BRITISH STANDARD

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13458-3:2003

Cryogenic vessels — Static vacuum insulated vessels —

Part 3: Operational requirements

The European Standard EN 13458-3:2003 has the status of a British Standard

ICS 23.020.40

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 13458-3:2003.

The UK participation in its preparation was entrusted to Technical Committee PVE/18, Cryogenic vessels, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

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Cryogenic vessels - Static vacuum insulated vessels - Part 3: Operational requirements

Récipients cryogéniques - Récipients fixes isolés sous vide - Partie 3: Exigences opérationnelles

Kryo-Behälter - Ortsfeste vakuum-isolierte Behälter - Teil 3: Betriebsanforderungen

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

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Contents

Foreword

This document (EN 13458-3:2003) 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.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.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Annexes A and B are informative.

EN 13458 consists of the following Parts under the general title, *Cryogenic vessels – Static vacuum insulated vessels*:

– Part 1: Fundamental requirements.

– Part 2: Design, fabrication, inspection and testing.

– Part 3: Operational requirements.

Introduction

Elements of this document support the requirements of the Pressure Equipment Directive and other national or local requirements.

Static cryogenic vessels are often partly equipped by the manufacturer, but may be installed or re-installed by another party, such as the operator, the user or the owner. For this reason some of the scope this European Standard which includes installation, putting into service, inspection, filling, maintenance and emergency procedure overlaps with some of the parts EN 13458-1 and EN 13458-2.

1 Scope

1.1 This European Standard specifies operational requirements for static vacuum insulated vessels designed for a maximum allowable pressure of more than 0.5 bar. It may also be used as a guideline for vessels designed for a maximum allowable pressure of less than 0,5 bar.

1.2 This European Standard applies to vessels designed for cryogenic fluids specified in EN 13458-1.

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).

EN 12300, *Cryogenic vessels - Cleanliness for cryogenic service.*

EN 13458-1:2002 *Cryogenic vessels - Static vacuum insulated vessels – Part 1: Fundamental requirements.*

EN 13458-2:2002, *Cryogenic vessels - Static vacuum insulated vessels – Part 2: Design, fabrication, inspection and testing.*

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply in addition to those given in EN 13458-1:2002.

3.1
putting into service
operation by which a vessel is prepared to be used for the first time

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 Installations should be considered on an individual base after a suitable and sufficient risk assessment has been carried out.

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

Included in safety distances are:

— distances between vessels and neighbouring installations, buildings or public roads, the purpose of which is to protect the vessel from any damage, such as heating as a result of fire or mechanical damage;

— the distance between the vessel and an object outside the installation, which has to be protected from the effects of a gas release arising from normal operation. These distances are measured from those points on a vessel from which in the normal course of operation a release of product may occur, e.g. vent point, fill connection, flanges or other mechanical joints.

The safety distance is the distance, outside of which:

— in the case of flammable gases dangers through formation of an explosive atmosphere is eliminated, i.e. the lower explosive limit (LEL) is not exceeded;

— in the case of inert and oxidising gases, dangers from a lack of oxygen or enrichment are eliminated.

The safety distances defined in annex B are based on experience and calculation of minor releases. They are given for inert fluids, oxidising fluids and flammable fluids.

The maximum volumes/masses of product in the vessel considered are as follows:

— 175 m^3 for inert fluids;

— 200 t for oxidising fluids (corresponding to approx. 175 m^3 LOX);

— 5 t for liquid hydrogen (corresponding to approx. 75 m^3 LH2); and

— 50 t for other flammable fluids.

For larger volumes/masses of products in the vessel the safety distances shall be determined by a specific hazard study.

The safety distance*s* are not intended to provide protection against catastrophic events or major releases and these should be addressed by other means to reduce the frequency and/or consequences to an acceptable level.

3.7
gas release
gas release may be due to operating conditions or malfunctions. Gas escape, caused by malfunctions, which can be reasonably excluded, are not taken into account

Gas release for operating reasons may be produced, for example; on

— vent lines;

— pressure release lines.

Gas escape due to malfunctions which cannot be excluded may occur, for example, in the case of:

— overfilling;

— failure of fittings;

— loose connections;

— faulty operation;

— leakages.

3.8
vessel
throughout this standard, vessel means a static cryogenic vessel as defined in 3.2 of EN 13458-1:2002.

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.

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 should 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 should be displayed. Parts under pressure shall be disconnected only if they have been previously depressurised. When under pressure leaking valves or connections may only be tightened using suitable tools and procedures. Direct flame or intense heat shall never be used to raise the pressure or to de-ice frozen valves.

Vessels shall be kept free from oil and grease; for cleanliness requirements see EN 12300. Valve outlets shall be kept clean, dry and free from contaminants. Vessels shall not be modified without proper authorisation.

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 vaporised gas. Spillage of cryogenic fluids can result in an oxygen deficient atmosphere, or in the case of vaporising oxygen, in an oxygen enriched 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 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 safety distances shall be observed; see also annex B (informative).

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 its filling operation can be carried out safely.

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.

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 hazardous 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 adequate 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 either, if traffic routes, escape routes or accessibility are limited.

Access by unauthorised persons should be prevented.

The floor under vessels as well as below detachable connections and fittings on the liquid phase on oxidising gases shall be of non-flammable materials and free of oil, grease and other flammable contaminants.

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

Pressure relief devices shall be provided to prevent overpressure of the equipment connected down stream of the vessel's outlet.

If this connected equipment is not designed for low temperatures safety devices shall be provided to protect it against possible low operating temperatures.

6.2 Indoor installation

Vessels should be installed outdoors wherever reasonably possible. If an indoor installation has to be carried out the following safety precautions shall apply.

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

Rooms shall:

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

— consist of materials which are fire resistant or non-combustible, with the exception of windows and -other closures of apertures in external walls;

— be separated from other rooms in accordance with a fire resistance class of 30 min;

— be separated in a gas-tight manner and without any apertures, from rooms normally occupied by public;

— have adequate ventilation; gas release from the trycock valve shall be taken into account when assessing the ventilation requirements.

Precautions/procedures shall be implemented to ensure that personnel entering or within the rooms are not exposed to hazardous atmospheres.

Rooms containing vessels shall not be used in any other way which may be a danger to the vessels due to mechanical effects, fire or explosion.

Filling connections shall be hard piped to an outdoor location.

In rooms there shall be no:

— air intake openings for the ventilation of other rooms;

— open ducts;

— any ducts inlets unprotected against the ingress of gas;

— open shafts;

— openings to lower rooms.

6.3 Outdoor installation

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

On sloping sites an installation may be necessary to prevent gas from penetrating over the place of installation down into lower rooms, ducts, shafts or air intakes; this may be a wall for example.

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.

7 Inspection

The tests and inspections shall be carried out by a competent person.

7.1 Inspection before putting into service

The inspection comprises:

— checking the markings;

— checking the completeness of the handover documents;

— checking the equipment;

— checking the installation.

7.1.1 Marking and labelling

Marking and labelling shall be in accordance with EN 13458-1.

7.1.2 Handover documents

In addition to the manufacturer's documentation, where necessary the cryogenic vessel shall be accompanied by vessel specific documents and instructions for all items supplied covering:

— operations;

— auxiliary equipment;

— inspection records.

These documents shall be retained by the owner or user of the vessel.

The user shall have appropriate operating instructions available. Such instructions may be attached to the vessel in a permanent manner.

7.1.3 Equipment

Checking the equipment covers:

— checking the safety relevant measuring devices for their availability and appropriate choice in respect of the suitability of the measuring range and, in so far as possible, for performance/correct operation;

— checking the safety devices against overpressure for availability, appropriate choice and setting, appropriate arrangement, safe venting location and, in so far as possible, for performance/correct operation;

— checking the safety relevant shut-off devices for availability, appropriate choice and arrangement in respect of pressure and temperature and, in so far as possible, for performance/correct operation;

— checking other safety relevant fittings, gauges and controlling devices in particular with regard to the medium to be supplied and vented; where these are automatically driven or controlled, also their performance in the event of a power cut or loss of pneumatic supply.

The vessel's connections are to be tested for leak-tightness before putting into service.

7.2 Periodic inspection

The periodic inspection shall consist of:

— an external visual inspection of the vessel and equipment to ensure that the vacuum between inner vessel and outer jacket remains and the conditions of clause 6 of EN 13458-1:2002 still fulfilled;

— a functional check of valves;

— leak tests under operating conditions;

— assessing any changes of the operational conditions of the installation and its surroundings.

The tests shall be carried out by a competent person.

The inspection intervals are to be determined by the competent person after considering the operating conditions and the recommendations of the manufacturer, but should not typically exceed 2 years on vessels for flammable gases and 3 years for all other vessels.

The inspection shall be certified.

7.3 Inspection of safety valves/bursting discs

7.3.1 General

The examinations and the inspection intervals are to be determined by the competent person according to the operating conditions, taking into consideration the recommendations of the manufacturer. Inspection intervals are recommended in the following Table 1.

Material properties, corrosion by the medium or from the outside, possible plugging shall be considered. An alternative to the performance test of the safety valves is to replace it. The inspections shall be made by a competent person.

Pressure relief devices for oxidising fluids shall be free of oil and grease (see also EN 12300). According to the requirements of EN 12300 they shall be suitably certified, marked, packed and stored.

Table 1 — Examinations/Inspection periods

Type of device; safety valve (SV); bursting disc	at commissioning	yearly	2 years	3 years	10 years
pilot operated SV	7.3.2	7.3.3 ; 7.3.4	----	----	---
SV for flammable gases/gas mixture	7.3.2 ; 7.3.3	----	7.3.3	7.3.4	---
SV for inert and oxidising gases/mixtures	7.3.2	---	---	7.3.3	7.3.4
thermal valves	7.3.2	---	---	7.3.3	7.3.4
bursting discs	7.3.2	----	----	7.3.3	7.3.5

Where redundancy is provided the inspection intervals may be extended in agreement with competent person.

7.3.2 Certificates and marking

The certificates/marking shall be examined by a competent person or manufacturer's declaration/data:

— conformity with drawings, specifications, type approval;

— identification, type approval/marking;

— suitability (medium, size, temperature, pressure, setting).

7.3.3 Visual inspection

Within the visual inspection the following should be checked:

— general condition;

— installation/orientation;

— leak tightness;

— vent location;

— unobstructed discharge piping.

7.3.4 Performance test

Within the performance test following parameters should be checked:

— set pressure;

— lift/stroke;

— leak tightness.

The inspection can be made with the valve installed or on the test bench. The results of the tests shall be recorded and kept at least until the next inspection.

7.3.5 Changing bursting discs (inner vessel)

Bursting discs should be replaced.

8 Putting into service

This operation shall follow a written procedure and the results of the steps involved should be recorded (e.g. in a check list). Such lists should be retained by the operating company.

Vessel and accessories shall be checked in accordance with 7.1 and 7.3.

The vessel shall be purged with an appropriate gas until the gas emerging from the vessel is sufficiently dry and pure.

The vessel shall be cooled down according to the manufacturer's recommendations. Steps shall be taken to avoid uncontrolled pressure rise due to rapid liquid evaporation.

9 Filling

Prior to filling the condition of the vessel shall be checked especially the:

— data plate/product identification label;

— correct coupling for the product;

— condition of fittings (not damaged, dirty, excessively iced).

The fill hose should be purged.

Depending on the type of the cryogenic vessel, it may be filled by volume or by mass, to the level the vessel is designed for taking into account product density. The necessary measuring equipment shall be in good working order and within the calibration period.

If there is no residual pressure in the vessel prior to filling it should be purged to remove possible contaminants. For carbon dioxide vessels only gaseous carbon dioxide should be used for purging.

If the vessel is warm, it should be cooled down gradually according to manufacturer's recommendations. Carbon dioxide vessels shall be pressurised with gaseous carbon dioxide before filling with liquid.

The purity of the residual product in the vessel shall be analysed and recorded where required by specification. Where the purity of the residual product is outside specification the vessel should be purged until it meets specification.

After filling the vessel mass or level of contents and pressure shall be checked and, if necessary, the vessel should be vented to reach the level required by specification.

If required by specification, the vessel contents shall be analysed and recorded.

It shall be checked that all filling valves are closed, that no cold spots have developed and that valves, piping and fittings are free from leaks.

10 Taking out of service

This operation shall follow a written procedure and the results of the steps involved should be recorded. If the vessel is intended for further service, such records should be retained by the operating company.

The procedure shall include the following:

— depressurisation and emptying of the vessel;

— when depressurising the vessel, it shall be verified that the valve used for emptying is not obstructed;

— the process shall be checked by monitoring pressure and mass, if necessary;

— due consideration should be given to the properties of the product involved.

If the vessel is intended to be taken into service again later, the following additional points shall be considered:

— the purging of the vessel and all piping and accessories with inert gas;

— if the vessel is to be transported or stored, protective caps should be fitted on all open connections;

— when in store, a slight positive pressure of dry inert gas shall be maintained in the vessel and the vessel shall be labelled accordingly.

If the vessel is to be scrapped, it shall be purged with air and labelled accordingly.

11 Maintenance and repair

Maintenance is required to ensure that equipment remains in a safe condition. The responsibility for the maintenance and repair shall be established between the contracting parties (e.g. owner, user, filler). Following maintenance, the vessel shall comply with the current approval documentation.

The issue of work permits shall be considered e.g. for hot work, modifications, works on electrical equipment.

Maintenance generally comprises:

— checking the condition of the vessel, piping and accessories;

— checking the operability of valves;

— minor repairs, e.g. changing of seals;

— cleaning external surfaces.

Maintenance operations shall only be carried out by personnel trained for the task.

Equipment shall not be taken out of service for repair until all pressure has been released.

Any leakage shall be rectified promptly and in a safe manner. Only original spare parts should be used. If this is not possible the suitability of the spare part shall be approved by a competent person.

Modifications in design, materials and equipment or repairs shall be approved by a competent person and documentation updated accordingly. (see also EN 13458-1).

Hot work (welding, soldering, heat treatment etc.) shall be carried out to the same procedures (fabrication, qualification of personnel, testing, certification etc.) as during manufacture.

Where repair or modification have been carried out which may have affected the integrity of the pressure vessel, the vessel shall be inspected and tested in accordance with clause 6 of EN 13458-2:2002.

The test shall be carried out by a competent person.

Vessels shall be internally clean, dry and free from particulate matter and contaminants; vessels for oxidising fluids shall be free from oil and grease (see also EN 12300).

12 Additional requirements for flammable gases

12.1 General

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

Precautions shall be taken when approaching a leak as the product may ignite and produce a flame. Products such as hydrogen require specific care as the flame is invisible.

Care should be taken in the choice of personnel clothing, to protect as much as possible against static charges and flames. Antistatic footwear shall be worn.

When under pressure, leaking valves or connections shall only be tightened using suitable tools (e.g. non sparking tools) and procedures.

12.2 Electrical equipment and installation/earthing

All equipment used and installed within the boundary of the installation shall be in accordance with the requirements of the area classification. All parts of the installation shall be bonded to ensure electrical continuity.

Major items of equipment such as the tank and vent stack shall be bonded directly to the earth point and not rely upon the piping as a means to earth.

Installations for flammable gases shall be earthed in accordance with national regulations. Consideration shall be given to the need for lightning protection.

Earthing can be done via:

— separate earthing wires: diverter resistance $\leq 2\ \Omega$;

— foundation earthing, ground earthing, combined use of earthing: diverter resistance $\leq 10\ \Omega$;

— installation on earth without intermediate insulation: diverter resistance $\leq 10^6\ \Omega$ (only permissible for diverting electro-static charge).

To ensure that the requirements for the prevention of the build up of static electricity on equipment are met, an inspection shall be carried out by a competent inspection body prior to commissioning.

For transferring processes between several installations or between static vessels and transport vessels, equalising of the electrical potentials is necessary.

Fixing points for the earthing connection of the earthing cable of the transport vessel are to be installed outside the explosion-zone. They may be inside the ex-zone, if the earthing cable has been fitted with suitably protected explosion-proof, earthing connections.

In the classified areas personnel shall not be permitted to carry sources of flames or non approved electrical equipment. Consideration should be given also to equipment generating electromagnetic waves, e.g. mobile phones, radio transmitters.

12.3 Installation

Vessels for flammable gases shall not be installed indoors or underground.

Vessels for flammable gases shall have adequate distance between each other and any other vessels to allow access for fire-fighting.

An adequate distance is in the case of cylindrical vessels half the diameter of the vessel; in the case of vessels with a diameter of less than 2 m., it shall however be at least 1 m.

The ground in the area of connections and fittings shall be such, that escaping fluid cannot penetrate it, or collect in dangerous quantities.

Special layout of the ground is not required if the connections including the fittings on the liquid phase - with the exception of the process measuring and control lines - have no detachable connections.

All vent pipes, including pressure relief devices and purging valves shall be connected to a vent line (stack).

The vent line shall ensure a safe venting. It may not issue at a point where a build-up of gas might be possible, for example under the eaves of buildings.

The collection of water, including condensate, in the ventline (stack) shall be prevented.

In explosion-zones there should only be constructions and installations which serve for the operation of the vessels.

Works and service roads and tracks are included in such installations. Only vehicles which serve the operation of the vessels should travel on such traffic routes.

Vehicles with combustion engines or non explosion-proof electric equipment shall not travel in explosion-zones, unless a dangerous explosive atmosphere can reasonably be excluded.

The design of the vessel support structure shall take into consideration the possibility of fire impingement. Appropriate precautions shall be taken, e.g.: installation design, thermal insulation, fire fighting methods.

In the storage areas for flammable gases, there shall be systems for warning in case of fire or risk of explosion.

In the area of storage tanks for flammable gases with a capacity of more than 50 t, an easily visible wind direction indicator should be installed, e.g. a wind sock. If due to the nature of the installation a local wind direction indicator is not practical, the wind direction may be indicated centrally at the appropriate point for the emergency service, e.g. the works fire brigade.

In installations where the storage capacity exceeds 50 t, which are not occupied by personnel during operation or are not regularly checked, automatic systems shall be in use for detecting and signalling fires or the risk of explosion, e.g. gas warning systems connected to a permanently manned position, e.g. control room.

In these areas, there shall be an emergency shut-down system, easy accessible signalling to a permanently manned position.

With the emergency shut-down systems, it shall be possible to block off the connecting pipes between vessels and other parts of the installation, so that no additional dangers arise. On vessels with a capacity of more than 5 t a remote-controlled shut off valve shall be fitted before or after the first manual shut off valve connected to the liquid phase of the filling and supply pipes.

A non-return valve may be built in the filling line instead of the remote-controlled shut off valve.

12.4 Filling

Where a vessel to be put into service, is empty or depressurised, prior to filling the vessel it shall be purged with an inert gas.

Before starting the transfer, the earthing conductor shall be connected and the filling hose(s) shall be purged free of air and impurities.

12.5 Maintenance, repair and taking out of service

Where maintenance and repair work requires the system to be inerted, as well as when taking out of service a purging with inert gas shall be carried out until the concentration of flammable gas is below 50 % of the lower explosive limit.

13 Emergency equipment/procedures

Emergency procedures shall be prepared to cover fire or any other hazardous events, e.g. spills, which may occur. It is advisable that emergency procedures are prepared in conjunction with the emergency services and that local conditions are considered.

The procedure should consider:

— the properties of the cryogenic fluids;

— the quantities involved;

— the local topography;

— the design and equipment of the vessel.

The procedure should include:

— listing of emergency equipment required;

— nomination of back-up personnel/organisations for managing emergencies and procedures for contacting them both during and outside working hours;

— immediate self-help actions required (shut down, sounding alarms, evacuation from the area, summoning help, etc).

The procedures should be readily available to all personnel involved, regularly practised and checked periodically that they are up to date.

For oxidising and flammable fluids a fire fighting system shall be provided. The type and quantity of the fire fighting equipment, depending on the size of the installation, should be discussed with the fire authorities.

As a minimum, it should consist of one suitable fire extinguisher. If water is used to keep equipment cool in the event of fire, it should not be sprayed near relief device vents, because of the potential danger of plugging vents with ice.

An example of an emergency procedure is given in annex A.

Annex A
(informative)

Example of an emergency procedure

Product	- non-flammable, non toxic, cryogenic fluid
	- colourless, odourless
Hazards	- liquid has very low temperature and evaporates readily
	- cold gas is heavier than air and spreads along the ground
	- cold gas is invisible but produces mist in contact with atmospheric moisture
	- the gas will suffocate without warning
	- contact with liquid causes cold burns and severe damage to eyes
	- heating the vessel will cause a pressure rise with a risk of the vessel bursting
Personal protection	- safety goggles, protective clothing, shoes and gloves
Equipment	- oxygen analyser
	- breathing apparatus
Fire fighting equipment	- extinguisher (CO_2, dry chemical)
	- water
Emergency action	- raise the alarm
	- evacuate all persons from the immediate danger area
	- notify fire brigade immediately (if necessary)
	- isolate the area
	- place warning signs
	- keep upwind (outdoors)
	- in case of leakage/spillage
	- tighten up leaks if this can be done without risk
	- allow liquid to evaporate
	- prevent liquid entering sewers, pits, trenches
	- in case of fire
	- keep vessel cool by spraying with water
	- do not spray water directly on valves or safety equipment
	- move the vessel to a safe location if possible
First aid	- get medical assistance if symptoms of inhalation are noticed or there has been product contact with skin or eyes
	- in case of contact with liquid, first thaw affected parts with tepid water, then remove clothing carefully

Important telephone numbers:

Fire brigade:

Supervisor:

Hospital/Physician:

Annex B
(informative)

Safety distances

The safety distances are indicated in Table B.1.

Table B.1 — Safety distances

Type of exposure	Safety distances (m)				
	inert fluids	oxidising fluids vessel capacity		flammable fluids	
		< 50 t	< 200t	liquide H_2	others
Site boundary, vehicle parking areas, public road/railway line	3	5	8	8	5
Areas where open flames, smoking or sources of ignition are permitted	3	5	8	8	5
Stocks of solid combustible materials e.g. timber, including wooden buildings and structures	3	5	8	8	5
Pits, ducts, surface water drains, openings of systems below ground level	3	5	8	8	5
offices, canteens and areas where employees/visitors are likely to congregate	3	5	8	15	5
Compressor/ventilator air intakes, fuel gas vents	3	5	8	15	5
Bulk flammable fluids	3	5	8	8	5
Overhead electric power cables	---	---	---	10	10

ANNEX ZA

(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 97/23/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 97/23/EC.

Once this standard is cited in the Official Journal of the European Communities 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 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.

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

Table ZA – Correspondence between this European Standard and Directive 97/23/EC

Harmonized clauses of EN 13458-3	Nature of requirement	PED Annex I
5.1, 7.1, 8, 9, 12.4	Operating instructions	3.4
5.2, 6, 8, 12.1 to 12.3	Provisions to ensure safe handling and operation	2.3
6	Principles to be applied	1.2
6, 12.3	Means of draining and venting	2.5
7.1, 12.1 to 12.3	Equipment to be designed, manufactured, checked equipped and installed to ensure safety	1.1
7.3.2, 7.3.3	Inspection of safety devices	3.2.3
9, 12.4	Provisions for filling and discharge	2.9

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