



Standard Test Method for Determining Charpy Impact Strength of Plastics¹

This standard is issued under the fixed designation D 5942; 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 a procedure for determining the Charpy impact strength of plastics under defined conditions. A number of different types of specimen and test configurations are defined. Different test parameters are specified according to the type of material, type of test specimen, and type of notch.

1.2 This test method is used for investigating the behavior of specified types of specimen under the impact conditions defined and for estimating the brittleness or toughness of specimens within the limitations inherent in the test conditions.

1.3 This test method has a greater range of applicability than that given in Test Method D 5941 and is more suitable for the testing of materials showing interlaminar shear fracture or of materials exhibiting surface effects due to environmental factors.

1.4 This test method is suitable for use with the following range of materials:

1.4.1 Rigid thermoplastics molding and extrusion materials, including filled and reinforced compounds in addition to unfilled types; rigid thermoplastic sheets;

1.4.2 Rigid thermosetting molding materials, including filled and reinforced compounds; rigid thermosetting sheets, including laminates;

1.4.3 Fiber-reinforced thermoset and thermoplastic composites incorporating unidirectional or nonunidirectional reinforcements such as mat, woven fabrics, woven rovings, chopped strands, combination and hybrid reinforcements, rovings, and milled fibers; sheets made from pre-impregnated materials (prepregs); and

1.4.4 Thermotropic liquid-crystal polymers.

1.5 This test method is not normally suitable for use with rigid cellular materials and sandwich structures containing cellular material. Also, notched specimens are not normally used for long-fiber-reinforced composites or for thermotropic liquid-crystal polymers.

1.6 This test method is adapted to the use of specimens that may be either molded to the chosen dimensions, machined from the central portion of a standard multipurpose test specimen (see ISO 3167 (Specification D 5936)), or machined from finished and semifinished products such as moldings, laminates, and extruded or cast sheet.

1.7 This test method specifies preferred dimensions for the test specimen. Tests that are conducted on specimens of different dimensions and notches, or on specimens that are prepared under different conditions, may produce results that are not comparable. Other factors, such as the energy capacity of the pendulum, its impact velocity, and the conditioning of the specimens, can also influence the results. Consequently, when comparative data are required, these factors must be controlled and recorded carefully.

1.8 This test method should not be used as a source of data for design calculations of components. Information on the typical behavior of a material can be obtained, however, by testing at different temperatures, by varying the notch radius or the thickness, or both, and by testing specimens prepared under different conditions.

1.9 This test method is identical to ISO 179. This test method is comparable to Test Method D 256, but neither test method should be substituted for the other. The two test methods may differ with respect to test specimen dimensions, test specimen conditioning, test equipment, testing conditions, etc. The two test methods may not give the same results.

1.10 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.11 *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:

D 256 Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics²

D 5936 Specification for Multipurpose Test Specimens Used for Testing Plastics³

D 5939 Practice for Preparing Multipurpose Test Specimens and Bars of Thermoplastics by Injection Moulding³

D 5940 Practice for Preparing Small Plate Test Specimens of Thermoplastics by Injection Moulding³

D 5941 Test Method for Determining the Izod Impact Strength of Plastics³

¹ This test method is under the jurisdiction of ASTM Committee D-20 on Plastics and is the direct responsibility of Subcommittee D20.61 on USA Technical Advisory Group for ISO/TC 61 on Plastics.

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² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 08.03.