



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 21013-3:2016

Cryogenic vessels - Pressure-relief  
accessories for cryogenic service - Part 3:  
Sizing and capacity determination (ISO  
21013-3:2016)

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I.S. EN ISO 21013-3:2016

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## National Foreword

I.S. EN ISO 21013-3:2016 is the adopted Irish version of the European Document EN ISO 21013-3:2016, Cryogenic vessels - Pressure-relief accessories for cryogenic service - Part 3: Sizing and capacity determination (ISO 21013-3:2016)

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EUROPEAN STANDARD

EN ISO 21013-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2016

ICS 23.020.40

Supersedes EN 13648-3:2002

English Version

## Cryogenic vessels - Pressure-relief accessories for cryogenic service - Part 3: Sizing and capacity determination (ISO 21013-3:2016)

Réceptifs cryogéniques - Dispositifs de sécurité pour  
le service cryogénique - Partie 3: Détermination de la  
taille et du volume (ISO 21013-3:2016)

Kryo-Behälter - Druckentlastungseinrichtungen für  
den Kryo-Betrieb - Teil 3: Bestimmung von Größe und  
Durchfluss (ISO 21013-3:2016)

This European Standard was approved by CEN on 15 April 2016.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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## European foreword

This document (EN ISO 21013-3:2016) 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of an identical text or by endorsement, at the latest by December 2016, and conflicting national standards shall be withdrawn at the latest by December 2016.

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 13648-3:2002.

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.

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

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

The text of ISO 21013-3:2016 has been approved by CEN as EN ISO 21013-3:2016 without any modification.

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EU Directive (2014/68/UE — Pressure Equipment Directive)

This European Standard has been prepared under a mandate given to CEN by the European Commission to provide a means of conforming to Essential Requirements of the New Approach Directive (2014/68/UE – Pressure Equipment Directive)

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the 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/UE – Pressure Equipment Directive)**

Clause(s)/subclause(s) of this EN	Essential Requirements (ERs) of Directive ...	Qualifying remarks/Notes
4, 5	Protection against exceeding the allowable limits of pressure equipment	Annex I, 2.10
6, 7	Safety accessories	Annex I, 2.11
4.3	External fire	Annex I, 2.12

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.



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**Cryogenic vessels — Pressure-relief  
accessories for cryogenic service —**

**Part 3:  
Sizing and capacity determination**

*Réipients cryogéniques — Dispositifs de sécurité pour le service  
cryogénique —*

*Partie 3: Détermination de la taille et du volume*





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

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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 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 220, *Cryogenic vessels*.

This second edition cancels and replaces the first edition (ISO 21013-3:2006), which has been technically revised.

ISO 21013 consists of the following parts, under the general title *Cryogenic vessels — Pressure-relief accessories for cryogenic service*:

- *Part 1: Reclosable pressure-relief valves*
- *Part 2: Non-reclosable pressure-relief devices*
- *Part 3: Sizing and capacity determination*
- *Part 4: Pressure-relief accessories for cryogenic service*

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# Cryogenic vessels — Pressure-relief accessories for cryogenic service —

## Part 3: Sizing and capacity determination

### 1 Scope

This part of ISO 21013 provides separate calculation methods for determining the required mass flow to be relieved for each of the following specified conditions:

- vacuum-insulated vessels with insulation system (outer jacket + insulating material) intact under normal vacuum, outer jacket at ambient temperature, inner vessel at temperature of the contents at the specified relieving pressure;
- vacuum-insulated vessels with insulation system (outer jacket + insulating material) intact under normal vacuum, outer jacket at ambient temperature, inner vessel at temperature of the contents at the specified relieving pressure, pressure regulator of the pressure build-up system functioning at full potential;
- vacuum or non-vacuum-insulated vessels with insulation system remaining in place, but with loss of vacuum in the case of vacuum-insulated vessels, outer jacket at ambient temperature, inner vessel at temperature of the contents at the specified relieving pressure or vacuum or non-vacuum-insulated vessels with insulation system remaining fully or partially in place, but with loss of vacuum in the case of vacuum-insulated vessels, fire engulfment, inner vessel at temperature of the contents at the specified relieving pressure;
- vacuum-insulated vessels containing fluids with saturation temperature below 75 K at 1 bar with insulation system remaining in place, but with loss of vacuum with air or nitrogen in the vacuum space;
- vacuum insulated vessels containing fluids with saturation temperature below 75 K at 1 bar with insulation system remaining in place, but with loss of vacuum with air or nitrogen in the vacuum space with fire engulfment;
- vessels with insulation system totally lost and fire engulfment.

Good engineering practice based on well-established theoretical physical science needs to be adopted to determine the required mass flow where an appropriate calculation method is not provided for an applicable condition.

Recommendations for pressure relief devices for cryostats are given in [Annex A](#).

### 2 Normative references

There are no normative references in this document.

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