

KRÜOGEENANUMAD. KRÜOGEENSETEL
TEMPERATUURIDEL MATERJALIDE
VASTUPIDAVUSNÕUDED. OSA 1: TEMPERATUURIDEL
ALLA -80 °C

Cryogenic vessels - Toughness requirements for
materials at cryogenic temperature - Part 1:
Temperatures below -80 °C (ISO 21028-1:2016)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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|---|--|
| See Eesti standard EVS-EN ISO 21028-1:2016 sisaldab Euroopa standardi EN ISO 21028-1:2016 ingliskeelset teksti. | This Estonian standard EVS-EN ISO 21028-1:2016 consists of the English text of the European standard EN ISO 21028-1:2016. |
| Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
| Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.10.2016. | Date of Availability of the European standard is 19.10.2016. |
| Standard on kättesaadav Eesti Standardikeskusest. | The standard is available from the Estonian Centre for Standardisation. |

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English Version

**Cryogenic vessels - Toughness requirements for materials
at cryogenic temperature - Part 1: Temperatures below
-80 °C (ISO 21028-1:2016)**

Réceptacles cryogéniques - Exigences de ténacité pour
les matériaux à température cryogénique - Partie 1:
Températures inférieures à -80 °C (ISO 21028-1:2016)

Kryo-Behälter - Zähigkeitsanforderungen an
Werkstoffe bei kryogenen Temperaturen - Teil 1:
Temperaturen unter -80 °C (ISO 21028-1:2016)

This European Standard was approved by CEN on 7 August 2016.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 21028-1:2016) 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of an identical text or by endorsement, at the latest by April 2017, and conflicting national standards shall be withdrawn at the latest by April 2017.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 1252-1:1998.

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, see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 21028-1:2016 has been approved by CEN as EN ISO 21028-1:2016 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)/subclause(s) of this EN | Remarks/Notes |
|--|-----------------------------------|--------------------------|
| Annex I § 2.2.3 b) | Subclauses 4.1 and 4.2 | Impact strength |
| Annex I § 7.5 | Subclause 4.2 | 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.

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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.

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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.

The committee responsible for this document is ISO/TC 220, *Cryogenic vessels*.

This second edition cancels and replaces the first edition (ISO 21028-1:2004), which has been technically revised.

ISO 21028 consists of the following parts, under the general title *Cryogenic vessels — Toughness requirements for materials at cryogenic temperature*:

- *Part 1: Temperatures below -80 °C*
- *Part 2: Temperatures between -80 °C and -20 °C*

Introduction

The use of materials at low temperatures entails special problems which are to be addressed. Consideration is to be given, in particular, to changes in mechanical characteristics, expansion and contraction phenomena and the thermal conduction of the various materials. Austenitic stainless steel can transform from the austenitic to the martensitic phase when cooled down, leading to dimensional change that needs to be considered during design.

However, the most important property to be considered is material toughness at low temperatures.