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STN	**Kryogénne nádoby Požiadavky na húževnatosť materiálu pri nízkych teplotách Časť 2: Teploty medzi -80 °C a -20 °C (ISO 21028-2: 2018)**	**STN EN ISO 21028-2** 69 7252

Cryogenic vessels - Toughness requirements for materials at cryogenic temperature - Part 2: Temperatures between -80 degrees C and -20 degrees C (ISO 21028-2:2018)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/18

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English Version

Cryogenic vessels - Toughness requirements for materials at cryogenic temperature - Part 2: Temperatures between -80 degrees C and -20 degrees C (ISO 21028-2:2018)

Récipients cryogéniques - Exigences de ténacité pour les matériaux à température cryogénique - Partie 2: Températures comprises entre -80 degrés C et -20 degrés C (ISO 21028-2:2018)

Kryo-Behälter - Zähigkeitsanforderungen an Werkstoffe bei kryogenen Temperaturen - Teil 2: Temperaturen zwischen -80 °C und -20 °C (ISO 21028-2.2:2018)

This European Standard was approved by CEN on 12 January 2018.

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EN ISO 21028-2:2018 (E)

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European foreword

This document (EN ISO 21028-2:2018) has been prepared by Technical Committee ISO/TC 220 "Cryogenic vessels" in collaboration with Technical Committee CEN/TC 268 “Cryogenic vessels and specific hydrogen technologies applications”, 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of an identical text or by endorsement, at the latest by October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

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

This document supersedes EN 1252-2:2001.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 21028-2:2018 has been approved by CEN as EN ISO 21028-2:2018 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonization of the laws of the Member States relating to the making available on the market of pressure equipment

This European Standard has been prepared under a Commission's standardization request, M/071 Pressure Equipment, to provide one voluntary means of conforming to Essential Requirements of the New Approach Directive 2014/68/EU "Pressure Equipment Directive" of the European Parliament and of the Council of 15 May 2014.

Once this standard is cited in the Official Journal of the European Union under that Directive compliance with the normative clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014

Essential Requirements of Directive 2014/68/EU	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
Annex I § 2.2.3 b)	All clauses	Impact strength
Annex I § 7.5	All clauses	Material characteristics

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

INTERNATIONAL STANDARD

ISO 21028-2

Second edition
2018-03

Cryogenic vessels — Toughness requirements for materials at cryogenic temperature —

Part 2: Temperatures between -80 degrees C and -20 degrees C

Récipients cryogéniques — Exigences de ténacité pour les matériaux à température cryogénique —

Partie 2: Températures comprises entre -80 degrés C et -20 degrés C

Reference number
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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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This document was prepared by Technical Committee ISO/TC 220*, Cryogenic vessels.*

This second edition cancels and replaces the first edition (ISO 21028-2:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

— tables and figures on impact test temperatures and design reference have been modified;

— Annex B has been added to present an example of calculation of the lowest temperature authorized during operation.

A list of all parts in the ISO 21028 series can be found on the ISO website.

Introduction

The use of materials at low temperatures entails special problems which should be addressed. Consideration should be given, in particular, to changes in mechanical characteristics, expansion and contraction phenomena and the thermal conduction of the various materials. The most important property to be considered is the material toughness at low temperature.

INTERNATIONAL STANDARD **ISO 21028-2:2018(E)**

Cryogenic vessels — Toughness requirements for materials at cryogenic temperature —

Part 2:
Temperatures between -80 degrees C and -20 degrees C

1 Scope

This document specifies the toughness requirements of metallic materials for use at temperatures between −20 °C and −80 °C to ensure their suitability for cryogenic vessels. This document is applicable to fine-grain and low-alloyed steels with specified yield strength ≤460 N/mm^2, aluminium and aluminium alloys, copper and copper alloys and austenitic stainless steels.

NOTE For steel materials listed in EN 13445-2 or EN 13480-2 or for steel materials and weldings complying with the same fundamental safety requirements, the requirements for prevention of brittle fracture at low temperatures according to EN 13445-2:2014, Annex B, method 2, or EN 13480-2:2012, Annex B, method 2 can be applied.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 (all parts), *Metallic materials — Charpy pendulum impact test*

ISO 9016, *Destructive tests on welds in metallic materials — Impact tests — Test specimen location, notch orientation and examination*

