# SLOVENSKI STANDARD
# SIST EN ISO 178:2011

**01-julij-2011**

**Nadomešča:**
**SIST EN ISO 178:2003**
**SIST EN ISO 178:2003/A1:2005**

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**Polimerni materiali - Določanje upogibnih lastnosti (ISO 178:2010)**

Plastics - Determination of flexural properties (ISO 178:2010)

Kunststoffe - Bestimmung der Biegeeigenschaften (ISO 178:2010)

Plastiques - Détermination des propriétés en flexion (ISO 178:2010)



**Ta slovenski standard je istoveten z:** **EN ISO 178:2010**

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**ICS:**

| | | |
|---|---|---|
| 83.080.01 | Polimerni materiali na splošno | Plastics in general |

**SIST EN ISO 178:2011** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN ISO 178

December 2010

ICS 83.080.01

Supersedes EN ISO 178:2003

English Version

# Plastics - Determination of flexural properties (ISO 178:2010)

Plastiques - Détermination des propriétés en flexion (ISO 178:2010)

Kunststoffe - Bestimmung der Biegeeigenschaften (ISO 178:2010)

This European Standard was approved by CEN on 14 December 2010.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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## Contents

Page

## Foreword

This document (EN ISO 178:2010) has been prepared by Technical Committee ISO/TC 61 “Plastics” in collaboration with Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

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This document supersedes EN ISO 178:2003.

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**Endorsement notice**

The text of ISO 178:2010 has been approved by CEN as a EN ISO 178:2010 without any modification.

# INTERNATIONAL STANDARD

# ISO 178

Fifth edition
2010-12-15

# Plastics — Determination of flexural properties

*Plastiques — Détermination des propriétés en flexion*



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# Contents

Page

## 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.

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

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



This fifth edition cancels and replaces the fourth edition (ISO 178:2001), which has been technically revised to harmonize it with ISO 527-2[2] with respect to the test speeds used for the determination of the flexural modulus and for the determination of other flexural properties. This has been done by specifying two methods, method A and method B. Method A is identical to the method specified in previous editions of ISO 178, i.e. it uses the same strain rate throughout the test, whereas method B uses two different strain rates (see 1.8 for details).



It also incorporates the Amendment ISO 178:2001/Amd.1:2004.

 

# 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 of the test specimens and to determine 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:

— thermoplastic moulding, extrusion and casting 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[5] and ISO 10350-2[6], 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 ISO 14125[7].



The method is not normally suitable for use with rigid cellular materials or sandwich structures containing cellular material. In such cases, ISO 1209-1[3] and/or ISO 1209-2[4] can be used.

NOTE For certain types of textile-fibre-reinforced plastic, a four-point bending test is preferred. This is described in ISO 14125.

**1.4** The method is performed using specimens which may be either moulded to the specified dimensions, machined from the central section of a standard multipurpose test specimen (see ISO 20753) or machined from finished or semi-finished products, such as mouldings, laminates, or extruded or cast sheet.

**1.5** The method specifies the 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, can produce results which are not comparable. Other factors, such as the test speed and the conditioning of the specimens, can also influence the results.

NOTE Especially for semi-crystalline polymers, the thickness of the oriented skin layer, which is dependent on the moulding conditions, also affects the flexural properties.

**1.6** The method is not suitable for the determination of design parameters but can be used in materials testing and as a quality control test.

**1.7** For materials exhibiting non-linear stress/strain behaviour, the flexural properties are only nominal. The equations given have been derived assuming linear elastic behaviour and are valid for deflections of the specimen that are small compared to its thickness. With the preferred specimen (which measures 80 mm × 10 mm × 4 mm) at the conventional flexural strain of 3,5 % and a span-to-thickness ratio, $L/h$, of 16, the deflection is 1,5$h$. Flexural tests are more appropriate for stiff and brittle materials showing small deflections at break than for very soft and ductile ones.