



# SLOVENSKI STANDARD SIST EN ISO 14456:2024

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SIST EN ISO 14456:2017

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**Plinske jeklenke - Lastnosti plina in pripadajoči razvrstitveni razredi (FTSC) (ISO 14456:2024)**

Gas cylinders - Gas properties and associated classification (FTSC) codes (ISO 14456:2024)

Gasflaschen - Eigenschaften von Gasen und zugehörige Klassifizierungscodes (FTSC) (ISO 14456:2024)

Bouteilles à gaz - Propriétés des gaz et codes de classification associés (FTSC) (ISO 14456:2024)

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**ICS:**

23.020.35 Plinske jeklenke

Gas cylinders

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English Version

## Gas cylinders - Gas properties and associated classification (FTSC) codes (ISO 14456:2024)

Bouteilles à gaz - Propriétés des gaz et codes de  
classification associés (FTSC) (ISO 14456:2024)

Gasflaschen - Eigenschaften von Gasen und zugehörige  
Klassifizierungscodes (FTSC) (ISO 14456:2024)

This European Standard was approved by CEN on 19 April 2024.

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## European foreword

This document (EN ISO 14456:2024) has been prepared by Technical Committee ISO/TC 58 "Gas cylinders" in collaboration with Technical Committee CEN/TC 23 "Transportable gas cylinders" the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2024, and conflicting national standards shall be withdrawn at the latest by November 2024.

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

This document supersedes EN ISO 14456:2016.

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## Endorsement notice

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# International Standard

**ISO 14456**

## Gas cylinders — Gas properties and associated classification (FTSC) codes

*Bouteilles à gaz — Propriétés des gaz et codes de classification  
associés (FTSC)*

**Second edition  
2024-04**

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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## ISO 14456:2024(en)

### 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 23, *Transportable gas cylinders*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 14456:2015), which has been technically revised. It also incorporates the Amendment ISO 14456:2015/Amd.1:2019.

The main changes are as follows:

- corrections to CAS numbers and FTSC codes;
- consequential revisions as a result of a new edition of ISO 5145;
- addition of new FTSC codes for commonly used gases and liquids.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

**ISO 14456:2024(en)****Introduction**

This document establishes a method of allocating a four-digit code number (FTSC) to any gases and liquids that are transported under pressure or mixture of gases contained in cylinders. This code number categorizes the gas, liquids that are transported under pressure or gas mixture in terms of its physical-chemical properties and/or flammability, toxicity, state of gas, and corrosiveness (see [4.1](#)). FTSC is the abbreviation of these properties.

The FTSC code enables gases and liquids that are transported under pressure or gas mixtures to be assigned to one of the 15 “compatible” gas groups.

The properties and the selection criteria are aligned as appropriate with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).<sup>[1]</sup>

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# Gas cylinders — Gas properties and associated classification (FTSC) codes

## 1 Scope

This document gives a list of FTSC (fire potential, i.e. “oxidizing power and flammability”, toxicity, state of the gas, and corrosiveness) codes determined according to the relevant properties of gases and of some liquids that are transported under pressure.

It does not cover material compatibility with gases which is covered by the ISO 11114 series.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### gas mixture

combination of different single gases and/or liquids deliberately mixed in specified proportions resulting in a homogeneous gaseous mixture

[SOURCE: ISO 10286:2021, 3.5.2, modified]

### 3.2

#### liquefied gas

gas, which, when packaged for transport, is partially liquid (or solid) at temperatures above  $-50\text{ °C}$

[SOURCE: ISO 10286:2021, 3.5.4]

### 3.3

#### compressed gas

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

Note 1 to entry: This category includes all gases with a critical temperature less than or equal to  $-50\text{ °C}$ .

[SOURCE: ISO 10286:2021, 3.5.3]

### 3.4

#### lethal concentration 50

##### $LC_{50}$

concentration of a substance in air exposure to which, for a specified length of time, is expected to cause the death of 50 % of the entire defined experimental animal population after a defined time period

Note 1 to entry: Lethal concentration is usually measured as ppm (volume fraction) or  $\text{mg}/\text{m}^3$ .

[SOURCE: ISO 10298:2018, 3.1, modified — Note 1 to entry has been changed.]

## ISO 14456:2024(en)

### 4 Gas properties - Numerical gas code (FTSC)

#### 4.1 General

The code number assigned to a gas or liquid is based on the following four physical-chemical properties:

- a) category I (F): fire potential, i.e. "oxidizing power and flammability", which defines the gas behaviour with respect to combustion;
- b) category II (T): acute toxicity;
- c) category III (S): gas state, defining the physical state of the fluid in the cylinder at 15 °C within a given pressure range;
- d) category IV (C): corrosiveness (ability to damage or destroy living tissues: eyes, skin and mucous membranes, or the potential for an acid/base chemical reaction).

Each category is subdivided into different characteristics (subdivisions), each identified by a different digit. In this way, a gas in a given state is characterized by a series of four digits (one digit per category) as illustrated in 4.1.2 to 4.1.5.

[Annex A](#) includes examples of how FTSC codes are rationalized for new entries to this document.

#### 4.2 Fire potential, category I

Subdivision 0: inert (any gas not classified under subdivisions 1 to 5 below).

Subdivision 1: supports combustion (gas having an oxidizing power equal to or less than a mixture containing 23,5 % of oxygen in nitrogen).

Subdivision 2: flammable (gas having flammability limits in air).

NOTE 1 See ISO 10156 for more information.

Subdivision 3: pyrophoric (spontaneously flammable).

Subdivision 4: oxidizing (gas having an oxidizing power greater than a mixture containing 23,5 % O<sub>2</sub> in N<sub>2</sub>).

NOTE 2 See ISO 10156 for more information.

Subdivision 5: chemically unstable (flammable and subject to rapid decomposition or polymerization).

NOTE 3 When considering the properties of gases from subdivisions 1 and 4, the following applies:

- a) subdivision 4 considers the risk of accelerating combustion more than air does;
- b) for gas/material compatibility with gases under pressure of subdivisions 1 and 4, it is considered that the risk of ignition exists when the oxygen partial pressure is more than 30 bar<sup>1)</sup>;
- c) for valve outlet selection (for example, see ISO 5145), the risk is to mix a flammable gas (subdivision 2 and/or 3) with a gas of subdivision 1 and/or 4.

#### 4.3 Acute toxicity, category II

Subdivision 0: supporting human life.

Subdivision 1: non-toxic LC<sub>50</sub> (1 h) > 0,5 % by volume (5 000 ppm).

Subdivision 2: toxic; 0,02 % by volume (200 ppm) < LC<sub>50</sub> (1 h) ≤ 0,5 % by volume (5 000 ppm).

1) 1 bar = 0,1 MPa = 10<sup>5</sup> Pa; 1 MPa = 1 N/mm<sup>2</sup>.