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SPECIFICATION FOR IDENTIFICATION MARKINGS OF THE CONTENTS OF INDUSTRIAL GAS CYLINDERS

SRI LANKA STANDARDS INSTITUTION

DRAFTING COMMITTEE ON INDUSTRIAL GAS CYLINDERS

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FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 89/12/28, after the draft, finalized by the Drafting Committee on Industrial Gas Cylinders had been approved by the Mechanical Engineering Divisional Committee.

This standard establishes a system of marking for the identification of the contents of gas cylinders intended for industrial use.

The assistance derived from the publication of the International Organization for standardization, the British Standards Institution and the Bureau of Indian Standards in the preparation of this standard is gratefully acknowledged.

1 SCOPE

This standard establishes a system of marking for the identification of the contents of gas cylinders intended for industrial use of water capacity exceeding 0.1 kg but not exceeding 500 kg. It excludes gas cylinders used for medical, breathing or fire fighting purposes.

2 REFERENCES

ISO	817	Organic refrigerants - Number designation
BS	381 C	Colours for identification, coding and special purposes.
BS	4800	Paint colours for building purposes

3 REQUIREMENTS

3.1 Marking

3.1.1 Cylinders shall be legibly and durable marked, preferably at the valve and and on the cylindrical part of the body with the :

a) Chemical formula or symbol and the name of the gas it contains; and

b) In case of mixtures, the chemical formulae or symbols, names and proportions of the constituent gases in the descending order of magnitude.

3.1.1.1 For gases such as air and certain fuel gases where the exact chemical composition cannot be precisely determined, the chemical formula or symbol can be excluded.

3.1.1.2 For organic refrigerants the chemical formula or symbol may be replaced by the designated refrigerant number in accordance with ISO 817.

Contd 2/-

3.1.2 The chemical formulae or symbols shall be in accordance with Table 1.

3.1.3 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.

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

3.1.5 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.

3.2 Colour identification

3.2.1 All gas cylinders shall be painted externally in accordance with Table 2 to provide means for visual identification of the gaseous contents. Wherever colour band is used, the width of the colour band shall be at least 0.25 D where D is the outside diameter of the cylinder shell.

3.2.2 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.

3.2.3 When the value of a container is wholly protected by an extension of the container body the colour band shall be painted or otherwise durably marked externally on the extension.

3.2.4 When two colour bands are required, the second band shall be painted or otherwise durably marked immediately below the first band.

3.3 Other marks

Any other bands or marks, painted or otherwise durably marked on the container by the gas manufacturer or filler for his own purposes, shall be placed on the body of the container.

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TABLE 1 - CHEMICAL FORMULAE OR SYMBOLS OF GASES

Name of Gas	Chemical formulae or symbol	Name of Gas	Chemical formulae or 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 trichloriide	BCl_3	Monochlorodifluoromethane	$CHClF_2$
Boron trifluoride (boron fluoride)	BF_3	(R-22)*	
Butadiene (vinylethylene, divinyl)	C_4H_6	Monochloromonobromodi-fluoromethane (R-12B$_1$)*	$CClF_2Br$
Butane	C_4H_{10}	Monochorotetrafluoroethane	CHF_2ClCF_2
Butane (commercial)	+	(R-124a)*	
Butene	C_4H_8	Monochlorotrifluoroethane	CH_2ClCF_3
Carbon dioxide	CO_2	(R-133a)*	
Carbon monoxide	CO	Monochlorotrifluoroethylene	$CClF = CF_2$
Chlorine	Cl_2	(R-1113)*	
Chlorine trifluoride	ClF_3	Monochlorotrifluoromethane	$CClF_3$
Chlorine pentafluoride	ClF_5	(R-13)*	
Coal gas (town gas, lighting gas)	$H_2+CO+CH_4$	Neon	Ne
Cynanogen	$(CN)_2$	Nitrogen	N_2
Cyanogen chloride	ClCN	Nitrogen peroxide (nitrogen dioxide)	NO_2
Cyclopropane	C_3H_6	Nitrogen tetroxide (dinitrogen tetroxide)	N_2O_4
Dichlorodifluoromethane (R-12)*	CCl_2F_2	Nitrosyl chloride	NOCl
Dichloromonofluoromethane(R-21)*	$CHCl_2F$	Nitrous oxide	N_2O
1.2 Dichlorotetrafluoroethane (R-114)*	$CClF_2CClF_2$	Nitrox	+
1.1 Difluoroethane (ethylldene fluoride) (R-152a)*	CH_3CHF_2	Octafluorocyclobutane (R-C 318)*	C_4F_8
1.1 Difluorpethylene (R-1132a)* (vinylidene fluoride)	$CH_2= CF_2$	Oil gas, compressed	CO + CmHn
Dimethylamine	$(CH_3)_2NH$	Oil gas, liquefied (Z-gas)	CO + CmHn
Dimethyl ether (methyl ether, methyl oxide)	$(CH_3)_2O$	Oxygen	O_2
		Phosgene (carbonyl chloride)	$COCl_2$
Ethane	C_2H_6	Propane	C_3H_8
Ethylamine (aminoethane)	$C_2H_5NH_2$	Propane (commercial)	+
Ethyl chloride (chloroethane)	C_2H_5Cl	Propene (propylene)	C_3H_6
Ethylene	C_2H_4	Sulphur dioxide	SO_2
Ethylene oxide	C_2H_4O	Sulphur hexafluoride	SF_6
Ftuorine	F_2	T-gas 28	$10\%CO_2+90\%C_2H_4O$
Helium	He	T-gas 250 (cartox)	$90\%CO_2+10\%C_2H_4O$
Hydrogen	H_2	Trichloromonofluoromethane	CCl_3F
Hydrogen bromide	HBr	(R-11)*	
Hydrogen chloride	HCl	1.1.2 Trichlorotrifluoroethane	CCl_2FCClF_2
Hydrogen cyanide	HCN	(R-113)*	
Hydrogen fluoride	HF	Trifluoromethane	CHF_3
Hydrogen sulphide	H_2S	Trifluoromonobromomethane	CF_3Br
Isobutane	$CH(CH_3)_3$	Trimethylamine	$(CH_3)_3N$
Isobutylene	$CH_2=C(CH_3)_2$	Vinyl bromide	$CH_2=CHBr$
Krypton	Kr	Vinyl chloride	$CH_2=CHCl$
Liquefied petroleum gas (LPG)	+	Vinyl methyl ether (methylvinyl oxide)	$CH_3OCH = CH_2$
Methane	CH_4	Water gas	$H_2 + CO$
Methanethiol (methylmercaptan)	CH_3SH	Xenon	Xe
Methyl acetylene	$CH_3C= CH$		
Methylamine (aminoethane)	CH_3NH_2		

* This is the refrigerant number of the gas in accordance with ISO 817 Organic refrigerant-Number designation.

+ No formula to be added.

TABLE 2 - CYLINDER GROUND COLOURS

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	Aluminium paint
Carbon monoxide	Signal red (537)	Golden yellow (356)
Chlorine	Golden yellow (356)	None
Coal gas	Signal red (537)	None
Dichlorodifluoro-methane (and other fluorinated hydrocarbons)	Dual coloured : Bottom end grey (360) Neck end violet (796)	- -
Ethylchloride	French grey (630)	Signal red (537)
Ethylene	Dark violet (796)	Signal red (537) &
Ethylene oxide	Dark violet (796)	Signal red (537) & 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	Peacock blue (103) & 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 BS 381 C : 1988.

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

TABLE 3 - COLOUR IDENTIFICATION OF GASES AND GAS MIXTURES

Nature of Gas or Mixture	Ground Colour of Cylinder Shell (See Notes 1 & 2)	Colour of Band* at Neck of Cylinder
Non-inflammable and non-posionous	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)+

NOTES

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

2. Paints which contain aluminium that contsitutes a fire risk should not be used.

* The numbers given in parentheses refer to the reference number of the colours given in BS 381 C : 1988.

\+ 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 BS 4800 : 1981 Paint colours for building purposes.

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