



Standard Test Method for High Speed Puncture Properties of Plastics Using Load and Displacement Sensors¹

This standard is issued under the fixed designation D3763; 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 determination of puncture properties of rigid plastics over a range of test velocities.

1.2 Test data obtained by this test method are relevant and appropriate for use in engineering design.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.*

NOTE 1—This standard and ISO 6603.2 address the same subject matter, but differ in technical content. The technical content and results shall not be compared between the two test methods.

2. Referenced Documents

2.1 ASTM Standards:²

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

D4000 Classification System for Specifying Plastic Materials

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 ISO Standard:³

ISO 6603.2 Plastics—Determination of Multi-axial Impact Behavior of Rigid Plastics Part 2: Instrumented Puncture Test

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² For referenced ASTM standards, visit the ASTM website, 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 website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

3. Terminology

3.1 *Definitions*—For definitions see Terminology D883 and for abbreviations see Terminology D1600.

4. Significance and Use

4.1 This test method is designed to provide load versus deformation response of plastics under essentially multi-axial deformation conditions at impact velocities. This test method further provides a measure of the rate sensitivity of the material to impact.

4.2 Multi-axial impact response, while partly dependent on thickness, does not necessarily have a linear correlation with specimen thickness. Therefore, results should be compared only for specimens of essentially the same thickness, unless specific responses versus thickness formulae have been established for the material.

4.3 For many materials, there may be a specification that requires the use of this test method, but with some procedural modifications that take precedence when adhering to the specification. Therefore, it is advisable to refer to that material specification before using this test method. Table 1 of Classification System D4000 lists the ASTM materials standards that currently exist.

5. Interferences

5.1 *Inertial Effects*—A loading function encountered when performing an instrumented impact test that may, in some cases, confuse the interpretation of the test data. For further definition and examples of inertial effects, refer to Appendix X1.

6. Apparatus

6.1 The testing machine shall consist of two assemblies, one fixed and the other driven by a suitable method to achieve the required impact velocity (that is, hydraulic, pneumatic, mechanical, or gravity):

6.1.1 *Clamp Assembly*, consisting of two parallel rigid plates with a 76.0 ± 3.0 mm diameter hole in the center of each. The hole edges shall be rounded to a radius of 0.8 ± 0.4 mm. Sufficient force must be applied (mechanically, pneumatically, or hydraulically) to prevent slippage of the specimen in the clamp during impact.

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