SLOVENSKI STANDARD
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Kriogene posode - Stabilne, vakuumsko izolirane posode - 2. del: Zahteve za obratovanje (ISO/DIS 21009-2:2013)

Cryogenic vessels - Static vacuum insulated vessels - Part 2: Operational requirements (ISO/DIS 21009-2:2013)

Kryo-Behälter - Ortsfeste vakuumisolierte Behälter - Teil 2: Betriebsbedingungen (ISO/DIS 21009-2:2013)

Récipients cryogéniques - Récipients fixes isolés sous vide - Partie 2: Exigences de fonctionnement (ISO/DIS 21009-2:2013)

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23.020.40	Proti mrazu odporne posode (kriogenske posode)	Cryogenic vessels

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Cryogenic vessels — Static vacuum insulated vessels —

Part 2:
Operational requirements

Récipients cryogéniques — Récipients fixes isolés sous vide —

Partie 2: Exigences de fonctionnement

[Revision of first edition (ISO 21009-2:2006)]

ICS: 23.020.40

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 21009-2 was prepared by Technical Committee ISO/TC 220, *Cryogenic vessels*, Subcommittee SC , and by Technical Committee CEN/TC 268, *Cryogenic vessels* in collaboration.

This secondedition cancels and replaces the firstedition (2006), which has been technically revised.

ISO 21009 consists of the following parts, under the general title *Cryogenic vessels — Static vacuum insulated vessels*:

— *Part 2: Operational requirements*

— *Part 1: Design, fabrication, inspection and tests*

— *Part 2: Operational requirements*

Cryogenic vessels — Static vacuum insulated vessels — Part 2: Operational requirements

1 Scope

This part of ISO 21009 specifies operational requirements for static vacuum insulated vessels designed for a maximum allowable pressure of more than 50 kPa (0,5 bar). It may also be used as a guideline for vessels designed for a maximum allowable pressure of less than 50 kPa (0,5 bar).

This part of ISO 21009 applies to vessels designed for cryogenic fluids specified in ISO 21009-1.

Static cryogenic vessels are often partly equipped by the manufacturer, but may be installed or re-installed by another party, such as the operator, user or owner.

NOTE For the installation of these vessels, additional requirements can apply; these are defined in specific regulations.

2 Normative references

The following referenced documents are indispensable for the application 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 23208, *Cryogenic vessels — Cleanliness for cryogenic service*

ISO 21009-1, *Cryogenic vessels — Static vacuum-insulated vessels — Part 1: Design, fabrication, inspection and tests*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
putting into service
operation by which a vessel is prepared to be used

Note 1 to entry: It applies to either a new vessel being used for the first time or an existing vessel being returned to service.

3.2
filling
operation by which a vessel undergoes a prefill check, filling with a cryogenic fluid and an after-fill check

3.3
withdrawal
operation by which the product is taken from a vessel connected to the supply system

3.4
outdoor location
location outside of any building or structure and not enclosed by more than two walls

3.5
underground location
area or room whose ground or floor is on all sides significantly lower than the adjacent ground surfaces

Note 1 to entry: Installations are to be considered on an individual basis after a suitable and sufficient risk assessment has been carried out.

3.6
safety distance
minimum distance separating a piece of equipment from its inherent hazard that will mitigate the effect of a likely foreseeable incident and prevent a minor incident escalating into a larger incident

Note 1 to entry: The safety distance will also be determined to provide protection from foreseeable external impact (e.g. roadway, flare) or activities outside the control of the operation (e.g. plant or customer station boundary).

3.7
gas release
escape of gas due to operating conditions, or to malfunctions that cannot be reasonably excluded

Note 1 to entry: Gas release for operating reasons can be produced, for example, on vent lines and pressure-release lines.

Note 2 to entry: Gas escape due to malfunctions which cannot be excluded can occur, for example, in the case of overfilling, failure of fittings, loose connections, faulty operation, and leakages.

3.8
vessel
static cryogenic vessel as defined in ISO 21009-1

3.9
authorized person
person authorized by the applicable regulations

4 Personnel training

Only persons trained for the specific task shall be allowed to install, put into service, fill, handle, operate or maintain the vessel and its equipment.

The training programme shall include

— normal operating procedures;

— product and hazard identification;

— safe operating limits;

— emergency procedures;

— physical and chemical properties of the vessel's contents and their effects on the human body;

— personnel protective equipment (e.g. safety boots, goggles, gloves).

Training shall be repeated as necessary to ensure that personnel remain competent. A training record shall be maintained which details the information personnel have received.

5 General safety requirements

5.1 General

Identification labels and plates shall not be removed or defaced.

Appropriate warning signs regarding product and operational hazards and personnel protective equipment requirements shall be displayed.

Parts under pressure shall be disconnected only if they have been previously depressurized.

All surfaces which may come in contact with the product shall be kept free from oil and grease. For cleanliness requirements, see ISO 23208.

Leaking valves or connections should be depressurized before rectification. When this is not possible, leaking valves under pressure shall be tightened using suitable tools and procedures. Direct flame or intense heat shall never be used to raise the pressure or de-ice frozen components.

Valve outlets shall be kept clean, dry and free from contaminants.

Vessels and their accessories shall not be modified without proper authorization.

5.2 Safety considerations

In all operations and training, the following safety considerations shall be taken into account.

— Small amounts of cryogenic fluids will produce large volumes of vaporized gas. Spillage of oxygen can result in an oxygen-enriched atmosphere; spillage of other cryogenic fluids can result in an oxygen-deficient atmosphere. Provision is to be made for appropriate measures for this, e.g. ventilation.

— Due to the possibility of cold embrittlement, cryogenic fluids shall not come in contact with materials (metals or plastics) which are not suitable for low temperatures.

— Because of their extremely low temperatures, cryogenic fluids will produce cold burns when coming in contact with the skin. Cold burns can also be produced from contact with uninsulated equipment and pipe.

— Oxygen enrichment due to liquefaction of ambient air can occur on the cold surfaces of uninsulated equipment which contain fluids with a boiling point lower than that of oxygen.

6 Installation

6.1 General requirements

Vessels shall be installed and operated in such a way that employees or third parties are not endangered. Necessary minimum safety distances shall be observed; see also Annex A.

Vessels shall be installed so that the name plate is easily readable.

The installation should allow inspection of vessels on all sides. All vessel controls shall be capable of being operated safely.

Vessels shall be installed in such a way that their filling operation can be carried out safely and easily.

Vessels shall be erected in such a way that no inadmissible misalignment or inclination can occur due to

— the actual foundations;

— the inherent mass of the vessel including its contents;

— external forces, e.g. seismic loads, wind loads.

Gas from pressure-relief devices or vents shall be discharged to a safe place.

Appropriate warning signs regarding product hazards shall be displayed, e.g. in rooms, areas, or on vessels. The operating instructions shall also refer to the properties of the gas.

Vessels shall be installed in locations where there is sufficient ventilation such that the formation of dangerous explosive gas-air mixtures or an oxygen-deficient/-enriched atmosphere is avoided.

Vessels shall be installed in such a way that adequate space is provided for maintenance and cleaning, as well as for emergency cases.

The space for maintenance and cleaning should be at least 0,5 m around the installation.

Vessels shall not be installed in corridors, passages or thoroughfares, generally accessible lobbies, stair-wells or near steps. Vessels should not be installed close to the aforementioned areas if traffic routes, escape routes or accessibility are limited.

Access by unauthorized persons should be prevented.

The area/foundation under vessels, as well as below detachable connections and fittings to the liquid phase of the vessel of oxidizing gases, shall be of non-combustible materials and free of oil, grease and other flammable contaminants.

Consideration shall also be given to the need for similar precautions for liquid-hydrogen or liquid-helium installations where significant air liquefaction may occur around uninsulated equipment.

NOTE To prevent a risk of brittle fracture, consideration should be given to the design temperature of the installation downstream of the installed or fitted vaporizing system and low temperature cut-off systems, if necessary.

6.2 Outdoor installation

Vessels should be installed outdoors.

The drainage of surface water from the place of installation shall be ensured.

On sloping sites, an installation (e.g. a wall) may be necessary to prevent gas from penetrating over the place of installation down into lower rooms, ducts, shafts or air intakes.

Vessels and their components shall be protected against mechanical damage, e.g. by vehicle buffer bars, enclosures, safety distances. The protection of vessel supports against leaking cryogenic fluid should be considered.

6.3 Indoor installation

If reasonable attempts to install the vessel outdoors fail, an indoor installation is permitted. Indoor installation shall comply with the following safety precautions.

The entrance of rooms in which vessels are installed shall be labelled. Reference shall be made to the relevant hazards of the gas.

Rooms shall:

— have self-closing doors, where these do not lead directly outside;

