SLOVENSKI STANDARD
SIST EN ISO 178:2003

01-julij-2003

Nadomeġļa:
SIST EN ISO 178:2000

Polimerni materiali - Doloļanje upogibnih lastnosti (ISO 178:2001)

Plastics - Determination of flexural properties (ISO 178:2001)

Kunststoffe - Bestimmung der Biegeeigenschaften (ISO 178:2001)

Plastiques - Détermination des propriétés en flexion (ISO 178:2001)

Ta slovenski standard je istoveten z: EN ISO 178:2003

ICS:

83.080.01	Polimerni materiali na splošno	Plastics in general

SIST EN ISO 178:2003 **en**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

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English version

Plastics - Determination of flexural properties (ISO 178:2001)

Plastiques - Détermination des propriétés en flexion (ISO 178:2001)

Kunststoffe - Bestimmung der Biegeeigenschaften (ISO 178:2001)

This European Standard was approved by CEN on 12 December 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

The text of ISO 178:2001 has been prepared by Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 178:2003 by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2003, and conflicting national standards shall be withdrawn at the latest by August 2003.

This document supersedes EN ISO 178:1996.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of ISO 178:2001 has been approved by CEN as EN ISO 178:2003 without any modifications.

NOTE Normative references to International Standards are listed in Annex ZA (normative).

Annex ZA
(normative)

Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

Publication	Year	Title	EN	Year
ISO 291	1997	Plastics - Standard atmospheres for conditioning and testing	EN ISO 291	1997
ISO 294-1	1996	Plastics - Injection moulding of test specimens of thermoplastic materials - Part 1: General principles, and moulding of multipurpose and bar test specimens	EN ISO 294-1	1998
ISO 295	1991	Plastics - Compression moulding of test specimens of thermosetting materials	EN ISO 295	1998
ISO 2818	1994	Plastics - Preparation of test specimens by machining	EN ISO 2818	1996
ISO 3167	1993	Plastics - Multipurpose-test specimens	EN ISO 3167	1996
ISO 10724-1	1998	Plastics - Injection moulding of test specimens o f thermosetting powder moulding compounds (PMCs) - Part 1: General principles and moulding of multi purpose test specimens	EN ISO 10724-1	2001

INTERNATIONAL STANDARD

ISO 178

Fourth edition
2001-12-15

Plastics — Determination of flexural properties

Plastiques — Détermination des propriétés en flexion

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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 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 178 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This fourth edition cancels and replaces the third edition (ISO 178:1993), which has been updated in the following ways:

— a method of correcting for curvature at the beginning of the stress/strain curve is given (see 9.2);

— a method of correcting for the compliance of the test machine is given (see annex A).

Annex A forms a normative part of this International Standard.

Plastics — Determination of flexural properties

1 Scope

1.1 This International Standard specifies a method for determining the flexural properties of rigid (see 3.12) and semi-rigid plastics under defined conditions. A standard test specimen is defined, but parameters are included for alternative specimen sizes for use where appropriate. A range of test speeds is included.

1.2 The method is used to investigate the flexural behaviour [1] of the test specimens and for determining the flexural strength, flexural modulus and other aspects of the flexural stress/strain relationship under the conditions defined. It applies to a freely supported beam, loaded at midspan (three-point loading test).

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

— thermoplastics moulding and extrusion materials, including filled and reinforced compounds in addition to unfilled types; rigid thermoplastics sheets;

— thermosetting moulding materials, including filled and reinforced compounds; thermosetting sheets.

In agreement with ISO 10350-1 and ISO 10350-2, this International Standard applies to fibre-reinforced compounds with fibre lengths $\leqslant$ 7,5 mm prior to processing. For long-fibre-reinforced materials (laminates) with fibre lengths $>$ 7,5 mm, see reference [2] in the bibliography.

The method is not normally suitable for use with rigid cellular materials and sandwich structures containing cellular material[3, 4].

NOTE For certain types of textile-fibre-reinforced plastics, a four-point bending test is preferred. It is described in reference [2].

1.4 The method is performed using specimens which may be moulded to the specified dimensions, machined from the central portion of a standard multipurpose test specimen (see ISO 3167) or machined from finished or semi-finished products such as mouldings, or 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, or on specimens which are prepared under different conditions, may produce results which are not comparable. Other factors, such as the test speed and the conditioning of the specimens, can also influence the results. Especially for semi-crystalline polymers, the thickness of the oriented skin layer, which is dependent on moulding conditions and thickness, affects the flexural properties. Consequently, when comparable data are required, these factors must be carefully controlled and recorded.

1.6 Flexural properties can only be used for engineering design purposes for materials with linear stress/strain behaviour. For non-linear behaviour, the flexural properties are only nominal. The bending test should preferentially be used with brittle materials, for which tensile tests are difficult.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For