



# SLOVENSKI STANDARD SIST EN ISO 148-1:2017

01-februar-2017

Nadomešča:  
SIST EN ISO 148-1:2010

---

**Kovinski materiali - Udarni preskus po Charpyju - 1. del: Preskusna metoda (ISO 148-1:2016)**

Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)

Metallische Werkstoffe - Kerbschlagbiegeversuch nach Charpy - Teil 1: Prüfverfahren (ISO 148-1:2016)

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

Matériaux métalliques - Essai de flexion par choc sur éprouvette Charpy - Partie 1: Méthode d'essai (ISO 148-1:2016)

[SIST EN ISO 148-1:2017  
https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017](https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017)

**Ta slovenski standard je istoveten z: EN ISO 148-1:2016**

---

**ICS:**

77.040.10 Mehansko preskušanje kovin Mechanical testing of metals

**SIST EN ISO 148-1:2017**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 148-1:2017](https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017)

<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>

EUROPEAN STANDARD

EN ISO 148-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2016

ICS 77.040.10

Supersedes EN ISO 148-1:2010

English Version

## Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1:2016)

Matériaux métalliques - Essai de flexion par choc sur  
éprouvette Charpy - Partie 1: Méthode d'essai (ISO  
148-1:2016)

Metallische Werkstoffe - Kerbschlagbiegeversuch nach  
Charpy - Teil 1: Prüfverfahren (ISO 148-1:2016)

This European Standard was approved by CEN on 20 August 2016.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

<b>Contents</b>	<b>Page</b>
European foreword.....	3

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 148-1:2017](https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017)  
<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>

## European foreword

This document (EN ISO 148-1:2016) 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 May 2017, and conflicting national standards shall be withdrawn at the latest by May 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 148-1:2010.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

[https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-](https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017)

The text of ISO 148-1:2016 has been approved by CEN as EN ISO 148-1:2016 without any modification.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 148-1:2017

<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>

INTERNATIONAL  
STANDARD

ISO  
148-1

Third edition  
2016-10-15

---

---

**Metallic materials — Charpy  
pendulum impact test —**

**Part 1:  
Test method**

*Matériaux métalliques — Essai de flexion par choc sur éprouvette*

*Charpy —*

*Partie 1: Méthode d'essai*

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN ISO 148-1:2017

<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>



Reference number  
ISO 148-1:2016(E)

© ISO 2016

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 148-1:2017

<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org



# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
3.1 Definitions pertaining to energy.....	1
3.2 Definitions pertaining to test piece.....	2
<b>4 Symbols and abbreviated terms</b> .....	<b>2</b>
<b>5 Principles of the test</b> .....	<b>3</b>
<b>6 Test pieces</b> .....	<b>3</b>
6.1 General.....	3
6.2 Notch geometry.....	4
6.2.1 V-notch.....	4
6.2.2 U-notch.....	4
6.3 Tolerance of the test pieces.....	4
6.4 Preparation of the test pieces.....	4
6.5 Marking of the test pieces.....	4
<b>7 Test equipment</b> .....	<b>4</b>
7.1 General.....	4
7.2 Installation and verification.....	5
7.3 Striker.....	5
<b>8 Test procedure</b> .....	<b>5</b>
8.1 General.....	5
8.2 Friction measurement.....	5
8.3 Test temperature.....	6
8.4 Specimen transfer.....	7
8.5 Exceeding machine capacity.....	7
8.6 Incomplete fracture.....	7
8.7 Test piece jamming.....	8
8.8 Post-fracture inspection.....	8
<b>9 Test report</b> .....	<b>8</b>
9.1 Mandatory information.....	8
9.2 Optional information.....	8
<b>Annex A (informative) Self-centring tongs</b> .....	<b>12</b>
<b>Annex B (informative) Lateral expansion</b> .....	<b>13</b>
<b>Annex C (informative) Fracture appearance</b> .....	<b>16</b>
<b>Annex D (informative) Absorbed energy vs. temperature curve and the transition temperature</b> .....	<b>19</b>
<b>Annex E (informative) Measurement uncertainty of an absorbed energy value, <math>K</math></b> .....	<b>21</b>
<b>Bibliography</b> .....	<b>29</b>

## ISO 148-1:2016(E)

## 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 4, *Toughness testing — Fracture (F), Pendulum (P), Tear (T)*.

This third edition cancels and replaces the second edition (ISO 148-1:2009), which has been technically revised.

ISO 148 consists of the following parts, under the general title *Metallic materials — Charpy pendulum impact test*:

- *Part 1: Test method*
- *Part 2: Verification of testing machines*
- *Part 3: Preparation and characterization of Charpy V-notch test pieces for indirect verification of pendulum impact machines*

# Metallic materials — Charpy pendulum impact test —

## Part 1: Test method

### 1 Scope

This part of ISO 148 specifies the Charpy (V-notch and U-notch) pendulum impact test method for determining the energy absorbed in an impact test of metallic materials. This part of ISO 148 does not cover instrumented impact testing, which is specified in ISO 14556.

[Annexes B](#) and [C](#) are based on ASTM E23 and are used with the permission of ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, USA.

### 2 Normative references

The following referenced documents, in whole or in part, are normatively referenced in this document and 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 148-2, *Metallic materials — Charpy pendulum impact test — Part 2: Verification of testing machines*

ISO 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits*

### 3 Terms and definitions

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

#### 3.1 Definitions pertaining to energy

##### 3.1.1

**initial potential energy**

**potential energy**

$K_p$

potential energy of the pendulum hammer prior to its release for the impact test, as determined by direct verification

##### 3.1.2

**absorbed energy**

$K$

energy required to break a test piece with a pendulum impact testing machine, after correction for friction

Note 1 to entry: The letter V or U is used to indicate the notch geometry, that is:  $KV$  or  $KU$ . The number 2 or 8 is used as a subscript to indicate the radius of the striker, for example  $KV_2$ .

##### 3.1.3

**nominal initial potential energy**

**nominal energy**

$K_N$

energy assigned by the manufacturer of the pendulum impact testing machine

## ISO 148-1:2016(E)

## 3.2 Definitions pertaining to test piece

## 3.2.1

**width***W*

distance between the notched face and the opposite face

Note 1 to entry: See Figure 1.

Note 2 to entry: In previous versions of the ISO 148 series (prior to 2016), the distance between the notched face and the opposite face was specified as “height”. Changing this dimension to “width” makes this part of ISO 148 consistent with the terminology used in other ISO fracture standards.

## 3.2.2

**thickness***B*

dimension perpendicular to the width and parallel to the notch

Note 1 to entry: See Figure 1.

Note 2 to entry: In previous versions of the ISO 148 series (prior to 2016), the dimension perpendicular to the width that is parallel to the notch was specified as “width”. Changing this dimension to “thickness” makes this part of ISO 148 consistent with the terminology used in other ISO fracture standards.

## 3.2.3

**length***L*

largest dimension perpendicular to the notch

Note 1 to entry: See Figure 1.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

[SIST EN ISO 148-1:2017](https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017)

## 4 Symbols and abbreviated terms

<https://standards.iteh.ai/catalog/standards/sist/70a52143-c963-40d4-977c-6edd949d86ff/sist-en-iso-148-1-2017>

The symbols and designations applicable to this part of ISO 148 are indicated in [Tables 1](#) and [2](#), and are illustrated in [Figure 2](#).

**Table 1 — Symbols and their unit and designation**

Symbol	Unit	Designation
<i>B</i>	mm	thickness of test piece
$\alpha$	°	angle of fall of the pendulum
$\beta_1$	J or °	angle of rise when the machine is operated in the normal manner without a test piece in position
$\beta_2$	J or °	angle of rise when the machine is operated in the normal manner without a test piece in position and without resetting the indication mechanism
<i>L</i>	mm	length of test piece
<i>LE</i>	mm	lateral expansion
<i>K</i>	J	absorbed energy (expressed as <i>KV</i> <sub>2</sub> , <i>KV</i> <sub>8</sub> , <i>KU</i> <sub>2</sub> , <i>KU</i> <sub>8</sub> , to identify specific notch geometries and the radius of the striking edge)
<i>K</i> <sub>1</sub>	J or °	indicated absorbed energy when the machine is operated in the normal manner without a test piece in position
<i>K</i> <sub>2</sub>	J or °	indicated absorbed energy when the machine is operated in the normal manner without a test piece in position and without resetting the indication mechanism
<i>K</i> <sub>N</sub>	J or °	nominal initial potential energy
<i>K</i> <sub>p</sub>	J	initial potential energy (potential energy)
<i>KV</i> <sub>2</sub>	J	absorbed energy for a V-notch test piece using a 2 mm striker