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

Second edition — 1981-11-01

UDC 621.642.17 **Ref. No. ISO 448-1981 (E)**

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

Price based on 2 pages

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, *Gas cylinders*, and was circulated to the member bodies in September 1979.

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

Australia	Ireland	Spain
Austria	Israel	Sweden
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).

Printed in Switzerland

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.

2 Reference

ISO 817, *Refrigerants — Number designation.*[1]

3 Marking[2] 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

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 $70CO_2 + 20N_2 + 10Ar$

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.

Exceptions

— In cases where the summary formula is the same for gases with different structure formulas, the summary formula shall be excluded.

Example :

Cyclopropane and propylene.

— 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

Name of gas	Formula	Number designation (see ISO 817)
Acetylene	C_2H_2	
Air	[1]	
Ammonia	NH_3	
Argon	Ar	
Boron trifluoride	BF_3	
Bromoethane (Ethyl bromide)	C_2H_5Br	
Bromomethane (Methyl bromide)	CH_3Br	
Butane (commercial)[2]	[1]	
Carbon dioxide	CO_2	
Carbon monoxide	CO	
Carbonyl chloride (Phosgene)	$COCl_2$	
Chlorine	Cl_2	
1-Chloro-1,1-difluoroethane	$C_2H_3ClF_2$	R 142b
Chlorodifluoromethane	$CHClF_2$	R 22
Chloroethane (Ethyl chloride)	C_2H_5Cl	R 160
Chloroethene (Vinyl chloride)	C_2H_3Cl	R 1140
Chloromethane (Methyl chloride)	CH_3Cl	R 40
Cyclopropane	[1]	
Dichlorodifluoromethane	CCl_2F_2	R 12
1,1-Difluoroethane	$C_2H_4F_2$	R 152a
Dinitrogen monoxide (Nitrous oxide)	N_2O	
Ethane	C_2H_6	R 170
Ethene (Ethylene)	C_2H_4	R 1150
Ethylene oxide	C_2H_4O	
Fluorine	F_2	
Helium	He	
Hydrogen	H_2	
Hydrogen chloride	HCl	
Hydrogen cyanide	HCN	
Hydrogen fluoride	HF	
Hydrogen sulphide	H_2S	
Krypton	Kr	
Methane	CH_4	R 50
Neon	Ne	
Nitrogen	N_2	
Nitrogen peroxide	N_2O_4	
Nitrosyl chloride	NOCl	
Oxygen	O_2	
Propane (commercial)[3]	[1]	
1-Propene (Propylene)	[1]	R 1270
Sulphur dioxide	SO_2	
Sulphur hexafluoride	SF_6	
Xenon	Xe	

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 °C.

3) Commercial mixture of hydrocarbon gases having a vapour pressure exceeding 750 kPa (absolute) at 45 °C and not exceeding 2 000 kPa (absolute) at 45 °C.