.1 The drop impact resistance is determined by dropping conditioned blow-molded containers filled with water from a platform onto a prescribed surface. Data developed with a water-filled container may not be representative of what might be expected with a carbonated liquid, an aerosol pack, a product of high specific gravity, or a powder of low bulk density.

4.1.1 *Procedure A* consists of dropping at least 20 containers from a fixed height and reporting the percent failures.

4.1.2 *Procedure B* consists of dropping at least 20 test containers from varying heights above and below the mean failure height of the set. A mean failure height and standard deviation are then calculated from the data.

5. Significance and Use

5.1 These procedures provide measures of the drop impact resistance of the group or lot of blown containers from which the test specimens were selected.

5.2 These procedures may be used for routine inspection purposes.

5.3 These procedures will evaluate the effect of construction, materials, and processing conditions on the impact resistance of the blown containers.

5.4 Before proceeding with this test method, reference should be made to the specification of the material being tested. Any test specimen preparation, conditioning, dimensions, or testing parameters, or combination thereof, covered in the