

SLOVENSKI STANDARD oSIST prEN ISO 8256:2022

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Polimerni materiali - Določanje natezno-udarne trdnosti (ISO/DIS 8256:2022)

Plastics - Determination of tensile-impact strength (ISO/DIS 8256:2022)

Kunststoffe - Bestimmung der Schlagzugzähigkeit (ISO/DIS 8256:2022)

Plastiques Détermination de la résistance au choc-traction (ISO/DIS 8256:2022)

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ICS:

83.080.01 Polimerni materiali na

splošno

Plastics in general

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Plastics — Determination of tensile-impact strength

Plastiques — Détermination de la résistance au choc-traction

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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ISO 8256 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This third edition cancels and replaces the second edition (ISO 8256:2004), which has been technically revised.

The changes in the third edition are the following:

- Replacement of the reference to ISO 3167 by the reference to ISO 20753
- Better clarity in <u>Table 2</u> Specimen types and dimensions
- Additional description on preparation methods for the specimen types in chpt. <u>6.2.1</u>

Plastics — Determination of tensile-impact strength

1 Scope

- **1.1** This International Standard specifies two methods (method A and method B) for the determination of the tensile-impact strength of plastics under defined conditions. The tests can be described as tensile tests at relatively high strain rates. These methods can be used for rigid materials (as defined in ISO 472), but are especially useful for materials too flexible or too thin to be tested with impact tests conforming to ISO 179 or ISO 180.
- **1.2** These methods are used for investigating the behaviour of specified specimens under specified impact velocities, and for estimating the brittleness or the toughness of specimens within the limitations inherent in the test conditions.
- **1.3** These methods are applicable both to specimens prepared from moulding materials and to specimens taken from finished or semi-finished products (for example mouldings, laminates, or extruded or cast sheets).
- 1.4 Results obtained by testing moulded specimens of different dimensions may not necessarily be the same. Equally, specimens cut from moulded products may not give the same results as specimens of the same dimensions moulded directly from the material. Test results obtained from specimens prepared from moulding compounds cannot be applied directly to mouldings of any given shape, because values may depend on the design of the moulding and the moulding conditions. Results obtained by method A and method B may or may not be comparable.
- **1.5** These methods are not suitable for use as a source of data for design calculations on components. Information on the typical behaviour of a material can be obtained, however, by testing different types of test specimen prepared under different conditions, and by testing at different temperatures. The two different methods are suitable for production control as well as for quality control.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 179-2, Plastics — Determination of Charpy impact properties — Part 2: Instrumented impact test

ISO 180, Plastics — Determination of Izod impact strength

ISO 291, Plastics — Standard atmospheres for conditioning and testing

ISO 293, Plastics — Compression moulding of test specimens of thermoplastic materials

ISO 294-1, Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens

ISO 294-2, Plastics — Injection moulding of test specimens of thermoplastic materials — Part 2: Small tensile bars

ISO 294-3, Plastics — Injection moulding of test specimens of thermoplastic materials — Part 3: Small plates

ISO 295, Plastics — Compression moulding of test specimens of thermosetting materials

ISO 472, Plastics — Vocabulary

ISO 1268 (all parts), Fibre-reinforced plastics — Methods of producing test plates

ISO 2602, Statistical interpretation of test results — Estimation of the mean — Confidence interval

ISO 2818, Plastics — Preparation of test specimens by machining

ISO 10350-1, Plastics — Acquisition and presentation of comparable single-point data — Part 1: Moulding materials

ISO 11403-3, Plastics — Acquisition and presentation of comparable multipoint data — Part 3: Environmental influences on properties

ISO 13802, Plastics — Verification of pendulum impact-testing machines — Charpy, Izod and tensile impact-testing

ISO 20753, Plastics — Test specimens

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

tensile-impact strength of unnotched specimens

 a_{t}

energy absorbed in breaking an unnotched specimen under specified conditions, referred to the original cross-sectional area of the specimen

Note 1 to entry: It is expressed in kilojoules per square metre (kJ/m²). 2022

3.2

tensile-impact strength of notched specimens

 a_{tN}

energy absorbed in breaking a notched specimen under specified conditions, referred to the original cross-sectional area of the specimen at the notch

Note 1 to entry: It is expressed in kilojoules per square metre (kI/m^2) .

4 Principle

A specimen is broken by a single impact at the bottom of the swing of the pendulum of a tensile-impact machine. The specimen is horizontal at the moment of rupture. One end of the specimen, at impact, is held either by the frame or the pendulum and the other end by the crosshead. The two methods described are based on two different ways of positioning the specimen held by the crosshead: the specimen may be either mounted stationary on the support frame (method A) or carried downward together with the pendulum (method B).

The energy to fracture is determined by the kinetic energy extracted from the pendulum in the process of breaking the specimen. Corrections are made for the energy to toss (method A) or bounce (method B) the crosshead.

5 Apparatus

5.1 Test machine

The principles, characteristics and verification of suitable test machines are detailed in ISO 13802.

5.2 Pendulum and striker

- **5.2.1** The pendulum shall be constructed of a single- or multiple-membered arm holding the head, in which the greatest mass is concentrated. A rigid pendulum is essential to maintain the proper clearances and geometric relationships between related parts and to minimize energy losses, which are always included in the measured impact-energy value.
- **5.2.2** The strikers for method A and method B are described in detail in ISO 13802.

5.3 Crosshead

- **5.3.1** As pointed out in ISO 13802, in order to reduce bouncing due to the impact of the metal striker on the metal crosshead, the material used for the crosshead shall be one which gives an essentially inelastic impact (e.g. aluminium). The mass of the crosshead, both for method A and for method B, shall be selected from the values given in <u>Table 1</u>.
- **5.3.2** A jig or other device shall be used to assist in clamping the crosshead in the specified position, at right angles to the longitudinal axis of the specimen.

Potential energy	Crosshead mass PR g VIE W						
J	Method A	Method B					
2,0	15 ± 1 or 30 ± 1	15 ± 1					
4,0	15 ± 1 or 30 ± 1	15 ± 1					
7,5	S 30 ± 1 or 60 ± 18256:2022	30 ± 1					
15,0ps://standa	rds.iteh.ai/ca30 ± 1 or 60 ± 1 s/sist/74 f7a.	3f-2a6f-4207-b120 ± 1					
25,0	4d9 1cc5 60 ± 1 or 120 ± 1 -lso-8256-2	022 120 ± 1					
50,0	60 ± 1 or 120 ± 1	120 ± 1					
NOTE For method A, use the lighter crosshead whenever possible.							

Table 1 — Crosshead masses

5.4 Clamping devices/jaws

Clamps and jaws for tensile-impact testing are described in ISO 13802.

5.5 Micrometers and gauges

Micrometers and gauges suitable for measuring the dimensions of test specimens to an accuracy of 0,01 mm are required. In measuring the thickness of the specimen, the measuring face shall apply a load of 0,01 MPa to 0,05 Mpa. For notched specimens, see the requirements of 7.4.

6 Test specimens

6.1 Shape and dimensions

Five types of test specimen, as specified in <u>Table 2</u> and shown in <u>Figure 1</u>, may be used. In general, all types can be used with either of the two methods.

Method A: the preferred specimen types are type 1 and type 4.

Method B: the preferred specimen types are type 2 and type 4.

The test result depends on the type of specimen used and its preparation and thickness. For reproducible results, or in cases of dispute, the type of test specimen and its preparation and thickness shall be agreed upon.

Specimens are tested at their original thickness up to and including 4 mm. The preferred specimen thickness is 4 mm \pm 0,2 mm for type 1 specimens and 3 mm \pm 0,2 mm for type 4 specimens. Within the gauge area, the thickness shall be maintained to within a tolerance of \pm 5 %. Above 4 mm, the test methods described in this International Standard are inapplicable, and ISO 179 or ISO 180 have to be used to determine the impact properties of specimens.

Table 2 — Specimen types and dimensions

Dimensions in millimetres

Specimen type	1	2	3	4	5		
Length l	80,0 ± 2,0	$60,0 \pm 2,0$	80,0 ± 2,0	60,0 ± 2,0	80,0 ± 2,0		
Free length between grips $l_{\rm e}$	30,0 ± 2,0	25,0 ± 2,0	30,0 ± 2,0	25,0 ± 2,0	50,0 ± 2,0		
Preferred value of dimension l_0	_	$10,0 \pm 0,2$	10,0 ± 0,2	_	10,0 ± 0,2		
Radius of curvature r	_	10,0 ± 1,0	20,0 ± 1,0	15,0 ± 1,0	20,0 ± 1,0		
Width b	10,0 ± 0,2	10,0 ± 0,2	15,0 ± 0,2	10,0 ± 0,2	15,0 ± 0,2		
Preferred value of dimension <i>x</i>	$6,0 \pm 0,2$	$3,0 \pm 0,2$	10,0 ± 0,2	$3,0 \pm 0,2$	5,0 ± 0,2		
b'	_	_	_	_	23,0 ± 2,0		
r'					4,0 ± 0,5		
l' IIE	n S-IA	NDAK	J PKE	V IL VV	11,0 ± 1,0		
Thickness h (Preferred value)	$\leq 4 (4,0 \pm 0,2)$	≤ 4	≤4	≤ 4 (3,0 ± 0,2)	≤ 4		
All tolerances for l , l_0 , r , b , x , b' , r' , l' , h identical with tolerances given in ISO 20753.							

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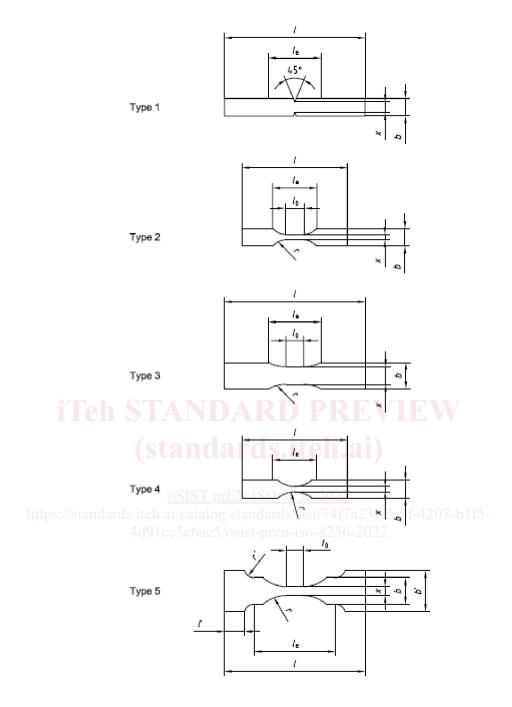


Figure 1 — Types of test specimen

6.2 Preparation

6.2.1 Moulding and extrusion compounds

Specimens shall be prepared in accordance with the relevant material specification. When none exists or when otherwise specified, specimens shall be directly extruded or compression or injection moulded from the material in accordance with ISO 293, ISO 294-1, ISO 294-2 or ISO 295, or machined in accordance with ISO 2818 from sheets or plates compression or injection moulded from the compound.

Type 1 specimen can be prepared from type A1 or B1 test specimen described in ISO 20753.

Type 2 specimen can be prepared from type D1 test specimen described in ISO 20753.