

---

---

**Gas cylinders — Cylinders for  
compressed and liquefied gases  
(excluding acetylene) — Inspection at  
time of filling**

*Bouteilles à gaz — Bouteilles à gaz comprimés et liquéfiés (à  
l'exception de l'acétylène) — Contrôle au moment du remplissage*

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

ISO 24431:2006

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>



**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 24431:2006

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

## Contents

Foreword.....	iv
Introduction .....	v
<b>1</b> <b>Scope</b> .....	<b>1</b>
<b>2</b> <b>Normative references</b> .....	<b>1</b>
<b>3</b> <b>Terms and definitions</b> .....	<b>1</b>
<b>4</b> <b>Filling inspection</b> .....	<b>3</b>
<b>5</b> <b>Description of inspection items</b> .....	<b>3</b>
<b>5.1</b> <b>Verification of serviceable condition</b> .....	<b>3</b>
<b>5.2</b> <b>Identification of cylinder owner</b> .....	<b>4</b>
<b>5.3</b> <b>Verification of tare and calculation of weight of gas to be charged</b> .....	<b>4</b>
<b>5.4</b> <b>Verification of internal cylinder condition</b> .....	<b>5</b>
<b>5.5</b> <b>Verification of the integrity of permanent attachments</b> .....	<b>5</b>
<b>5.6</b> <b>Verification of valve integrity and suitability</b> .....	<b>5</b>
<b>5.7</b> <b>Check for correct filling pressure</b> .....	<b>6</b>
<b>5.8</b> <b>Check for correct filling weight</b> .....	<b>6</b>
<b>5.9</b> <b>Check of the valve protection</b> .....	<b>6</b>
<b>Annex A</b> (informative) <b>Example of a procedure to establish a correct tare</b> .....	<b>7</b>
<b>Annex B</b> (informative) <b>Procedures to be adopted when de-valving and/or when it is suspected that a cylinder valve is obstructed</b> .....	<b>8</b>
<b>B.1</b> <b>Check for obstructed valve</b> .....	<b>8</b>
<b>B.2</b> <b>Valve unobstructed</b> .....	<b>8</b>
<b>B.3</b> <b>Valve obstructed</b> .....	<b>8</b>
<b>Bibliography</b> .....	<b>11</b>

## 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 24431 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 4, *Operational requirements for gas cylinders*.

This first edition of ISO 24431 cancels and replaces ISO 10463:1993 and ISO 11113:1995, of which it constitutes a technical revision.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**  
ISO 24431:2006  
<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

## Introduction

This International Standard covers requirements that reflect current practice and experience.

Each transportable gas cylinder is inspected at the time of filling in order to establish that:

- it has no defects which render it unsafe for filling or continued use;
- it can be identified and complies with the relevant requirements with regard to marking, labelling, colour coding and completeness of its accessories;
- its valve functions satisfactorily.

The cylinder filling inspection is carried out exclusively by persons who have the appropriate training and competences, so as to ensure that each cylinder is safe for continued use.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO 24431:2006](https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006)

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 24431:2006

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

# Gas cylinders — Cylinders for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

## 1 Scope

This International Standard specifies the inspection requirements at the time of filling, and applies to seamless or welded transportable gas cylinders made of steel or aluminium alloy for liquefied or compressed gases (excluding acetylene) of a water capacity of between 0,5 l and 150 l. It also applies to cylinders of less than 0,5 l water capacity, as far as practicable.

This International Standard does not apply to cylinders manifolded in bundles or trailers.

This International Standard applies primarily to industrial gases other than liquefied petroleum gas (LPG), but may also be applied to LPG. For specific LPG applications, refer to ISO 10691.

For cylinders manifolded in bundles, refer to ISO 11755.

NOTE In International Standards, weight is equivalent to a force, expressed in newtons. However, in common parlance (as used in terms defined in this International Standard), the word “weight” continues to be used to mean “mass”, although this practice is deprecated (see ISO 80000-4).

## 2 Normative references

ISO 24431:2006

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

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 6406, *Gas cylinders — Seamless steel gas cylinders — Periodic inspection and testing*

ISO 10460, *Gas cylinders — Welded carbon-steel gas cylinders — Periodic inspection and testing*

ISO 10461, *Gas cylinders — Seamless aluminium-alloy gas cylinders — Periodic inspection and testing*

ISO 11114-1, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials*

ISO 11114-2, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials*

## 3 Terms and definitions

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

### 3.1

#### **compressed gas**

gas which when packaged under pressure for transport is entirely gaseous at  $-50\text{ °C}$

NOTE This category includes all gases with a critical temperature less than or equal to  $-50\text{ °C}$ .

**3.2**  
**empty weight**  
**empty mass**

mass of the cylinder including all integral parts (e.g. neck ring, foot ring), but excluding the mass of valve, valve cap or valve guard and any coating

**3.3**  
**filler**

person (or persons) responsible for inspection prior to, during and immediately after filling, who has received an appropriate level of training for the work involved and who has access to all necessary data for the cylinder, valve and all other fittings used

**3.4**  
**filling pressure**

pressure to which a cylinder is filled at the time of filling

NOTE Filling pressure varies according to the gas temperature in the cylinder, which is dependent on the charging parameters and ambient conditions.

**3.5**  
**filling ratio**

ratio of the mass of gas to the mass of water at 15 °C that would fill completely a pressure receptacle fitted ready for use

**3.6**  
**liquefied gas**

gas which, when packaged under pressure for transport, is partially liquid at temperatures above –50 °C

NOTE A distinction is made between:

- high pressure liquefied gas, a gas with a critical temperature between –50 °C and +65 °C, and
- low pressure liquefied gas, a gas with a critical temperature above +65 °C.

**3.7**  
**maximum permissible filling weight**  
**maximum permissible filling mass**

product of the water capacity of the cylinder and the **filling ratio** (3.5) of the gas

**3.8**  
**pallet**

device for handling several cylinders at the same time

**3.9**  
**pressure relief device**

device fitted to the cylinder or its valve, which is designed to open to prevent a rise of pressure in excess of a specified value, due to excess temperature and/or pressure

**3.10**  
**tare**

sum of the **empty weight** (3.2) plus the mass of the valve, including dip tube where fitted, any fixed valve guard and all other parts that are permanently attached (e.g. by clamping or bolted fixing) to the cylinder when presented for filling

**3.11**  
**total weight**  
**total mass**

**tare** (3.10) of the cylinder plus the **maximum permissible filling weight** (3.7)



**3.12****working pressure**

settled pressure of a **compressed gas** (3.1) at a reference temperature of 15 °C in a pressure receptacle

**4 Filling inspection**

Each cylinder shall be subjected to an inspection prior to, during and immediately after filling. The following items shall be covered by a filling inspection:

- a) verification of serviceable condition (see 5.1),
- b) identification of cylinder owner, if required (see 5.2),
- c) for cylinders filled by weight, verification of tare and calculation of weight of gas to be charged (see 5.3),
- d) verification of internal cylinder condition (see 5.4),
- e) verification of integrity of neck ring/threaded boss (see 5.5),
- f) verification of valve integrity and suitability (see 5.6),
- g) verification of correct filling pressure as applicable (see 5.7),
- h) verification of correct filling weight as applicable (see 5.8), and
- i) verification of the valve protection (see 5.9).

Cylinders which do not satisfy the criteria listed above shall be handled in accordance with the relevant procedures of the filling company before any further action is taken.

<https://standards.iteh.ai/catalog/standards/sist/9b530b7e-1b8c-4533-b1fb-a27016069b33/iso-24431-2006>

**5 Description of inspection items****5.1 Verification of serviceable condition****5.1.1 General criteria**

Before filling a cylinder, it shall be established that:

- a) the cylinder has not exceeded its due date for periodic inspection and testing,
- b) the cylinder is compatible with the intended gas content and filling pressure,
- c) the cylinder is permitted for filling in the country of the filling station,
- d) the intended gas contents correspond to any identification label and shoulder or body colour on the cylinder (e.g. through verification of the cylinder's markings or by questioning the owner of the cylinder), and
- e) each cylinder, whether individual or palletized, is in a serviceable condition.

Cylinders judged to be unserviceable shall be clearly marked and separated for further treatment, in accordance with the written procedures of the filling company.