

**Krüogeenanumad. Ohutusseadmed
kaitseks ülerõhu eest. Osa 3: Nõutava
survestuse määramine. Mahutavus ja
suuruse määramine**

Cryogenic vessels - Safety devices for protection
against excessive pressure - Part 3: Determination
of required discharge - Capacity and sizing

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 13648-3:2003 sisaldab Euroopa standardi EN 13648-3:2002 ingliskeelset teksti. Käesolev dokument on jõustatud 18.02.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 13648-3:2003 consists of the English text of the European standard EN 13648-3:2002. This document is endorsed on 18.02.2003 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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Käsitlusala: This standard provides a separate calculation method for determining the contributing mass flow to be relieved resulting from 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 relieving pressure;	Scope: This standard provides a separate calculation method for determining the contributing mass flow to be relieved resulting from 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 relieving pressure;
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ICS 23.020.40, 23.060.40

Võtmesõnad: dimensional measurements, performa, pneumatic tests, pressure, pressure control valves, pressure overload, safety device, safety requirements, safety valves, size measurement, specification, specification (approval), specifications, testing, tests, tightness, valves

ICS 23.020.40

English version

**Cryogenic vessels - Safety devices for protection against
excessive pressure - Part 3: Determination of required discharge
- Capacity and sizing**

Réceptifs cryogéniques - Dispositifs de protection contre
les surpressions - Partie 3: Détermination du débit à
évacuer - Capacité et dimensionnement

Kryo-Behälter - Sicherheitseinrichtungen gegen
Drucküberschreitung - Teil 3: Ermittlung des erforderlichen
Ausflusses - Ausflussmassenstrom und Auslegung

This European Standard was approved by CEN on 19 August 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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Foreword

This document (EN 13648-3:2002) has been prepared by Technical Committee CEN/TC 268 "Cryogenic vessels", 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 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

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.

EN 13648 consists of the following parts:

EN 13648-1, *Cryogenic vessels - Safety devices for protection against excessive pressure - Part 1: Safety valves for cryogenic service.*

EN 13648-2, *Cryogenic vessels - Safety devices for protection against excessive pressure - Part 2: Bursting discs safety devices for cryogenic service.*

EN 13648-3, *Cryogenic vessels - Safety devices for protection against excessive pressure - Part 3: Determination of required discharge - Capacity and sizing.*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The capacity of each of the pressure relief devices is established by considering all of the probable conditions contributing to internal excess pressure. The applicable conditions are specified in the product standard of each type of cryogenic vessel.

This European Standard provides a separate calculation method for determining the contributing mass flow to be relieved for each of the specified conditions. Conformity of the pressure protection system with the requirement for each condition is assumed if the applicable method of this standard is adopted.

This European Standard is based on CGA pamphlet, S-1.2 and S-1.3 and standards prepared by CEN/TC 69.

1 Scope

This standard provides a separate calculation method for determining the contributing mass flow to be relieved resulting from 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 relieving pressure;
- vacuum insulated vessels with insulation system remaining in place but with loss of vacuum, or non vacuum insulated vessels with insulation system intact. Outer jacket at ambient temperature. Inner vessel at temperature of the contents at the relieving pressure;
- 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, and fire engulfment. Inner vessel at temperature of the contents at the relieving pressure;
- vessels with insulation system totally lost and fire engulfment.

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

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prEN ISO 4126-1, *Safety devices for protection against excessive pressure - Part 1: Safety valves (identical to ISO 4126-1)*.

prEN ISO 4126-6:2000, *Safety devices for protection against excessive pressure - Part 6: Application, selection and installation of bursting disc safety devices (ISO/DIS 4126-6:2000)*.

3 Calculation of the total quantity of heat transferred per unit time from the hot wall (outer jacket) to the cold wall (inner vessel)

3.1 General

p (bar abs) is the actual relieving pressure which is used for the sizing of a safety valve. This shall not be greater than 1,1 PS, where PS is the maximum allowable pressure for which the vessel is designed.

T_a (K) is the maximum ambient temperature for conditions other than fire (as specified e.g. by regulation/standard)

T_f (K) is the external environment temperature under fire conditions (in any case $T_f = 922$ K, i.e. 649°C or 1200 F)