
Gas cylinders — Safe handling

Bouteilles à gaz — Sécurité de manutention

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Published in Switzerland

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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.

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 11625 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 4, *Operational requirements for gas cylinders*.

This second edition cancels and replaces the first edition (ISO 11625:1998) which has been technically revised.

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Introduction

The following guidelines are for everyone who handles gas cylinders, and are based upon experience. Some precautions are also applicable to gas suppliers and distributors. It should not be assumed that every applicable safety precaution or regulation is contained herein.

Gas cylinders are constructed, maintained and used in accordance with applicable regulations and are safe for the purposes for which they are intended. Accidents occurring during the transportation, handling, usage and storage of these cylinders can often be traced to failure to follow the guidelines set forth in this International Standard.

Users of compressed, liquefied or dissolved gases should become familiar with the properties and inherent hazards of the products they use. Valuable information pertaining to each specific gas is contained within its product labelling and safety data sheet.

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Gas cylinders — Safe handling

1 Scope

This International Standard specifies requirements for safe handling, use and storage of gas cylinders for compressed, liquefied or dissolved gases. This International Standard applies only to single gas cylinders of sizes from 0,5 l to 150 l water capacity.

For specific gas applications such as welding, diving, inerting, etc., additional requirements apply which are not covered in this International Standard.

Maintenance, repair, marking, labelling, inspection and retesting of gas cylinders, which are normally under the responsibility of the gas cylinder owner, are also not included in this International Standard.

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 32, *Gas cylinders for medical use — Marking for identification of content*

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ISO 5145:2004, *Cylinder valve outlets for gases and gas mixtures — Selection and dimensioning*

ISO 7225, *Gas cylinders — Precautionary labels*

ISO/TR 7470, *Valve outlets for gas cylinders — List of provisions which are either standardized or in use*

ISO 10286, *Gas cylinders — Terminology*

ISO 11117, *Gas cylinders — Valve protection caps and valve guards — Design, construction and tests*

ISO 13769, *Gas cylinders — Stamp marking*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10286 and the following apply.

3.1

air line mask

breathing mask connected to a pipeline (the 'air line') with breathable air

3.2

handling

moving, connecting or disconnecting a gas cylinder under normal conditions of use

**3.3
manifold**

gas distribution system that transfers product through multiple inlets from gas cylinders to the supply pipeline [to the point(s) of use]

NOTE The pressure regulator, non-return device(s), flame arrestor (acetylene) and gauges can be integrated in the manifold.

**3.4
misuse**

utilizing a gas cylinder for a purpose other than that for which it was made, e.g., roller, support, etc.

**3.5
label**

information durably attached to the cylinder or indicated by an adherent and clearly visible means such as printing, stencilling or any other equivalent process

**3.6
supplier**

any entity that manufactures and packages gas

**3.7
transfilling**

transfer of gas from one cylinder to another

**3.8
user**

any entity other than a supplier

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4 Content identification

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Cylinders offered for shipment shall have their contents identified as prescribed by relevant national and/or international regulations and standards. Content identification shall be present during the transportation, delivery to user and during use.

The primary and only accurate identifier of cylinder content is the cylinder label (see ISO 7225). Cylinders may be painted (colour coded, see ISO 32) to permit recognition of the contents or hazard and to permit segregation more readily in gas supplier handling operations.

The user should read the label to verify that the correct gas ordered has been supplied. Cylinders that do not bear a legible label to identify the content or cylinders that bear more than one label with contradictory identification shall not be used. They shall be returned to the supplier, unused, together with appropriate explanations.

5 Safe handling requirements

5.1 General

Gas cylinders shall be handled and used only by properly trained persons. The following rules apply to all gas cylinders.

5.2 User responsibilities

5.2.1 General

The user is responsible for the safe use and handling of the cylinder and its contents. When cylinders are rented, on an exchange programme or otherwise owned by a distributor, gas supplier or other such entity, the user shall maintain and care for the cylinder to ensure that it is returned or exchanged in the same safe condition as it was received.

If the user has any difficulty understanding any of the precautions and requirements in this International Standard, concerning the gas cylinder, the user shall contact the cylinder supplier before the gas is used.

The user shall inform the supplier if the gas cylinder has been misused or damaged.

5.2.2 Prescribed markings

Markings on cylinders are required by the relevant authority. Markings shall be clear and legible while the cylinder is in service. The user shall not add, remove or alter any of the markings on the cylinder (see ISO 13769) unless specifically allowed by the relevant authority.

5.2.3 Labels

If applied, labels shall be clear and legible. The user shall not deface, alter or remove any labels.

5.2.4 Cylinder modifications

The user shall not modify, tamper with, obstruct, remove or repair any part of the cylinder or valve including the pressure relief device, retest ring and other accessories if so equipped.

The user shall not alter or modify (for any reason) the colour of the cylinder unless the user has received authorization to do so from the owner.

5.2.5 Contamination

Contamination can occur when foreign substances, other gases, process materials or fluids enter the cylinder through the valve. If contamination has occurred or is suspected, the user shall identify and clearly mark the cylinder and shall notify the gas supplier of details on the contamination. It is the user's responsibility to ensure the valve is closed during transport to the supplier.

5.2.6 Misuse

Gas cylinders shall not be used as rollers, supports or for any purpose other than to deliver the gas content.

5.2.7 Electrical circuits

Cylinders shall not be placed where they become part of an electrical circuit. When gas cylinders are used in conjunction with electric welding, they shall not be used for earthing (grounding) of electrical equipment. Arc welding near gas cylinders should be avoided. The use of a cylinder to test the arc performance shall not be allowed. Observing these precautions will prevent the cylinder from being arc burned.

5.2.8 Magnetic resonance imaging (MRI)

Cylinders and accessories with ferritic (magnetic) material (in most cases steel cylinders) shall not be used in the proximity of magnetic resonance imaging (MRI) equipment. There is the risk of personal injury/fatality and equipment damage from such cylinders being magnetically attracted by the unit.

5.2.9 Temperature limits

Gas cylinders shall not intentionally be exposed to temperatures above 65 °C. Never apply a flame or heat directly to any part of a gas cylinder or allow it to come in contact with an electrically energized system. If ice or snow accumulates on a cylinder or related accessories, with permission of the supplier, thaw the cylinder at room temperature or with water at a temperature not exceeding 50 °C. In the event that the cylinder has been accidentally heated above these temperatures, the user shall segregate the cylinder and notify the supplier. In the case where the supplier is not the owner of the cylinder, it shall be the responsibility of the supplier to pass this information along to the owner.

Cylinders shall not be subjected to artificially created low temperatures without the approval of the supplier. Cylinders are designed for use under ambient conditions; normally the temperatures for design are – 20 °C to + 50 °C.

Gas cylinders that have been in, or exposed to fire shall not be shipped if they still contain gas under pressure. Consult the gas supplier prior to returning such cylinders.

NOTE 1 Cylinders exposed to elevated temperatures can suffer mechanical damage, which could lead to an unsafe cylinder. Certain materials and alloys (such as aluminium or non-metallic valve components) are more susceptible to temperature elevations, but cylinders of all materials can suffer mechanical damage from elevated temperatures.

NOTE 2 Acetylene cylinders with elevated temperatures pose the risk of gas decomposition.

5.2.10 Leaking cylinders

Do not use a cylinder found to be leaking. Only trained and prepared personnel who have knowledge of the gas hazard(s) and who have proper protective equipment shall handle a leaking cylinder. If the hazard of the gas warrants it, all other personnel should be evacuated from the area, and emergency response people should be allowed to handle the situation.

When personnel are addressing a leaking cylinder, it can be moved to a well-ventilated area or contained so that the leaking gas poses no threat to human health or life.

NOTE If the leaking cylinder contains corrosive or toxic gas, consider emergency action by placing it in a special cylinder containment vessel (e.g. salvage container) for disposal.

5.2.11 Corrosion and other damage

If a cylinder or valve is noticeably damaged or corroded, the gas supplier shall be notified, and his instructions followed. Any other damage that might impair the safety of the cylinder during use or transportation shall be called to the attention of the gas supplier before the return of the cylinder.

5.2.12 Discharging gas

The discharge of contents from any gas cylinder shall not be directed toward any person. Corrosive or toxic gases shall not be discharged directly to the atmosphere. The user shall return cylinders containing these gases to the supplier for proper disposal.

Flammable gases under certain conditions may be discharged only under controlled conditions as recommended by the supplier.

Discharging gas can cause a variety of injuries to the body especially the eyes and hands. In the event of a release, precautions should be taken to prevent potentially hazardous accumulations, e.g. toxic, asphyxiant, flammable, etc.

5.2.13 Non-refillable cylinders

Non-refillable cylinders shall not be refilled after use of original contents. After usage, such cylinders shall be disposed of in accordance with the cylinder supplier's recommendations and national regulations.

5.2.14 Valve protection

Valves are designed either to have inherent valve protection or they require a protection device. Except for guards/shrouds noted below, when valve protection is provided by the supplier, the user shall keep such devices on the cylinder except when cylinders are connected to dispensing equipment. For a complete description of valve protection devices, see ISO 11117.

When cylinders are disconnected from dispensing equipment, valve protection devices shall be re-attached to the cylinder. The user shall verify that the re-attached protection device is of the same type and size that was supplied with the cylinder by the supplier.

Valve guards/shrouds are valve protection devices that are not removed, even when the cylinder is connected to dispensing equipment. Valve guards/shrouds shall not be removed by the user.

5.2.15 Valve outlet caps and/or plugs

Where valve outlet caps and/or plugs are provided on the valves, the user shall keep such devices on the valve outlet at all times except when cylinders are connected to dispensing equipment. Gas-tight valve outlet caps and plugs are required by regulations for some harmful gases. When the valve outlet cap/plug is supplied, it shall be tightened securely, immediately after use.

NOTE Cylinders fitted with single-use safety caps are not subject to this requirement (e.g. commercial LPG cylinders).

5.2.16 Handling of cylinders

Users shall not roll or drag cylinders in the horizontal position in order to move them. A suitable hand truck, forklift truck or similar material-handling device may be used with the cylinder securely held by the device, especially for large or heavy cylinders. However for short distances, larger cylinders may be manoeuvred manually by wheeling the cylinder on the base ring with the cylinder slightly tilted. Caution shall be used to guard against dropping or permitting cylinders to violently strike against each other or other surfaces.

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Do not lift cylinders by using the valve protection device unless they have been designed for that purpose. Do not use ropes, chains or slings to suspend cylinders unless the supplier has installed appropriate lifting attachments such as lugs. Suitable cradles, platforms or pallets to hold the cylinders may be used for lifting.

NOTE 1 Some smaller cylinders are designed to have a carrying handle that also serves as the valve protection device. It is safe to carry cylinders by such handles/shrouds.

NOTE 2 Personnel handling cylinders should wear appropriate protective equipment (e.g. safety shoes).

5.2.17 Transfilling

The user shall not transfer gases from one cylinder to another cylinder, except where the system has been designed to safely permit transfilling and with authorization of the owner of the receiving cylinder or gas supplier, and if the local authority allows it.

EXCEPTION: Never transfill acetylene from one cylinder into another cylinder. A fire or explosion could result.

5.2.18 Valve removal

The user shall not remove, alter or tamper with the cylinder valve under any circumstances.

Even if it is suspected or believed that the cylinder is empty, valve removal is dangerous and an unsafe operation. Valves and their fittings shall not be modified, disassembled or repaired. In case of improper valve functioning, the supplier shall be contacted.