



SLOVENSKI STANDARD
SIST EN 12300:1999

01-september-1999

Posode za globoko podhlajene pline - Čistoča za obratovanje pri nizkih temperaturah

Cryogenic vessels - Cleanliness for cryogenic service

Kryo-Behälter - Reinheit für den tiefkalten Betrieb

Réceptifs cryogéniques - Propreté

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Ta slovenski standard je istoveten z: EN 12300:1998

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ICS:

23.020.40 Proti mrazu odporne posode Cryogenic vessels
(kriogenske posode)

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en

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EUROPEAN STANDARD

EN 12300

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1998

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Descriptors: pressure vessels, cryogeny, area, cleanliness checks, cleaning, protection, specifications, marking

English version

Cryogenic vessels - Cleanliness for cryogenic service

Réceptifs cryogéniques - Propreté

Kryo-Behälter - Reinheit für den tiefkalten Betrieb

This European Standard was approved by CEN on 1 September 1998.

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 Central Secretariat 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 Central Secretariat 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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard 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 May 1999, and conflicting national standards shall be withdrawn at the latest by May 1999.

This European Standard 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 standard.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This standard specifies the minimum requirements for the cleanliness of all surfaces of cryogenic vessels and associated accessories, that are in contact with the cryogenic fluid at any expected operating conditions.

This standard defines the acceptable level of surface and particle contamination to minimize the risk of malfunction of equipment and ensure safety against ignition when in contact with oxygen or oxidizing fluids (see EN 720-2).

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.

EN 720-2		Transportable gas cylinders - Gases and gas mixtures - Part 2 : Determination of flammability and oxidizing ability of gases and gas mixtures
prEN 1251-1	1995	Cryogenic vessels - Transportable vacuum insulated vessels of not more than 1000 litres volume - Part 1 : Fundamental requirements
EN 1797-1		Cryogenic vessels - Gas/material compatibility - Part 1 : Oxygen compatibility

3 Definitions

For the purpose of this European Standard, the following definitions apply :

3.1 cryogenic fluid : see prEN 1251-1:1995.

3.2 oxidizing fluid : A cryogenic fluid with oxidizing properties in accordance with EN 720-2.

4 Requirements

4.1 General requirements

Chips, foreign matter, major potentially loose particles such as oxide scale, weld spatter, are not acceptable.

Particles visible under daylight or white light without magnification are not acceptable. More stringent requirements for particle's size may be required depending upon the design of the system to avoid malfunction of equipment.

Free water shall not be detectable by visual examination.

4.2 Additional requirements for oxygen and oxidizing fluids

For oxygen and other oxidizing fluids, hydrocarbon contamination, paint, adhesives, sealants and protective coating shall not be detectable by visual examination using white light unless they are oxygen compatible in accordance with EN 1797-1 .

The maximum acceptable hydrocarbon contamination (oil, grease, etc.) is 500 mg/m².

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5 Cleaning procedure

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Any cleaning procedure may be used, providing the requirements of 4.1 and 4.2, if relevant, are met. If solvent or cleaning agents are used, they shall be compatible with all materials to be cleaned in particular plastics. Special care shall be taken to remove any non oxygen compatible agents (see EN 1797-1) from equipment cleaned for oxygen or oxidizing fluid service.

6 Cleanliness evaluation

An inspection and sampling method shall be selected to ensure that the requirements of 4.1 and 4.2, if relevant, are met. It shall take into account the cleaning procedure to be used, the equipment to be cleaned and its level of contamination. Cleanliness evaluation methods may include those listed in annex A.

The method of inspection shall not itself result in contamination levels greater than those specified in 4.1 and 4.2.

The cleanliness evaluation method shall be documented and the results obtained shall be recorded.

7 Post cleaning protection

After cleaning, items shall be protected to maintain their clean condition until used. To reduce the risk of condensing any atmospheric moisture during storage, consideration shall be given to purging and sealing the equipment

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Any packaging, plugs, etc. that can contact the clean surfaces shall be clean and removable without leaving any residue. Any packaging material shall be strong enough to resist the expected handling and storage conditions and be able to be sealed and water proof.

Any protective gas used shall be dry and oil and dust free.

Any pressurizing gas shall be kept at low pressure compatible with the strength of the packaging and should not exceed 0,5 bar. For pressure above 0,5 bar, the package may fall under transportable pressure vessels regulation.

8 Marking

Evidence of conformity with the requirements of this standard shall be documented by either :

- a certificate accompanying the equipment/item ;

or

- a label fixed to the protective packaging or equipment/item.

The certificate or label shall indicate :

- "EN 12300 - O₂" when cleaned for oxygen or other oxidizing fluids ;

- "EN 12300" when cleaned for other cryogenic fluids only.

If a protective gas is used, the type of gas and its pressure shall be legibly marked.

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Annex A (informative)

Inspection methods

A.1 General

Various methods exist for determining the cleanliness acceptance of equipment and it is necessary that the method selected complements the cleaning method used. This annex covers the most practical and effective methods available. It is necessary that competent persons with the necessary training and relevant industrial experience are used for this activity.

All parts being checked by solvent flushing or immersion should be able to drain freely to empty the solvent. If an area is identified which cannot freely drain, a method should be developed to remove completely the solvent without leaving contamination.

For parts that are inaccessible for inspection after assembly, it may be necessary to disassemble or inspect parts prior to assembly. Consideration should be given to any contamination which may occur during the assembly of inspected components.

If an inspection reveals the presence of any contaminants, the item should be partially or totally recleaned. Persistent rejection requires a re-evaluation of the cleaning methods and quality control provisions before re-acceptance.

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A.2 Direct visual examination with daylight or white light

This is the most common inspection method used to detect the presence of contaminants on equipment with easily accessible surfaces. This method will without magnification detect very small particulate matter and moisture, oils, grease, etc. in relatively small amounts.

The effectiveness of this method is dependent on the roughness of the inspected surface. The method can be used for sandblasted or mechanically cleaned steel surfaces.

Magnifying glasses are not necessary, but it is important to have a sufficient bright level of daylight or artificial white light.

Visual examination of the surfaces is appropriate for detecting :

- moisture (free water) ;
- cleaning agents ;
- flux residues from brazing, soldering or welding ;
- rust and loose scale, weld spatters, particles, fibres or other foreign matter ;
- organic material such as oils, grease, paint, etc..

This direct visual examination method enables detection of a hydrocarbon contamination level of 500 mg/m².