SLOVENSKI STANDARD
SIST EN ISO 6892-1:2017

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Nadomešča:
SIST EN ISO 6892-1:2010

Kovinski materiali - Natezni preskus - 1. del: Metoda preskušanja pri sobni temperaturi (ISO 6892-1:2016)

Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2016)

Metallische Werkstoffe - Zugversuch - Teil 1: Prüfverfahren bei Raumtemperatur (ISO 6892-1:2016)

Matériaux métalliques - Essai de traction - Partie 1: Méthode d'essai à température ambiante (ISO 6892-1:2016)

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ICS:

77.040.10 Mehansko preskušanje kovin Mechanical testing of metals

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EUROPEAN STANDARD

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English Version

Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2016)

Matériaux métalliques - Essai de traction - Partie 1: Méthode d'essai à température ambiante (ISO 6892-1:2016)

Metallische Werkstoffe - Zugversuch - Teil 1: Prüfverfahren bei Raumtemperatur (ISO 6892-1:2016)

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

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European Foreword

This document (EN ISO 6892-1:2016) has been prepared by Technical Committee ISO/TC 164 “Mechanical testing of metals” in collaboration with Technical Committee ECISS/TC 101 “Test methods for steel (other than chemical analysis)” the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by January 2017, and conflicting national standards shall be withdrawn at the latest by January 2017.

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

This document supersedes EN ISO 6892-1:2009.

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Endorsement notice

The text of ISO 6892-1:2016 has been approved by CEN as EN ISO 6892-1:2016 without any modification.

INTERNATIONAL STANDARD

ISO 6892-1

Second edition
2016-07-01

Metallic materials — Tensile testing —

Part 1:
Method of test at room temperature

Matériaux métalliques — Essai de traction —

Partie 1: Méthode d'essai à température ambiante

Reference number
ISO 6892-1:2016(E)

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 1, *Uniaxial testing*.

This second edition cancels and replaces the first edition (ISO 6892-1:2009), which has been technically revised with the following changes:

a) renumbering of Clause 10;

b) additional information about the use of Method A and B;

c) new denomination for:

   1) Method A closed loop → A1

   2) Method A open loop → A2;

e) addition of A.5;

f) addition in Annex F for determination of the stiffness of the testing equipment;

g) new normative Annex G: Determination of the modulus of elasticity of metallic materials using a uniaxial tensile test;

h) the old Annex G is renamed to Annex H, Annex H to Annex I, etc.

ISO 6892 consists of the following parts, under the general title *Metallic materials — Tensile testing*:

— *Part 1: Method of test at room temperature*

— *Part 2:Method of test at elevated temperature*

— *Part 3:Method of test at low temperature*

— *Part 4: Method of test in liquid helium*

Introduction

During discussions concerning the speed of testing in the preparation of ISO 6892, it was decided to recommend the use of strain rate control in future revisions.

In this part of ISO 6892, there are two methods of testing speeds available. The first, method A, is based on strain rates (including crosshead separation rate) and the second, method B, is based on stress rates. Method A is intended to minimize the variation of the test rates during the moment when strain rate sensitive parameters are determined and to minimize the measurement uncertainty of the test results. Therefore, and out of the fact that often the strain rate sensitivity of the materials is not known, the use of method A is strongly recommended.

Metallic materials — Tensile testing —

Part 1:
Method of test at room temperature

1 Scope

This part of ISO 6892 specifies the method for tensile testing of metallic materials and defines the mechanical properties which can be determined at room temperature.

NOTE Annex A contains further recommendations for computer controlled testing machines.

2 Normative references

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

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

ISO 9513, *Metallic materials — Calibration of extensometer systems used in uniaxial testing*

3 Terms and definitions

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

NOTE In what follows, the designations “force” and “stress” or “extension”, “percentage extension”, and “strain”, respectively, are used on various occasions (as figure axis labels or in explanations for the determination of different properties). However, for a general description or point on a curve, the designations “force” and “stress” or “extension”, “percentage extension”, and “strain”, respectively, can be interchanged.

3.1
gauge length
L
length of the parallel portion of the test piece on which elongation is measured at any moment during the test

3.1.1
original gauge length
L_o
length between *gauge length* (3.1) marks on the test piece measured at room temperature before the test

3.1.2
final gauge length after fracture
L_u
length between *gauge length* (3.1) marks on the test piece measured after rupture, at room temperature, the two pieces having been carefully fitted back together so that their axes lie in a straight line

3.2
parallel length
L_c
length of the parallel reduced section of the test piece

Note 1 to entry: The concept of parallel length is replaced by the concept of distance between grips for unmachined test pieces.

3.3
elongation
increase in the *original gauge length* (3.1.1) at any moment during the test

3.4
percentage elongation
elongation expressed as a percentage of the *original gauge length* (3.1.1)

3.4.1
percentage permanent elongation
increase in the *original gauge length* (3.1.1) of a test piece after removal of a specified stress, expressed as a percentage of the original gauge length

3.4.2
percentage elongation after fracture
A
permanent elongation of the gauge length after fracture, ($L_u - L_o$), expressed as a percentage of the *original gauge length* (3.1.1)

Note 1 to entry: For further information, see 8.1.

3.5
extensometer gauge length
L_e
initial extensometer gauge length used for measurement of extension by means of an extensometer

Note 1 to entry: For further information, see 8.3.

3.6
extension
increase in the *extensometer gauge length* (3.5), at any moment during the test

3.6.1
percentage extension
"strain"
e
extension expressed as a percentage of the *extensometer gauge length* (3.5)

Note 1 to entry: e is commonly called engineering strain.

3.6.2
percentage permanent extension
increase in the extensometer gauge length, after removal of a specified stress from the test piece, expressed as a percentage of the *extensometer gauge length* (3.5)

3.6.3
percentage yield point extension
A_e
in discontinuous yielding materials, the extension between the start of yielding and the start of uniform work-hardening, expressed as a percentage of the *extensometer gauge length* (3.5)

Note 1 to entry: See Figure 7.

3.6.4
percentage total extension at maximum force
A_{gt}
total extension (elastic extension plus plastic extension) at maximum force, expressed as a percentage of the *extensometer gauge length* (3.5)

Note 1 to entry: See Figure 1.

3.6.5
percentage plastic extension at maximum force
A_g
plastic extension at maximum force, expressed as a percentage of the *extensometer gauge length* (3.5)

Note 1 to entry: See Figure 1.

3.6.6
percentage total extension at fracture
A_t
total extension (elastic extension plus plastic extension) at the moment of fracture, expressed as a percentage of the *extensometer gauge length* (3.5)

Note 1 to entry: See Figure 1.

3.7 Testing rate

3.7.1
strain rate

$\dot{e}_{L_e}$
increase of strain, measured with an extensometer, *in extensometer gauge length* (3.5), per time

3.7.2
estimated strain rate over the parallel length
$\dot{e}_{L_c}$
value of the increase of strain over the *parallel length* (3.2), of the test piece per time based on the *crosshead separation rate* (3.7.3) and the parallel length of the test piece

3.7.3
crosshead separation rate
v_c
displacement of the crossheads per time

3.7.4
stress rate
$\dot{R}$
increase of stress per time

Note 1 to entry: Stress rate is only used in the elastic part of the test (method B) (see also 10.3.3).

3.8
percentage reduction of area
Z
maximum change in cross-sectional area which has occurred during the test, ($S_o - S_u$), expressed as a percentage of the original cross-sectional area, S_o:

$$Z = \frac{S_o - S_u}{S_o} \cdot 100$$

