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Plastics — Determination of Charpy impact strength

Plastiques — Détermination de la résistance au choc Charpy



Reference number
ISO 179:1993(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 179 was prepared by Technical Committee ISO/TC 61, *Plastics*, Sub-Committee SC 2, *Mechanical properties*.

This second edition cancels and replaces the first edition (ISO 179:1982), which has been revised in the following ways.

- The recommended specimen types for testing moulding materials are reduced to one only, which can be taken from the multipurpose test specimen complying with ISO 3167 by simple machining.
- The notch types are reduced to three only: V-type, 45°, with different notch base radii.
- The preferred direction of blow is changed from "flatwise" (parallel to the dimension thickness) to "edgewise" (parallel to the dimension width) in order to align the test method with that of the Izod test according to ISO 180.
- Special test methods are included for laminated sheets in order to respect the thicknesses of semifinished products and interlaminar shear failure.
- The designation of sizes are harmonized with those of a great number of other International Standards for testing plastics, in accordance with ISO 31.

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- The method designations are harmonized with the modifications described above (direction of blow and types of notch).

Annex A of this International Standard is for information only.

Plastics — Determination of Charpy impact strength

1 Scope

1.1 This International Standard specifies a method 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, the type of test specimen and the type of notch.

1.2 The method is used to investigate the behaviour 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.

The method has a greater range of applicability than that given in ISO 180 (Izod)¹⁾ and is more suitable for the testing of materials showing interlaminar shear fracture or of materials exhibiting surface effects due to environmental factors.

1.3 The method is suitable for use with the following range of materials:

- rigid thermoplastics moulding and extrusion materials, including filled and reinforced compounds in addition to unfilled types; rigid thermoplastics sheets;
- rigid thermosetting moulding materials, including filled and reinforced compounds; rigid thermosetting sheets, including laminates;
- fibre-reinforced thermoset and thermoplastics composites incorporating unidirectional or non-unidirectional reinforcements such as mat, woven fabrics, woven rovings, chopped strands, combination and hybrid reinforcements, rovings and milled fibres; sheets made from pre-impregnated materials (prepregs);
- thermotropic liquid-crystal polymers.

The 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-fibre-reinforced composites or for thermotropic liquid-crystal polymers.

1.4 The method is adapted to the use of specimens which may be either moulded to the chosen dimensions, machined from the central portion of a standard multipurpose test specimen (see ISO 3167) or machined from finished and semifinished products such as mouldings, laminates and extruded or cast sheet.

1.5 The method specifies preferred dimensions for the test specimen. Tests which are carried out on specimens of different dimensions and notches, or on specimens which are prepared under different conditions, may produce results which 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 carefully controlled and recorded.

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

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

1) ISO 180:1993, *Plastics — Determination of Izod impact strength*.