International Standard



448

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Gas cylinders for industrial use — Marking for identification of content

Bouteilles à gaz pour usages industriels - Marquage pour l'identification du contenu

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Descriptors: gas cylinders, industrial products, marking, chemical formulas.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 448 was developed by Technical Committee ISO/TC 58, EVIEW Gas cylinders, and was circulated to the member bodies in September 1979.

It has been approved by the member bodies of the following countries:

ISO 448:1981

Australia liteland/standards.iteh.ai/cataloSpaindards/sist/c3a02398-f934-4070-b7b8-

Austria Israel 289eaSweden iso-448-1981

Canada Italy Switzerland
Chile Libyan Arab Jamahiriya United Kingdom

Czechoslovakia Norway USA

Denmark Poland

India South Africa, Rep. of

The member bodies of the following countries expressed disapproval of the document on technical grounds:

Belgium France Germany, F.R. Netherlands

This second edition cancels and replaces the first edition (i.e. ISO 448-1977).

Gas cylinders for industrial use — Marking for identification of content

1 Scope and field of application

This International Standard establishes a system of marking for the identification of the content of gas cylinders intended for industrial use. b) the **name** of the gas or mixture of gases it contains in the language of the country in which it is filled or used.

Additional markings may be applied at the discretion of national standards organizations.

2 Reference

ISO 817, Refrigerants — Number designation. TANDARD In cases where the summary formula is the same for gases with different structure formulas, the summary formula shall be (standards excluded. a)

Exceptions

Example :

3 Marking²⁾ of each cylinder

Each cylinder shall be legibly marked at the valve end of the cylinder and preferably off the cylindrical part of the body with cyclopropane and propylene.

- a) the **chemical molecular formula** of the gas it contains. The formula shall conform with the convention adopted by the International Union of Pure and Applied Chemistry. Mixtures of gases shall be shown by the chemical formulae of constituent gases in descending order of magnitude. The percentage by volume may be inserted before the chemical formula.³⁾
- Example:

A mixture composed, by volume, of 70 % of carbon dioxide, 20 % nitrogen and 10 % argon.

$$CO_2 + N_2 + Ar$$
 or $70CO_2 + 20N_2 + 10Ar$

- For gases such as air and certain fuel gases where the exact chemical composition is not precisely determined, the chemical formula can be excluded.
- For organic refrigerants, the chemical summary formula may be replaced by the designated refrigerant number in accordance with ISO 817.

4 Chemical formulae

The names and formulae of the most frequently used gases are given in the table.

¹⁾ At present at the stage of draft. (Revision of ISO 817-1974.)

²⁾ The term "marking" is not confined to stamping, but includes other legible means of identification.

³⁾ Marking of gas mixtures:

constituent components below 1 % may be omitted if not poisonous or important for safety reasons;

for mixtures containing more than three components, the marking may be limited to the three main components, provided that their proportion is equal to or over 80 %. The last component shall be followed by the sign + and ellipsis.

Table — Examples of gases

| Acetylene | Name of gas | Formula | Number designation (see ISO 817) |
|---|-----------------------------|----------------------------------|--|
| Air Ammonia Argon Argon Beron trifluoride Bromoethane (Ethyl bromide) Butane (commercial) ²¹ Carbon dioxide Carbon monoxide Carbonyl chloride (Phosgene) Chloroethane (Ethyl chloride) Chloroethane (Cinyl chloride) Chloroethane (Cinyl chloride) Chloroethane (Cinyl chloride) Chloroethane (Ethyl chloride) Cyclopropane ITeh STAND Chloroethane (Methyl chloride) Cyclopropane ITeh STAND Chloroethane (Mitrous oxide) Ethane Ethene (Ethylene)https://standards.iteh.ai/catalog/standards/sQahla_02398-1934 Ethylene oxide Chloroethane Hydrogen Hydrogen Hydrogen cyanide Hydrogen sulphide Hydrogen sulphide Krypton Methane Neon Nitrogen Propane (commercial) ³⁾ 1) 1-Propene (Propylene) Sulphur dioxide | Acetylene | C ₂ H ₂ | |
| Ammonia Argon Boron triffuoride Bromoethane (Ethyl bromide) Bromoethane (Methyl bromide) Butane (commercial) ²⁾ Carbon dioxide Carbony (hloride (Phosgene) Chlorine 1-Chloro-1,-1-diffuoroethane Chloroethane (Ethyl chloride) Chloromethane (Methyl chloride) Chloromethane Chloroethane (Ethyl chloride) Chloromethane Chloroethane (Ethyl chloride) Chloromethane Chloroethane (Vinyl chloride) Cyclopropane ITeh STAND Dichlorodiffuoromethane 1,-1-Diffuoroethane Standards 2,448-1, ai) Cyclopropane I,-1-Diffuoroethane Standards 3,448-1, ai) Cyclopropane I,-1-Diffuoroethane ISO 1,-1-Diffuoroethane Standards 3,448-1, ai) Ethene (Ethylene) https://standards.itch.ai/catalog/standards/s-Qaffan/2398-1934-4070-871150 Ethylene oxide 1,-1-Diffuoroethane Soundards 3,448-1, ai) Ethylene oxide Ethylene oxide 1,-1-Diffuoroethane Ethylene oxide 1,-1-Diffuoroethane ISO 1,-1-Diffuoroet | · | 1) | |
| Argon Boron trifluoride BF3 | | NH ₃ | |
| Boron trifluoride Bromoethane (Ethyl bromide) C2H3Br C2H3Br Stromoethane (Methyl bromide) CH3Br Stromomethane (Methyl bromide) CH3Br Stromomethane (Commercial) 11 Carbon dioxide CO2 CO2 CO2 CO3 CO3 CO4 CO4 CO5 CO | | - | |
| Bromoethane (Ethyl bromide) C2H ₅ Br CH ₃ Br Butane (commercial) ² 1) Carbon dioxide CO ₂ Carbon monoxide CO ₂ Carbon monoxide CO ₂ Colorine Cl ₂ Chloroine Cl ₂ Chloroine Chloroine C ₂ H ₃ ClF ₂ R 142b Chloro-1,1-difluoroethane C ₂ H ₃ ClF ₂ R 160 Chloro-thane (Ethyl chloride) C ₂ H ₅ Cl R 160 Chloroethane (Ethyl chloride) C ₂ H ₃ Cl R 1140 Chloroethane (Methyl chloride) C ₂ H ₃ Cl R 140 Chloroethane (Methyl chloride) CH ₃ Cl R 120 Chloroethane (Methyl chloride) CH ₃ Cl R 152a Chloroethane (Methyl chloride) Chloride Chloroethane (Methyl chloride) Chloroethan | , - | BF ₃ | Ì |
| Bromomethane (Methyl bromide) CH ₃ Br 11 Carbon dioxide CO ₂ Carbon monoxide COCl ₂ Colon monoxide Cocl ₂ Cocl ₂ Colon monoxide Cocl ₂ Cocl ₂ | | C ₂ H ₅ Br | |
| Butane (commercial) ²⁾ | , | | |
| Carbon dioxide | | 1) | |
| Carbon monoxide Carbonyl chloride (Phosgene) Chloroine 1-Chloro-1,1-difluoroethane Chlorodifluoromethane Chlorodifluoromethane Chloroethane (Ethyl chloride) Chloromethane (Winyl chloride) Chloromethane (Methyl chloride) Cyclopropane ITel STAND Chlorodifluoromethane Chlorodifluoromethane 1,1-Difluoroethane Standards, 2,4-4-1, ai) Chlorodifluoromethane Standards, 3,2-4-4-1, ai) Ethane Elouitrogen monoxide (Nitrous oxide) Ethane Elouitrogen chloride Ethylene oxide Elouitrogen Elouitrogen Helium Hellium Hellium Hellium Hellium Hellium Hydrogen chloride Hydrogen cyanide HHCN Hydrogen fluoride HCN Hydrogen fluoride HCN Hydrogen peroxide Neon Nitrogen Nitrogen Nitrogen Nitrogen peroxide Nitrosyl chloride Oxygen O2 Propane (commercial) ³⁾ 1-Propene (Propylene) Sulphur dioxide COC, C2HaOSI R 142b CHGE R 22 R 152 R 160 CH ₃ Cl R 170 CH ₃ Cl R 160 CH ₃ Cl R 170 CH ₃ Cl R 160 CH ₃ Cl R 160 CH ₃ Cl R 170 CH ₃ Cl R 160 CH ₃ Cl R | | CO ₂ | |
| Carbonyl chloride (Phosgene) COCl2 Chlorine Cl2 1-Chloro-1,1-difluoroethane C2h3ClF2 R 142b Chlorodifluoromethane CHClF2 R 22 Chloroethane (Ethyl chloride) C2h3Cl R 160 Chloroethane (Winyl chloride) C2h3Cl R 1140 Chloroethane (Winyl chloride) C2h3Cl R 140 Chloromethane (Winyl chloride) C4h3Cl R 40 Cyclopropane Teh STAND ARD PREV W Ciclorogifluoromethane Classes C2h4F2 Cal 1,1-Difluoroethane Cstanda C3h4F2 Cal 1,1-Difluoroethane Cstanda C3h4F2 Cal 1,1-Difluoroethane Classes C3h4F2 Cal 1,1-Difluoroethane Cstanda C3h4F2 Cal 1,1-Difluoroethane Classes C3h4F2 Cal 1,1-Difluoroethane Standa C4h4F2 Cal 1,1-Difluoroethane Standa C4h4F2 Cal 1,1-Difluoroethane Standa C4h4F2 Cal 1,1-Difluoroethane Standa C4h | | со | |
| Chlorine | | COCI ₂ | |
| 1-Chloro-1,1-difluoroethane | | Cl ₂ | |
| Chlorodifluoromethane Chlorogy Chloroethane (Ethyl chloride) C2H5Cl R 160 C2H3Cl R 1140 Chloromethane (Methyl chloride) C2H3Cl R 40 CH3Cl R 40 CH3Cl R 40 CH3Cl R 152a Chlorodifluoromethane Chloromethane Chloromethane Chloromethane Chloromethane Chlorodifluoromethane Chloromethane Chlorodifluoromethane Chlorodifluor | | | R 142b |
| Chloroethane (Ethyl chloride) | | _ | R 22 |
| Chloroethene (Vinyl chloride) | | _ | R 160 |
| Chloromethane (Methyl chloride) | , | | R 1140 |
| Cyclopropane Teh STAND ARD PREV EW | , | l | R 40 |
| Dichlorodifluoromethane 1,1-Difluoroethane 2,1-Difluoroethane 2,1-Difluoroethane 3,2-B4F1.ai Dinitrogen monoxide (Nitrous oxide) Ethane Ethene (Ethylene)https://standards.itch.ai/catalog/standards/si92-B402398-1934-4070-87150 Ethylene oxide Ethy | | ARDIPREV | IFW |
| 1,1-Diffuoroethane | Dichlorodifluoromethane | CCI ₂ F ₂ | R 12 |
| Dinitrogen monoxide (Nitrous oxide) N20 | 1 1-Diffuoroethane (Standa) | rds.dteh.ai) | R 152a |
| Ethane | ` | | |
| Ethene (Ethylene)https://standards.iteh.ai/catalog/standards/si92Ha.02398-f934 4070-871150 Ethylene oxide 289ea6690 fca/iso-C2Ha081 Fluorine F2 Helium He Hydrogen H2 Hydrogen chloride HCI Hydrogen cyanide HCN Hydrogen sulphide HF Hydrogen sulphide Krypton Kr Methane CH4 R 50 Neon Ne Nitrogen N2 Nitrogen peroxide N0Cl Oxygen O2 Propane (commercial) ³¹ 1-Propene (Propylene) S02 | · · | <u> </u> | R 170 |
| Ethylene oxide 289ca6690 ca/iso-42H4081 Fluorine F2 Helium He Hydrogen H2 Hydrogen chloride HCI Hydrogen cyanide HCN Hydrogen fluoride HF Hydrogen sulphide Kr Krypton Kr Methane CH4 R 50 Neon Ne Nitrogen N2 Nitrogen peroxide N204 Nitrosyl chloride NOCI Oxygen O2 Propane (commercial)3) 1) 1-Propene (Propylene) 1) R 1270 Sulphur dioxide SO2 | | | 4070-1871-150 |
| Fluorine | | | 1070 0700 |
| Helium | | | |
| Hydrogen H ₂ | | _ | |
| Hydrogen chloride HCI Hydrogen cyanide HCN Hydrogen fluoride HF Hydrogen sulphide HF Krypton Kr Methane CH4 R 50 Neon Ne Nitrogen N2 Noci Nitrogen peroxide NOCi NOCi Oxygen O2 Propane (commercial) ³⁾ 1) 1-Propene (Propylene) 1) R 1270 Sulphur dioxide SO2 | | H ₂ | |
| Hydrogen cyanide HCN Hydrogen fluoride HF Hydrogen sulphide H2S Krypton Kr Methane CH4 R 50 Neon Ne Nitrogen N2 Nocl Nitrosyl chloride NOCl NOCl Oxygen O2 Propane (commercial) ³⁾ 1-Propene (Propylene) 1) R 1270 Sulphur dioxide SO2 | | _ | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | HCN | |
| Hydrogen sulphide | 1 | HF | |
| Krypton Kr R 50 Methane CH ₄ R 50 Neon Ne Nitrogen N ₂ Nitrosyl chloride NOCI Oxygen O ₂ Propane (commercial) ³⁾ 1) 1-Propene (Propylene) 1) Sulphur dioxide SO ₂ | , - | H ₂ S | |
| Methane CH ₄ R 50 Neon Ne Nitrogen N ₂ Nitrogen peroxide N ₂ O ₄ Nitrosyl chloride NOCI Oxygen O ₂ Propane (commercial) ³⁾ 1) 1-Propene (Propylene) 1) Sulphur dioxide SO ₂ | 1 | | |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | | CH₄ | R 50 |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ | } | | i |
| $\begin{array}{c ccccc} Nitrogen \ peroxide & & N_2O_4 \\ Nitrosyl \ chloride & & NOCI \\ Oxygen & & O_2 \\ Propane \ (commercial)^{3)} & & 1) \\ 1-Propene \ (Propylene) & & 1) & R \ 1270 \\ Sulphur \ dioxide & & SO_2 \\ \end{array}$ | | N ₂ | |
| $\begin{array}{c cccc} \text{Nitrosyl chloride} & & \text{NOCI} \\ \text{Oxygen} & & \text{O}_2 \\ \text{Propane (commercial)}^{3)} & & \text{1} \\ \text{1-Propene (Propylene)} & & \text{1}) & & \text{R 1270} \\ \text{Sulphur dioxide} & & \text{SO}_2 \\ \end{array}$ | 1 - | | |
| Oxygen O2 Propane (commercial) ³⁾ 1) 1-Propene (Propylene) 1) R 1270 Sulphur dioxide SO2 | | | |
| Propane (commercial) ³⁾ 1-Propene (Propylene) Sulphur dioxide 1) R 1270 SO ₂ | 1 | | |
| 1-Propene (Propylene) | · · · · | 1 | |
| Sulphur dioxide SO ₂ | | 1) | R 1270 |
| | | SO ₂ | } |
| | | | 1 |
| Xenon | | i | |

¹⁾ Formula not marked on cylinder in these cases.

²⁾ Commercial mixture of hydrocarbon gases having a vapour pressure not exceeding 750 kPa (absolute) at $45~{\rm ^{\circ}C}$.

³⁾ Commercial mixture of hydrocarbon gases having a vapour pressure exceeding 750 kPa (absolute) at 45 $^{\circ}$ C and not exceeding 2 000 kPa (absolute) at 45 $^{\circ}$ C.