INTERNATIONAL STANDARD

ISO 179-2

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Plastics — Determination of Charpy impact properties —

Part 2:
Instrumented impact test

Plastiques — Détermination des caractéristiques au choc Charpy —

Partie 2: Essai de choc instrumenté

Reference number
ISO 179-2:1997(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 179-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

ISO 179 consists of the following parts, under the general title *Plastics — Determination of Charpy impact properties*:

— *Part 1: Non-instrumented impact test*

— *Part 2: Instrumented impact test*

Annexes A to C of this part of ISO 179 are for information only.

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Plastics — Determination of Charpy impact properties —

Part 2:
Instrumented impact test

1 Scope

1.1 This part of ISO 179 specifies a method for determining Charpy impact properties of plastics from force-deflection diagrams. Different types of rod-shaped test specimen and test configuration, as well as test parameters depending on the type of material, the type of test specimen and the type of notch are defined in part 1 of ISO 179.

Dynamic effects such as load-cell/striker resonance, test specimen resonance and initial-contact/inertia peaks are described (see figure 1, curve b, and annex A).

1.2 For the comparison between Charpy and Izod test methods, see ISO 179-1, clause 1.

ISO 179-1 is suitable for characterizing the impact behaviour by the impact strength only and for using apparatus whose potential energy is matched approximately to the particular energy to break to be measured (see ISO 13802, annex C). This part of ISO 179 is used if a force-deflection or force-time diagram is necessary for detailed characterization of the impact behaviour, and for developing automatic apparatus, i.e. avoiding the need, mentioned above, to match energy.

1.3 For the range of materials which may be tested by this method, see ISO 179-1, clause 1.

1.4 For the general comparability of test results, see ISO 179-1, clause 1.

1.5 The method may not be used as a source of data for design calculations on components. However, the possible use of data is not the subject of this part of ISO 179. Any application of data obtained using this part of ISO 179 should be specified by a referring standard or agreed upon by the interested parties.

Information on the typical behaviour of materials can be obtained by testing at different temperatures, by varying the notch radius and/or specimen thickness and by testing specimens prepared under different conditions.

It is not the purpose of this part of ISO 179 to give an interpretation of the mechanism occurring at every point on the force-deflection diagram. These interpretations are a task for on-going scientific research.

1.6 The test results are comparable only if the conditions of test specimen preparation, as well as the test conditions, are the same. Comprehensive evaluation of the reaction to impact stress requires that determinations be made as a function of deformation rate and temperature for different material variables such as crystallinity and moisture content. The impact behaviour of finished products cannot, therefore, be predicted directly from this test, but test specimens may be taken from finished products for testing by this method.

1.7 Impact strengths determined by this method may replace those determined using ISO 179-1 if comparability has been established by previous tests.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 179. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 179 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 179-1:—[1], *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test.*

ISO 13802:—[2], *Plastics — Verification of pendulum impact-testing machines — Charpy, Izod and tensile impact testing*.

3 Definitions

For the purposes of this part of ISO 179, the definitions given in part 1 apply, together with the following:

3.1 impact velocity, v_0: The velocity of the striker relative to the test specimen supports at the moment of impact.

It is expressed in metres per second (m/s).

3.2 inertial peak: The first peak in a force-time or force-deflection diagram. It arises from the inertia of that part of the test specimen accelerated after the first contact with the striker (see figure 1, curve b, and annex A).

3.3 impact force, F: The force exerted by the striking edge on the test specimen in the direction of impact.

It is expressed in newtons (N).

3.4 deflection, s: The displacement of the striker relative to the test specimen supports after impact, starting at first contact between striker and test specimen.

It is expressed in millimetres (mm).

3.5 impact energy, W: The energy expended in accelerating, deforming and breaking the test specimen during the deflection s.

It is expressed in joules (J).

It is measured by integrating the area under the force-deflection curve from the point of impact to the deflection s.

3.6 maximum impact force, F_M: The maximum value of the impact force in a force-time or force-deflection diagram (see figure 1).

It is expressed in newtons (N).

3.7 deflection at maximum impact force, s_M: The deflection at which the maximum impact force F_M occurs (see figure 1).

It is expressed in millimetres (mm).

1) To be published. (Revision of ISO 179:1993)
2) To be published.