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मानक

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4379 (1981): Identification of contents of industrial gas cylinders [MED 16: Mechanical Engineering]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

*Indian Standard***IDENTIFICATION OF THE CONTENTS
OF INDUSTRIAL GAS CYLINDERS***(First Revision)*

1. Scope — This standard covers the method of marking industrial gas cylinders up to and including 130 litres water capacity to identify their contents. It excludes medical gas cylinders identification of which is covered in IS:3933-1966 'Colour identification of gas cylinders and related equipment intended for medical use'.

2. Identification Marking

2.1 Cylinders shall be legibly and durably marked, preferably at the valve end and off the cylindrical part of the body with the:

- a) Chemical formula and the name of the gas it contains; and
- b) In case of mixtures, the chemical formulae, name and proportion of the constituent gases in descending order of magnitude.

2.1.1 For gases such as air and certain fuel gases where the exact chemical composition is not precisely determined, the chemical formula can be excluded.

2.1.2 For organic refrigerants the chemical formula may be replaced by the designated refrigerant number in accordance with 'Indian Standard Refrigerants — number designation' (*under preparation*).

2.1.3 The chemical formulae shall be in accordance with Table 1.

2.1.4 The mark shall be made by stamping, embossing, engraving, stencilling, transfers or paint. The method of marking adopted shall be such that it does not weaken or damage the cylinder.

2.1.5 The dimensions of the lettering and figures shall commensurate with the size of the cylinder and as large as necessary for easy identification.

2.1.6 The colour of the lettering and figures shall contrast against the ground colour of the cylinder and shall be such as not to impair their legibility.

3. Colour Identification

3.1 All gas cylinders shall be painted externally in accordance with Table 2 to provide means for visual identification of the gaseous contents. The colour identification shall consist of a ground colour and colour bands. The width of the colour band shall be at least $0.25 D$ where D is the outside diameter of the cylinder shell.

3.2 Cylinders containing gases or gas mixtures for which exclusive identification is not provided in Table 2, shall be colour-marked in accordance with Table 3.

TABLE 1 CHEMICAL FORMULAE OF GASES

(Clause 2.1.3)

Name of Gas	Chemical Symbol	Name of Gas	Chemical Symbol
Acetylene, dissolved	C_2H_2	Methyl bromide (bromomethane)	CH_3Br
Air, compressed	—	Methyl chloride (chloromethane)	CH_3Cl
Ammonia (anhydrous or dissolved)	NH_3	Monochlorodifluoroethane (R-142b)*	CH_3CClF_2
Argon	Ar	Monobromotrifluoromethane (R-13B ₁)*	$CBrF_3$
Boron trichloride	BCl_3	Monochlorodifluoromethane (R-22)*	$CHClF_2$
Boron trifluoride (boron fluoride)	BF_3	Monochloromonobromodifluoromethane (R-12 B ₁)*	$CClF_2Br$
Butadiene (vinyl ethylene, divinyl)	C_4H_6	Monochlorotetrafluoroethane (R-124a)*	CHF_2ClCF_2
Butane	C_4H_{10}	Monochlorotrifluoroethane (R-133a)*	CH_2ClCF_3
Butane (commercial)*	—	Monochlorotrifluoroethylene (R-1113)*	$CClF = CF_2$
Butene	C_4H_8	Monochlorotrifluoromethane (R-13)*	$CClF_3$
Carbon dioxide	CO_2	Neon	Ne
Carbon monoxide	CO	Nitrogen	N_2
Chlorine	Cl_2	Nitrogen peroxide (nitrogen dioxide)	NO_2
Chlorine trifluoride	ClF_3	Nitrogen tetroxide (dinitrogen tetroxide)	N_2O_4
Chlorine pentafluoride	ClF_5	Nitrosyl chloride	$NOCl$
Coal gas (town gas, lighting gas)	$H_2 + CO + CH_4$	Nitrous oxide	N_2O
Cyanogen	$(CN)_2$	Nitrox	—
Cyanogen chloride	$CICN$	Octafluorocyclobutane (R-C 318)*	C_4F_8
Cyclopropane	C_3H_6	Oil gas, compressed	$CO + C_mH_n$
Dichlorodifluoromethane (R-12)*	CCl_2F_2	Oil gas, liquefied (Z-gas)	$CO + C_mH_n$
Dichloromonofluoromethane (R-21)*	$CHCl_2F$	Oxygen	O_2
1,2 Dichlorotetrafluoroethane (R-114)*	$CClF_2CClF_2$	Phosgene (carbonyl chloride)	$COCl_2$
1,1 Difluoroethane (ethylidene fluoride) (R-152a)*	CH_3CHF_2	Propane	C_3H_8
1,1 Difluoroethylene (R-1132a)* (vinylidene fluoride)	$CH_2 = CF_2$	Propane (commercial)*	—
Dimethylamine	$(CH_3)_2NH$	Propene (propylene)	C_3H_6
Dimethyl ether (methyl ether, methyl oxide)	$(CH_3)_2O$	Sulphur dioxide	SO_2
Ethane	C_2H_6	Sulphur hexafluoride	SF_6
Ethylamine (aminoethane)	$C_2H_5NH_2$	T-gas 28	$10\% CO_2 + 90\% C_2H_4O$
Ethyl chloride (chloroethane)	C_2H_5Cl	T-gas 250 (cartox)	$90\% CO_2 + 10\% C_2H_4O$
Ethylene	C_2H_4	Trichloromonofluoromethane (R-11)*	CCl_3F
Ethylene oxide	C_2H_4O	1,1,2 Trichlorotrifluoroethane (R-113)*	CCl_2FCClF_2
Fluorine	F_2	Trifluoromethane	CHF_3
Helium	He	Trifluoromonobromomethane	CF_3Br
Hydrogen	H_2	Trimethylamine	$(CH_3)_3N$
Hydrogen bromide	HBr	Vinyl bromide	$CH_2 = CHBr$
Hydrogen chloride	HCl	Vinyl chloride	$CH_2 = CHCl$
Hydrogen cyanide	HCN	Vinyl methyl ether (methylvinyl oxide)	$CH_3OCH = CH_2$
Hydrogen fluoride	HF	Water gas	$H_2 + CO$
Hydrogen sulphide	H_2S	Xenon	Xe
Isobutane	$CH(CH_3)_3$		
Isobutylene	$CH_2 = C(CH_3)_2$		
Krypton	Kr		
Liquefied petroleum gas (LPG)	—		
Methane	CH_4		
Methanethiol (methylmercaptan)	CH_3SH		
Methyl acetylene	$CH_3C \equiv CH$		
Methylamine (aminoethane)	CH_3NH_2		

*This is the refrigerant number of the gas in accordance with ISO/R 817-1974 'Organic refrigerant — Number designation' issued by International Organization for Standardization.

TABLE 2 CYLINDER GROUND COLOURS

(Clause 3.1)

Name of Gas	Ground Colour*	Colour of Band†
Acetylene	Maroon (541)	None
Air	French grey (630)	None
Ammonia	Black	Signal red (537) and Golden yellow (356)
Argon	Peacock blue (103)	None
Butane	Signal red (537)	—
Carbon dioxide	Black	White or Aluminium paint
Carbon monoxide	Signal red (537)	Golden yellow (356)
Chloride	Golden yellow (356)	None
Coal gas	Signal red (537)	None
Dichlorodifluoromethane (and other fluorinated hydrocarbons)	Dual coloured: Bottom end grey (630) Neck end violet (796)‡	— —
Ethyl chloride	French grey (630)	Signal red (537)
Ethylene	Dark violet (796)‡	Signal red (537)
Ethylene oxide	Dark violet (796)‡	Signal red (537) and Golden yellow (356)
Helium	Middle brown (411)	—
Hydrogen cyanide	Peacock blue (103)	Golden yellow (356)
Hydrogen	Signal red (537)	—
Liquefied petroleum gas (LPG)	Signal red (537)	—
Methane	Signal red (537)	—
Methyl bromide	Peacock blue (103)	Black
Methyl chloride	Light brunswick green (225)	Signal red (537)
Neon	Middle brown (411)	Black
Nitrogen	French grey (630)	Black
Oxygen	Black	—
Phosgene	Black	Peacock blue (103) and Golden yellow (356)
Propane	Signal red (537)	—
Sulphur dioxide	Light brunswick green (225)	Golden yellow (356)

*The numbers given in parentheses refer to the reference number of the colours given in IS : 5-1978 'Colours for ready mixed paints (third revision)'.

†When two bands are given, the red band or the blue band shall be placed next to the valve fitting and the yellow band shall be placed between that band and the shell colour of the cylinder.

‡The shade dark violet is also known as mauve.

TABLE 3 COLOUR IDENTIFICATION OF GASES AND GAS MIXTURES

(Clause 3.2)

Nature of Gas or Mixture	Ground Colour of Cylinder Shell (See Notes 1 and 2)	Colour of Band* at Neck of Cylinder
Non-inflammable and non-poisonous	White	—
Non-inflammable and poisonous	White	Golden yellow (356)
Flammable and non-poisonous	White	Signal red (537)
Flammable and poisonous	White	Signal red (537) and Golden yellow (356)†

Note 1 — Only colours having reflectance of munsel value‡ not less than 6 should be used.

Note 2 — Paints which contain aluminium that constitutes a fire risk should not be used.

*The numbers given in parentheses refer to the reference number of the colours given in IS : 5-1978.

†The red band shall be placed next to the valve fitting and the yellow band shall be placed between that band and the shell colour of the cylinder.

‡See IS : 1650-1973 ' Standard colours for building and decorative finishes '.

EXPLANATORY NOTE

This standard was first published in 1967. It has been usual to specify the contents of gas cylinders by colour marking of the gas cylinders. With the increasing number of gases and mixture of gases used by industry, the number of discreet colours for identifying the gases concerned is not sufficient. Therefore, it has become customary to identify the contents of the gas cylinders by marking the cylinders with the name of the gas and chemical formula in addition to colour-marking of the cylinders.

In the preparation of this standard, considerable assistance has been derived from:

- i) ISO/TC 58 N 217 (Revision of ISO/R 448) Marking of industrial gas cylinders for the identification of the content. International Organization for Standardization.
- ii) SABS 019-1964 Code of practice relating to the use of portable steel containers for compressed gases. South African Bureau of Standards.
- iii) BS 349-1973 Identification of the contents of industrial gas cylinders. British Standards Institution.

Colour identification included in this specification is in accordance with the requirements of Gas Cylinder Rules, 1981, of the Government of India as amended from time to time.

TO

IS : 4379-1981 IDENTIFICATION OF THE CONTENTS OF
INDUSTRIAL GAS CYLINDERS(*First Revision*)

Addenda

(*Page 1, clause 3.2*) — Add the following new matter at the end of the clause:

'Cylinders containing specific gas mixture shall be colour-marked in accordance with Table 4.'

(*Page 4, Table 3*) — Add the following new table after Table 3:

TABLE 4 COLOUR IDENTIFICATION OF SPECIFIC GAS MIXTURES

(*Clause 3.2*)

Gas Mixture (with More than 50% of the First Named Gas)	Ground Colour	Shoulder Colour Band	Body Colour Band
Argon & Carbon dioxide	Blue (103)	Same as ground colour	Green (225)
Hydrogen & Nitrogen	Red (537)	Same as ground colour	Grey (630)
Nitrogen & Oxygen	Grey (630)	Black	Black —
Nitrogen & Carbon dioxide	Grey (630)	Black	Green (225)
Air & Carbon dioxide	Grey (630)	Same as ground colour	Green (225)
Argon & Oxygen	Blue (103)	..	Black —
Argon & Nitrogen	Blue (103)	..	Grey (630)

Note 1 — Shoulder colour bands shall be painted round the neck of each cylinder adjacent to the valve fitting and shall be wide enough to occupy half the portion.

Note 2 — Body colour band shall be painted round the cylinder midway between the base & neck and shall have a width equal to one-fifth of the total length of the cylinder. The numbers given in parentheses refer to the reference number of the colours given in IS : 5-1978 'Colours for ready mixed paints (*third revision*)'.

AMENDMENT NO. 2 AUGUST 2006
TO
IS 4379: 1981 IDENTIFICATION OF CONTENTS OF
INDUSTRIAL GAS CYLINDERS

(First Revision)

(Page 3, Table 2) — Insert the following note at the end:

'NOTE — For liquefied petroleum gas (LPG) any other colour is permitted with the approval of the statutory authority.'

(ME 16)

AMENDMENT NO. 3 JUNE 2013
TO
IS 4379 : 1981 IDENTIFICATION OF THE CONTENTS
OF INDUSTRIAL GAS CYLINDERS

(First Revision)

(Page 1, *clause 3.2*) — Insert the following note at the end of clause:

‘NOTE — For aluminium alloy cylinders:

- 1** There shall be no change in the shoulder colour band(s).
- 2** Instead of full length cylinder, the ‘ground colour’ shall be painted below the shoulder length covering 1/5 of the parallel length of the cylinder or 10 cm, whichever is more.
- 3** The ‘colour band’ if applicable shall be painted after the ‘ground colour’ as specified in 2. This shall also be 1/5th of the parallel length of the cylinder or 10 cm, whichever is more.’

(MED 16)