SLOVENSKI STANDARD
SIST EN ISO 527-1:2012

01-maj-2012

Nadomešča:
SIST EN ISO 527-1:2000

Polimerni materiali - Ugotavljanje nateznih lastnosti - 1. del: Splošna načela (ISO 527-1:2012)

Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1:2012)

Kunststoffe - Bestimmung der Zugeigenschaften - Teil 1: Allgemeine Grundsätze (ISO 527-1:2012)

Plastiques - Détermination des propriétés en traction - Partie 1: Principes généraux (ISO 527-1:2012)

Ta slovenski standard je istoveten z: **EN ISO 527-1:2012**

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83.080.01	Polimerni materiali na splošno	Plastics in general

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English Version

Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1:2012)

Plastiques - Détermination des propriétés en traction - Partie 1: Principes généraux (ISO 527-1:2012)

Kunststoffe - Bestimmung der Zugeigenschaften - Teil 1: Allgemeine Grundsätze (ISO 527-1:2012)

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

Foreword

This document (EN ISO 527-1:2012) 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of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.

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The text of ISO 527-1:2012 has been approved by CEN as a EN ISO 527-1:2012 without any modification.

INTERNATIONAL STANDARD

ISO 527-1

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Plastics — Determination of tensile properties —

Part 1: General principles

Plastiques — Détermination des propriétés en traction —

Partie 1: Principes généraux

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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.

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ISO 527-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This second edition cancels and replaces the first edition (ISO 527-1:1993), which has been technically revised. It incorporates ISO 527-1:1993/Cor 1:1994 and ISO 527-1:1993/Amd 1:2005. The main changes are as follows.

— A method for the determination of Poisson's ratio has been introduced. It is similar to the one used in ASTM D638, but in order to overcome difficulties with precision of the determination of the lateral contraction at small values of the longitudinal strain, the strain interval is extended far beyond the strain region for the modulus determination.

— Definitions and methods have been optimized for computer controlled tensile test machines.

— The preferred gauge length for use on the multipurpose test specimen has been increased from 50 mm to 75 mm. This is used especially in ISO 527-2.

— Nominal strain and especially nominal strain at break will be determined relative to the gripping distance. Nominal strain in general will be calculated as crosshead displacement from the beginning of the test, relative to the gripping distance, or as the preferred method if multipurpose test specimens are used, where strains up to the yield point are determined using an extensometer, as the sum of yield strain and nominal strain increment after the yield point, the latter also relative to the gripping distance.

ISO 527 consists of the following parts, under the general title *Plastics — Determination of tensile properties*:

— *Part 1: General principles*

— *Part 2 :Test conditions for moulding and extrusion plastics*

— *Part 3: Test conditions for films and sheets*

— *Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

— *Part 5: Test conditions for unidirectional fibre-reinforced plastic composites*

Plastics — Determination of tensile properties —

Part 1:
General principles

1 Scope

1.1 This part of ISO 527 specifies the general principles for determining the tensile properties of plastics and plastic composites under defined conditions. Several different types of test specimen are defined to suit different types of material which are detailed in subsequent parts of ISO 527.

1.2 The methods are used to investigate the tensile behaviour of the test specimens and for determining the tensile strength, tensile modulus and other aspects of the tensile stress/strain relationship under the conditions defined.

1.3 The methods are selectively suitable for use with the following materials:

— rigid and semi-rigid (see 3.12 and 3.13, respectively) moulding, extrusion and cast thermoplastic materials, including filled and reinforced compounds in addition to unfilled types; rigid and semi-rigid thermoplastics sheets and films;

— rigid and semi-rigid thermosetting moulding materials, including filled and reinforced compounds; rigid and semi-rigid thermosetting sheets, including laminates;

— fibre-reinforced thermosets and thermoplastic composites incorporating unidirectional or non-unidirectional reinforcements, such as mat, woven fabrics, woven rovings, chopped strands, combination and hybrid reinforcement, rovings and milled fibres; sheet made from pre-impregnated materials (prepregs),

— thermotropic liquid crystal polymers.

The methods are not normally suitable for use with rigid cellular materials, for which ISO 1926 is used, or for sandwich structures containing cellular materials.

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 291, *Plastics — Standard atmospheres for conditioning and testing*

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

ISO 7500-1:2004, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 9513:1999, *Metallic materials — Calibration of extensometers used in uniaxial testing*

ISO 16012, *Plastics — Determination of linear dimensions of test specimens*

ISO 20753, *Plastics — Test specimens*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

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

3.1
gauge length
L_0
initial distance between the gauge marks on the central part of the test specimen

NOTE 1 It is expressed in millimetres (mm).

NOTE 2 The values of the gauge length that are indicated for the specimen types in the different parts of ISO 527 represent the relevant maximum gauge length.

3.2
thickness
h
smaller initial dimension of the rectangular cross-section in the central part of a test specimen

NOTE It is expressed in millimetres (mm).

3.3
width
b
larger initial dimension of the rectangular cross-section in the central part of a test specimen

NOTE It is expressed in millimetres (mm).

3.4
cross-section
A
product of initial width and thickness, $A = bh$, of a test specimen.

NOTE It is expressed in square millimetres, (mm^2).

3.5
test speed
v
rate of separation of the gripping jaws

NOTE It is expressed in millimetres per minute (mm/min).

3.6
stress
σ
normal force per unit area of the original cross-section within the gauge length

NOTE 1 It is expressed in megapascals (MPa)

NOTE 2 In order to differentiate from the true stress related to the actual cross-section of the specimen, this stress is frequently called “engineering stress”

3.6.1
stress at yield
σ_y
stress at the yield strain

NOTE 1 It is expressed in megapascals (MPa).

NOTE 2 It may be less than the maximum attainable stress (see Figure 1, curves b and c)