



JABATAN KESIHATAN NEGERI SARAWAK,  
JALAN DIPLOMATIK OFF JALAN BAKO,  
93050 PETRA JAYA,  
KUCHING, SARAWAK.

TEL : 082-473200  
FAX : 082-441786/441815



Ruj. kami : JKNSWK/F-31/(70) Jld.15  
Tarikh : 26 Disember 2012

### **SENARAI EDARAN**

Tuan/ Puan,

### **EDARAN GARISPANDUAN UNTUK PENGGUNA, PENGANGKUT DAN PENGEDAR SILINDER GAS MAMPAT**

Saya dengan segala hormatnya merujuk kepada perkara di atas.

2. Bersama ini disertakan Garispanduan Untuk Pengguna, Pengangkut Dan Pengedar Silinder Gas Mampat dari Eastern Oxygen Industries Sdn. Bhd. untuk rujukan dan tindakan selanjutnya.

Sekian, terima kasih.

**"BERKHIDMAT UNTUK NEGARA"**

*"Penyayang, Profesionalisme Dan Kerja Berpasukan Adalah Budaya Kerja Kita"*

Saya yang menurut perintah,

**(MARDZIAH BINTI SUHAILI)**

Timbalan Pengarah Kesihatan Negeri (Farmasi),  
b.p Pengarah Kesihatan Negeri Sarawak

## **SENARAI EDARAN**

Pegawai Kesihatan Bahagian, Bahagian Kuching  
Pegawai Kesihatan Bahagian, Bahagian Samarahan  
Pegawai Kesihatan Bahagian, Bahagian Betong  
Pegawai Kesihatan Bahagian, Bahagian Sri Aman  
Pegawai Kesihatan Bahagian, Bahagian Sarikei  
Pegawai Kesihatan Bahagian, Bahagian Mukah  
Pegawai Kesihatan Bahagian, Bahagian Sibu  
Pegawai Kesihatan Bahagian, Bahagian Kapit  
Pegawai Kesihatan Bahagian, Bahagian Bintulu  
Pegawai Kesihatan Bahagian, Bahagian Limbang  
Pegawai Kesihatan Bahagian, Bahagian Miri

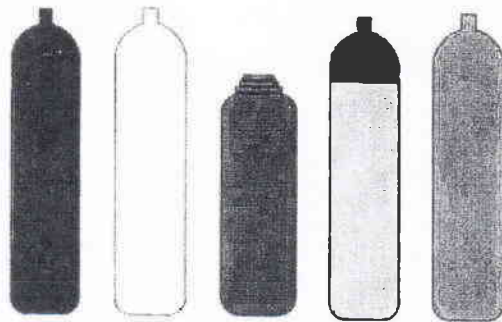
Pengarah Hospital, Hospital Umum Sarawak  
Pengarah Hospital, Hospital Sibu  
Pengarah Hospital, Hospital Bintulu  
Pengarah Hospital, Hospital Miri  
Pengarah Hospital, Hospital Sri Aman  
Pengarah Hospital, Hospital Limbang  
Pengarah Hospital, Hospital Sarikei  
Pengarah Hospital, Hospital Kapit  
Pengarah Hospital, Hospital Sentosa  
Pengarah Hospital, Hospital Bau  
Pengarah Hospital, Hospital Lundu  
Pengarah Hospital, Hospital Serian  
Pengarah Hospital, Hospital Saratok  
Pengarah Hospital, Hospital Betong  
Pengarah Hospital, Hospital Kanowit  
Pengarah Hospital, Hospital Mukah  
Pengarah Hospital, Hospital Lawas  
Pengarah Hospital, Hospital Simunjan  
Pengarah Hospital, Hospital RCBM  
Pengarah Hospital, Hospital Daro  
Pengarah Hospital, Hospital Marudi  
Pengarah Hospital, Hospital Dalat

Ketua Penolong Pengarah Kanan, Makmal Ubat dan Stor Negeri, Kuching

Pegawai Farmasi Bahagian, Bahagian Sibu  
Pegawai Farmasi Bahagian, Bahagian Sri Aman  
Pegawai Farmasi Bahagian, Bahagian Miri  
Pegawai Farmasi Bahagian, Bahagian Limbang  
Pegawai Farmasi Bahagian, Bahagian Sarikei  
Pegawai Farmasi Bahagian, Bahagian Kapit

# *“Caring for Cylinders”*

13-8-04



Guidelines for users, transporters, dealers of Industrial  
Compressed Gas Cylinders

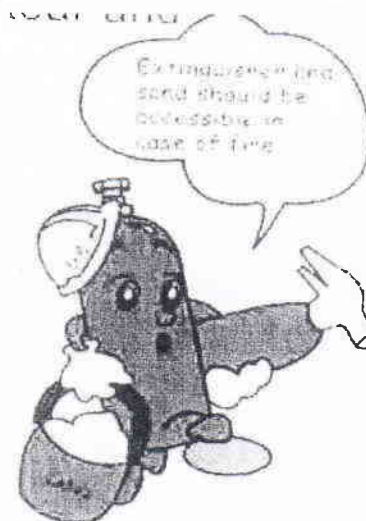
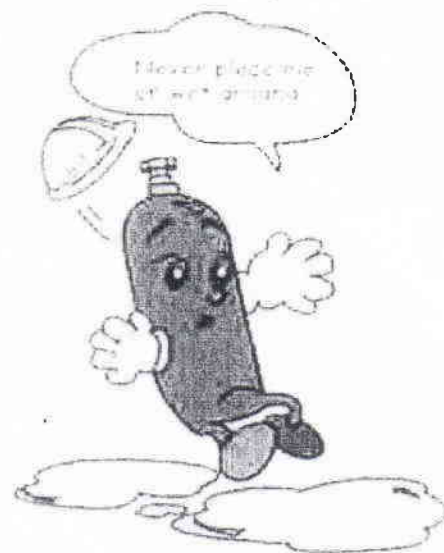
**Eastern Oxygen Industries**  
20th July 2004

**GENERAL INSTRUCTION**

- ☐ **Do care for the cylinder.**
- ☐ Do handle, store, and use cylinders safely.
- ☐ Don't alter or tamper with cylinders, their colour, valve threads or markings.
- ☐ Don't mix gases in a cylinder or try to fill one cylinder from the other.
- ☐ Don't carry cylinders in closed vehicles such as a car or van.
- ☐ Don't overload the vehicle. Travel slowly.
- ☐ Don't roll a cylinder.
- ☐ Don't scrape a cylinder! Only the owner or gas supplier is authorised to do so.
- ☐ Never lift or drag the cylinder by the cap or valve because it may cause damage e.g. leak or dent

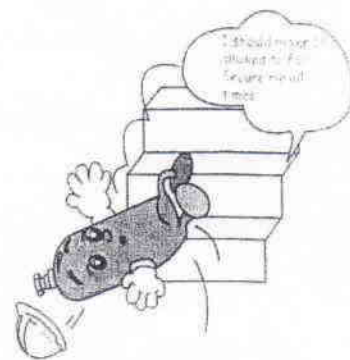
**STORAGE**

- ☐ Store cylinders properly in well ventilated areas, away from heat and cold.
- ☐ Storage area should be free from fire risk and away from sources of heat and ignition.
- ☐ Full and empty cylinders should be kept apart.
- ☐ Damaged cylinders should be set aside and the supplier informed.
- ☐ Don't allow electrical welding tools or red-hot metals to get near or come into contact with cylinders.  
Cylinders should not be subjected to temperatures above 450C.
- ☐ Storage area preferable be concrete with good drainage for rainwater. Cylinders not to be allowed to stand on wet soil as these could cause base corrosion.
- ☐ Other products particularly oil, solvent, combustible and corrosive materials should never be stored adjacent to the gas cylinders.
- ☐ Don't store oxygen and flammable gases together such as acetylene. Sufficient safe distance of 1m between the respective gases and 2m away from flammable gases.
- ☐ Smoking and the use of naked flames either inside or in the vicinity of the cylinder storage area should be prohibited.
- ☐ A fire hose and other fire fighting equipment should be conveniently available.



## **HANDLING**

- ☐ Cylinders should be secured to prevent them falling and must not be dropped directly onto a hard surface, thrown or handled in any way which may cause damage to the cylinder, valve, valve guard, paintwork or labeling. This has the potential to make the cylinder, unusable or unsafe.
- ☐ Where freestanding cylinders present a risk of falling or may be subject to impact, the need for suitable methods of restraint e.g. chains, webbing strap would be necessary.
- ☐ Special care must be taken when handling full cylinders. Even though these may be small in size, they can be heavy, especially when filled with liquid.
- ☐ Check cylinders for leaks. Test leaks with soapy water.
- ☐ If an acetylene is heated accidentally or becomes hot, shut the valve, remove the regulator and take the cylinder into the open at once. Immerse the cylinder in water and keep it cool. Call the supplier immediately.
- ☐ If other gas cylinders are accidentally heated, take action to cool the cylinder immediately to prevent pressure build-up.
- ☐ If there's fire around cylinder area, and the cylinders have not been reached by flame, remove them from the area immediately.
- ☐ Always open the cylinder valve slowly, and close it sufficiently to shut off the gas.
- ☐ Use regulators to regulate cylinder pressure to the pressure required for welding or cutting jobs.
- ☐ Don't subject cylinders to blows or mechanical damage
- ☐ Don't allow cylinders to come into contact with electrical appliances or live wires. Keep them away from sparks, flames, welding and cutting operations.
- ☐ Don't lubricate cylinder valves or fittings and do not handle oxygen cylinders with greasy hands or gloves. Keep cylinders and valves clean.
- ☐ Don't use excessive force, Compressed gas cylinders are not to be used as rollers, supports, or for any purpose other than their specific design purpose i.e. containment of compressed gas.
- ☐ Don't transport cylinders with the regulators and hoses attached unless a proper trolley or carrier is used.





EOX

EASTERN OXYGEN INDUSTRIES

# "Caring For Cylinders"

Cylinders belonging to EOX are manufactured according to internationally recognized standards. This means they are from approved materials and manufacturing processes. Cylinders from EOX are painted to the Malaysian standard MS1023 on identification of contents of industrial gas cylinders and this helps you differentiate one gas from another.

Every cylinder from EOX is labeled with the name of gas, volume and the gas hazard information. Safety features are also incorporated in cylinder valves. The valves of combustible and non-combustible gases have different threads to prevent the interchange of fittings between cylinders. The valve outlet of oxygen, nitrogen and compressed air are threaded in a clockwise direction and the valve outlets of acetylene and hydrogen are threaded in an anti-clockwise direction.

General Manager

## **HEAD OFFICE**

Lot 36, Section 66,  
Jln. Peteri, Bintawa Industrial  
Estate, 93450 Kuching, Sarawak  
Tel: 082-350888  
Fax: 082-483132  
e-mail : eobhd@po.jaring.my

## **Branches**

<b>Sibu</b>	: 084-212093
<b>Miri</b>	: 086-253233
<b>Bintulu</b>	: 085-653507



# PROTOCOL

## Use on Medical Oxygen Therapy Regulator Set

### A. Check before use

- a. To ensure all connections between The Medical regulator Set and Cylinder is well connected.
- b. Read the content gauge on Regulator :
  - i. Full 2000psi = 14000 kpa
  - ii. Empty 75psi = 525 kpa

### B. To use

- a. Open the cylinder valve with a spindle key on anti-clockwise direction gently ( $\frac{1}{2}$  turn to 1 turn).
- b. Check and read the content gauge again.
- c. Turn the green knob on Flowmeter tube anti-clockwise direction and read the bobbin in flow-tube, allow the bobbin to float at between 2 – 5 LPM

#### Note:

Consult a medical doctor for flow rate, if necessary  
Bubbles will generate in the Humidifier below the flowmeter during service mode

- d. The Plastic-bottle Humidifier shall be filled with distilled water, cleaned and changed once per week.
- e. A  $0.4\text{m}^3$  size cylinder will last for  $\pm 2$  hours in continuous usage.

## Safety Precaution

- A. Do not expose Regulator, Cylinder and Valve with oil, grease and fire / heat.
- B. Do not apply therapy in poorly ventilated room.



**Industrial  
Gases  
Committee**

# Safety Leaflet Oxygen



**MALAYSIAN  
OXYGEN  
BERHAD**

No. 12, Jalan 222, 46100 Petaling Jaya, Selangor

Company cylinder colour code **BLACK**

## GENERAL PROPERTIES

Gaseous oxygen is colourless, odourless and tasteless; it is slightly heavier than air at equal temperatures. Liquid oxygen is odourless, light blue in colour and boils at minus 183°C. One volume of liquid oxygen gives approximately 860 volumes of gas at ambient conditions.

Oxygen is necessary to support life and combines readily with other elements. Its volume concentration in the atmosphere is 21%.

## GENERAL HAZARDS

Oxygen is not a flammable gas but it vigorously supports combustion.

Combustible materials catch fire more easily and burn more vigorously when the atmosphere contains more than 21% oxygen. These effects intensify as the oxygen concentration in the atmosphere increases. Many commonly used materials not normally combustible in air may burn in pure oxygen or oxygen enriched atmospheres.

When liquid oxygen evaporates, the gas produced is very cold and much heavier than air. Thus it may accumulate in low lying areas such as pits and trenches and cause oxygen enrichment.

## MATERIAL HAZARDS

Certain steels, such as carbon steel, and some other materials are unsuitable for service at subzero temperatures because they lose impact strength and become extremely brittle.

Materials normally suitable for service at low temperatures are stainless steels, aluminium and copper and their alloys.

In an area where liquid oxygen spillage can occur care should be taken to ensure that it does not come into contact with vulnerable steel structures and vehicle tyres.

Only use materials suitable for oxygen service.

## HEALTH HAZARDS

### Cold burns

Liquid oxygen and cold oxygen vapours can produce effects on the skin similar to a burn. Naked parts of the body coming into contact with uninsulated parts of equipment may also stick fast and the flesh may be torn on separation. Affected parts must be washed immediately with large quantities of tepid water. Summon medical help.

### Effects on breathing

High purity oxygen is not harmful at atmospheric pressure provided that exposure to high concentrations is not prolonged for more than 24 hours.

## SAFETY PRECAUTIONS

(see reverse side also)

Areas where smoking and the use of naked flames are prohibited shall be observed. Personnel should not enter enclosed areas enriched with oxygen. Where doubt exists, the atmosphere should be checked with an oxygen analyser and a "SAFETY WORK PERMIT System" applied.

Clothing impregnated with oxygen should be well ventilated.

Tools and clothing should be free of oil and grease. Any equipment for oxygen service shall never come in contact with oil or grease.

When handling liquid oxygen or where exposure to very low temperatures can occur, gloves and where appropriate eye protection, safety shoes and body protection shall be worn.

## MISUSE OF OXYGEN

Oxygen should be used only for applications for which it is intended. It is highly dangerous to use oxygen as a substitute for nitrogen, inert gas or air in the following or similar applications:

- Starting internal combustion engines
- Operating pneumatic tools
- Pressurising oil reservoirs
- Paint spraying
- Filling vehicle tyres
- Purging vessels and pipelines in preparation for maintenance or inspection
- Enrichment of breathing atmospheres deficient in oxygen

## EMERGENCY ACTION

### Leaking cylinder

Close valve if possible ensuring that clothing does not become impregnated with oxygen.

Move leaking cylinder to an open space, away from persons and combustible materials. Post warning (including no smoking) notices.

### Action in event of fire

(see reverse side also)

Since oxygen vigorously supports combustion quick action in closing any oxygen valves may reduce the intensity of the fire.



# Safe handling and storage of gas cylinders

The following practices are recommended for the safe handling and storage of high pressure, dissolved and liquefied gases. Additional precautions may be necessary depending upon the category to which the gas belongs (flammable, oxidant, or inert), the individual properties of the gas and the process in which it is used.

## GENERAL

- 1 Only experienced and properly instructed persons should handle compressed gases.
- 2 Observe all regulations and local requirements regarding use and storage of cylinders.
- 3 Do not remove or deface labels provided by the supplier.
- 4 Ascertain the identity of the gas before using it.
- 5 Know and understand the properties and hazards associated with each gas before using it.
- 6 Before using gases, be aware of any plans to cover any emergency situations that might arise.
- 7 When doubt exists as to the correct handling procedure for a particular gas the supplier should be contacted.

## HANDLING AND USE

- 1 Wear stout gloves.
- 2 Never lift a cylinder by the cap or guard, unless supplier states it is designed for that purpose.
- 3 Use a cylinder trolley or other suitable device for transporting cylinders, even for a short distance.
- 4 Leave valve protection caps/guards in place until the cylinder has been secured against either a wall or bench or placed in a cylinder stand and is ready for use.
- 5 Where leaks are suspected apply soap solution. Bubbling shows up leaks.
- 6 Employ suitable pressure regulating devices on all cylinders when the gas is being supplied to systems with a lower pressure rating than that of the cylinder.
- 7 Before connecting the cylinder for use ensure that back feed from the system into the cylinder is prevented.
- 8 Open cylinder valves slowly.
- 9 Never use direct flame or electrical heating devices to raise the pressure of a cylinder.
- 10 Never attempt to transfer gases from one cylinder to another.
- 11 Do not use cylinders as rollers or supports.
- 12 Keep cylinder valve outlets clean and free from contaminants particularly oil and dirt.
- 13 Do not subject cylinders to abnormal mechanical shocks which may cause damage to their shell or valve.
- 14 Never attempt to repair or modify cylinders, cylinder valves or safety relief devices! Any

damage should be made known to the supplier.

- 15 Close cylinder valve whenever cylinder is not in use, even if cylinder is still connected to equipment or is empty.
- 16 Replace outlet caps or plugs and cylinder caps, where supplied, as soon as cylinder is disconnected from equipment.

## DAMAGED CYLINDERS

Should any gas cylinder be damaged in service, it should be clearly identified and be returned to the supplier. On no account should repairs be attempted or evidence of damage be concealed, since this may result in subsequent failure with possible injury to other persons.

## STORAGE

- 1 Cylinders should be stored in a dedicated area which should be well ventilated.
- 2 Store cylinders in location free from fire risk and away from sources of heat and ignition.
- 3 The cylinder storage area should be kept clear and access should be restricted to authorised persons only. The area should be clearly marked as a cylinder store and appropriate hazard warning signs displayed (e.g. flammable).
- 4 Smoking and the use of naked flames either inside or in the vicinity of the cylinder storage area should be prohibited.
- 5 Where cylinders are so designed they should be stored in the vertical position. The cylinder valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Cylinder valve guards or caps should be in place.
- 6 Store full and empty cylinders separately.
- 7 In the storage area cylinders for different gases should be separated.
- 8 Cylinders held in storage should be periodically checked for general condition and leakage.

## ACTION IN THE EVENT OF FIRE

- 1 In general vacate area and remove cylinders from area of fire, if safe to do so.
- 2 If cylinders cannot be moved and fire cannot be immediately extinguished, keep adjacent cylinders cool with water hosed from a safe distance.
- 3 Call fire brigade and inform them of the potential danger of exploding and rocketing cylinders.
- 4 Clearly mark any cylinder exposed to a fire and inform the supplier.

Further information concerning specific problems arising from the storage and handling of gases, hazards and first aid treatment, can be obtained from the supplier.



# Safety Leaflet

## Carbon Dioxide



Company cylinder colour code ..... **SHOULDER ALUMINIUM, BODY BLACK**

### GENERAL PROPERTIES

Carbon dioxide can exist as a gas, a liquid or a solid. At atmospheric temperatures and pressures carbon dioxide is a colourless gas which has a slightly pungent odour at high concentrations; the gas is about one and a half times heavier than air at equal temperatures and pressures. Liquid carbon dioxide is colourless and exists at temperatures between  $-56.6^{\circ}\text{C}$  and  $30.6^{\circ}\text{C}$  at elevated pressures. One volume of liquid gives approximately 500 volumes of gas at ambient conditions.

Carbon dioxide cannot exist as a liquid at atmospheric pressure. When the liquid under pressure is released to the atmosphere, the discharge will consist of gaseous and solid carbon dioxide only.

Solid carbon dioxide is a white, snow-like material. When in direct contact with the skin it can cause cold burns or frost bite. One volume of solid carbon dioxide gives approximately 920 volumes of gas at ambient conditions.

Carbon dioxide is non-flammable. It is generally regarded as an inert gas.

In the presence of water, carbon dioxide is corrosive to certain of the common metals.

### GENERAL HAZARDS

The principle hazards of gaseous carbon dioxide in the atmosphere is the extent to which it displaces oxygen so that there is a lack of oxygen to breathe and to support life.

### MATERIAL HAZARDS

Certain steels, such as some carbon steel, and other materials are unsuitable for service at subzero temperatures because they lose impact strength and become extremely brittle. Materials normally suitable for service at low temperatures are the austenitic stainless steels, aluminium, and copper and their alloys.

Carbon dioxide as supplied in cylinders contains only trace quantities of water and is virtually non-corrosive. However, carbon dioxide dissolved in water, particularly at elevated pressures, is corrosive and will attack common metals such as mild steel and certain copper alloys e.g. high tensile brass. Under these conditions materials which are resistant to carbonic acid attack must be used.

### HEALTH HAZARDS

#### Cold burns

Severe prolonged exposure to solid carbon dioxide or cold carbon dioxide gas can cause frostbite. Affected parts must be washed immediately with large quantities of tepid water. Summon medical help.

#### Toxicity

In low concentrations up to 3% carbon dioxide is not harmful. Concentrations in the atmosphere of more than 7% cause deep and laboured respirations, palpitations, headache, weakness and muscular twitching, leading to death. Levels of around 10% are soon fatal.

The presence of carbon dioxide gas is not detectable by the normal human senses.

### SAFETY PRECAUTIONS

(see also reverse side)

Areas where equipment containing carbon dioxide is installed or carbon dioxide is being used shall be well ventilated.

Personnel should not enter enclosed areas which may contain carbon dioxide. Where doubt exists, the atmosphere should be checked with a suitable analyser and a "SAFETY WORK PERMIT System" applied. When handling cold carbon dioxide gloves and where appropriate eye protection, safety shoes, body protection shall be worn.

### EMERGENCY ACTION

#### Toxicity

Persons showing symptoms of exposure to carbon dioxide should be moved immediately to a normal atmosphere and must receive immediate artificial respiration. Medical assistance should be summoned without delay.

It is important to note that personnel carrying out rescue operations must minimise the risk to themselves. A RESCUER SHOULD NOT ATTEMPT TO ENTER AN ATMOSPHERE CONTAINING CARBON DIOXIDE WITHOUT USING SUITABLE SELF CONTAINED BREATHING APPARATUS.

#### Fire fighting

(see reverse side also)

Carbon dioxide is not flammable and no special fire fighting precautions or equipment are needed. (In fact many fire extinguishers contain carbon dioxide as the extinguishing medium.)

# Safe handling and storage of gas cylinders

The following practices are recommended for the safe handling and storage of high pressure, dissolved and liquefied gases. Additional precautions may be necessary depending upon the category to which the gas belongs (flammable, oxidant, or inert), the individual properties of the gas and the process in which it is used.

## GENERAL

- 1 Only experienced and properly instructed persons should handle compressed gases.
- 2 Observe all regulations and local requirements regarding use and storage of cylinders.
- 3 Do not remove or deface labels provided by the supplier.
- 4 Ascertain the identity of the gas before using it.
- 5 Know and understand the properties and hazards associated with each gas before using it.
- 6 Before using gases, be aware of any plans to cover any emergency situations that might arise.
- 7 When doubt exists as to the correct handling procedure for a particular gas the supplier should be contacted.

## HANDLING AND USE

- 1 Wear stout gloves.
- 2 Never lift a cylinder by the cap or guard, unless supplier states it is designed for that purpose.
- 3 Use a cylinder trolley or other suitable device for transporting cylinders, even for a short distance.
- 4 Leave valve protection caps/guards in place until the cylinder has been secured against either a wall or bench or placed in a cylinder stand and is ready for use.
- 5 Where leaks are suspected apply soap solution. Bubbling shows up leaks.
- 6 Employ suitable pressure regulating devices on all cylinders when the gas is being supplied to systems with a lower pressure rating than that of the cylinder.
- 7 Before connecting the cylinder for use ensure that back feed from the system into the cylinder is prevented.
- 8 Open cylinder valves slowly.
- 9 Never use direct flame or electrical heating devices to raise the pressure of a cylinder.
- 10 Never attempt to transfer gases from one cylinder to another.
- 11 Do not use cylinders as rollers or supports.
- 12 Keep cylinder valve outlets clean and free from contaminants particularly oil and dirt.
- 13 Do not subject cylinders to abnormal mechanical shocks which may cause damage to their shell or valve.
- 14 Never attempt to repair or modify cylinders, cylinder valves or safety relief devices! Any

damage should be made known to the supplier.

- 15 Close cylinder valve whenever cylinder is not in use, even if cylinder is still connected to equipment or is empty.
- 16 Replace outlet caps or plugs and cylinder caps, where supplied, as soon as cylinder is disconnected from equipment.

## DAMAGED CYLINDERS

Should any gas cylinder be damaged in service, it should be clearly identified and be returned to the supplier. On no account should repairs be attempted or evidence of damage be concealed, since this may result in subsequent failure with possible injury to other persons.

## STORAGE

- 1 Cylinders should be stored in a dedicated area which should be well ventilated.
- 2 Store cylinders in location free from fire risk and away from sources of heat and ignition.
- 3 The cylinder storage area should be kept clear and access should be restricted to authorised persons only. The area should be clearly marked as a cylinder store and appropriate hazard warning signs displayed (e.g. flammable).
- 4 Smoking and the use of naked flames either inside or in the vicinity of the cylinder storage area should be prohibited.
- 5 Where cylinders are so designed they should be stored in the vertical position. The cylinder valves should be tightly closed and where appropriate valve outlets should be capped or plugged. Cylinder valve guards or caps should be in place.
- 6 Store full and empty cylinders separately.
- 7 In the storage area cylinders for different gases should be separated.
- 8 Cylinders held in storage should be periodically checked for general condition and leakage.

## ACTION IN THE EVENT OF FIRE

- 1 In general vacate area and remove cylinders from area of fire, if safe to do so.
- 2 If cylinders cannot be moved and fire cannot be immediately extinguished, keep adjacent cylinders cool with water hosed from a safe distance.
- 3 Call fire brigade and inform them of the potential danger of exploding and rocketing cylinders.
- 4 Clearly mark any cylinder exposed to a fire and inform the supplier.

Further information concerning specific problems arising from the storage and handling of gases, hazards and first aid treatment, can be obtained from the supplier.

# Nitrous Oxide, Compressed, (N<sub>2</sub>O)

GASES GROUP	
M.S.D.S. No.	0 7 2
DATE	9/93
ISSUE/REV	C/0
PAGE 1 OF 4	

## COMPANY DETAILS

**Company:** The Commonwealth Industrial Gases Limited  
**Address:** A.C.N. 000 029 729  
 799 Pacific Highway, Chatswood, NSW 2067  
**Telephone Number:** (02) 936 3666  
**Emergency Telephone Number:** Refer to State Branch contacts on Page 4

## IDENTIFICATION

**Product Name:** Nitrous Oxide, Compressed    **UN Number:** 1070  
**Manufacturer's Product Code:**    **Hazchem Code:** 2R  
 621 (Instrument Grade)  
 620 (NITROSOL™ - Food Grade)  
 624 (Engine Boosting Grade)  
**Dangerous Goods Class and Sub-risk:** 2.2, 5.1  
**Other Names:**    **Poisons Schedule:** Not applicable except for therapeutic use.  
 NITROSOL™ - Food Grade Nitrous Oxide.

**Use:**    **Transport E.P.G.Card:** 2C8  
 Instrument grade Nitrous Oxide is used as a combustion support gas (oxidant) in atomic absorption spectrophotometers. NITROSOL™ Food Grade is used for food applicants such as cream whipping. Engine Boosting Grade is supplied under special regulations for motor sport applications.

## Physical Description/Properties

**Appearance/Odour:**    **Critical Temperature (°C):** 36.4  
 Colourless. Sweetish odour  
**Boiling Point (°C):** -88.5    **Critical Pressure (kPa)** 7254  
**Vapour Pressure (kPa at 25°C):** 5700    **Flammability Limits:** Non Flammable  
    but vigorously supports combustion  
**Relative Density (25°C, 101.3kPa)**  
    (Air = 1): 1.53    **Solubility in Water (101.325kPa, 20°C):**  
    slightly 0.68L/L

## Ingredients:

Chemical Entity:	Cas No:	Proportion:
Nitrous Oxide (Instrumental Grade)	10024-97-2	>99.5% (liq.phase)
NITROSOL™ (Food Grade)	10024-97-2	>99.0% (liq.phase)
Nitrous Oxide (Engine Boosting Grade)	10024-97-2	>99.0% (liq.phase)



# Nitrous Oxide, Compressed, (N<sub>2</sub>O)

GASES GROUP	
M.S.D.S. No.	072
DATE	9/93
ISSUE/REV	C/0
PAGE 2 OF 4	

## HEALTH HAZARD INFORMATION

### Health Effects:

#### Acute:

#### Toxicity:

Non-toxic and non-irritating. An anaesthetic in raised concentration. Without oxygen Nitrous Oxide acts as a simple asphyxiant and can cause death. Epidemiological studies indicate that there is an increased risk of spontaneous abortion and low birth weight of off-spring in female workers employed in operating theatres and dental surgeries.

#### Symptoms:

Inhalation of small amounts of Nitrous Oxide may produce euphoria. Larger doses mixed with air or oxygen induce anaesthesia. High concentrations without sufficient oxygen can lead to asphyxia and quick death.

#### Swallowed:

Not Applicable

#### Eye:

Eye contact with cold liquid can result in frostbite or cryogenic "burns".

#### Skin:

Cold liquid can cause frostbite, as can expanding high pressure liquefied gas.

#### Inhaled:

Anaesthetic/asphyxiant in high concentrations.

#### Chronic:

Possible embryofetal toxicity.

#### Advice to Doctor:

Treatment for asphyxia and cryogenic burns.

### First Aid:

Rescue personnel should be aware of severe fire hazards in Nitrous Oxide atmosphere and should wear self contained apparatus. Remove patient to uncontaminated area.

#### Swallowed:

Not Applicable

#### Eye:

Keep patient calm. Irrigate with gentle flow of water for 15 to 20 minutes bathing entire eyeball (hold eyelids apart). Urgently seek eye specialist attention.

#### Skin:

**COLD BURNS:** Irrigate affected area with tepid water (30-35°C) if available for 15 to 30 minutes. Apply sterile dry dressing and treat as thermal burn. If large areas or limbs involved immerse affected area in tepid water for 15 to 30 minutes. If tepid water unavailable use tap water. Do not apply any form of direct heat. Seek medical attention. Summon ambulance; recommend admission to hospital for observation.

#### Inhaled:

Persons should be moved to uncontaminated area & breathe fresh air. If breathing has ceased, give artificial respiration immediately, preferably using an oxygen resuscitator if available.

#### First Aid Facilities:

Air/Oxy viva. Tepid water for irrigation.

## PRECAUTIONS FOR USE

### Exposure Standards:

TLV-TWA 25ppm.

### Ventilation:

Gas is heavier than air especially if cold. Provide general and local exhaust ventilation to meet TLV requirements. Do not store or use Nitrous Oxide near any combustion source or flammable gases.

### Engineering Controls:

Equipment must be oil and grease free and cleaned to "oxygen" standards. Always use a regulator to reduce pressure or ensure only approved pressure rated equipment is used. Never trap liquified N<sub>2</sub>O in lines unprotected by safety valves. Open cylinder valve slowly and close when not in use. Secure cylinder at all times especially when in use. Do not withdraw gas at such a rate as to cause regulator or cylinder icing. Ensure cylinder cannot be back contaminated as this can be hazardous. See Material Compatibility later.

### Flammability:

Non flammable but vigorously accelerates combustion, do not smoke. Store away from flammable material and poisons.

### Personal Protection:

Only experienced and properly instructed people should use this gas. Avoid contact with high pressure gas or cold liquid. Wear safety glasses, use leather/plastic gloves, wear overalls and safety footwear when handling cylinders. Never lubricate or permit oil, grease, fibres or other combustible substance to come in contact with Nitrous Oxide. Do not smoke in close proximity to Nitrous Oxide. For gas withdrawal use cylinder upright. Nitrous Oxide presents a low temperature hazard and should not be allowed to contact the skin or clothing.



# Nitrous Oxide, Compressed, (N<sub>2</sub>O)

GASES GROUP	
M.S.D.S. No.	072
DATE	9/93
ISSUE/REV	C/0
PAGE 3 OF 4	

## SAFE HANDLING INFORMATION

### Storage and Transport:

Store and transport in accordance with Dangerous Goods Legislation. Site Dangerous Goods Licence may be required for larger quantities. Do not store near flammable gases or liquids, combustible materials or poisons. Compressed - high pressure gas in cylinders. Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from areas of heavy traffic and emergency exits. Do not allow the temperature where cylinders are stored to exceed 45°C. Cylinders should be transported, stored and used upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system.

Transport on an open vehicle or ensure well ventilated and separated from driver.

### Fire/Explosion Hazard:

Vigorously accelerates combustion. Do not smoke. High pressure gas. Shut off supply if possible and safe to do so. Call Fire Brigade. Cool cylinders with water from a protected location. Do not approach cylinders suspected to be hot. Remove cool cylinders from the path of the fire. If unable to keep containers cool, evacuate area. Danger of exploding cylinders. Nitrous Oxide can decompose explosively at high temperatures.

### Leaks:

Always ensure regulator is used to regulate pressure to downstream system pressure rating. System leak checking may be done by a pressure drop test or by using soapy water. High pressure leaks can usually be heard. Isolate cylinder, remove pressure and purge lines before attempting to repair system leaks. If cylinder is leaking, shut valve if possible and safe to do so. Disconnect from system and move to a well ventilated remote area preferably outdoors and allow to vent. Inform CIG and notify emergency services if required. Never attempt to repair a leaking or damaged cylinder valve, which can be hazardous. No smoking or naked lights.

### Disposals:

Return cylinders to CIG for proper disposal.

In an emergency, cylinders may be allowed to vent slowly in a well ventilated open area.

## OTHER INFORMATION

### Cylinder Colour:

Ultramarine (B21)

**Note:** Engine Boosting Grade - Gas code 624, also has a "red band" at base of cylinder and black educator tube stripes indicating liquid withdrawal.

### Cylinder Valve Outlet:

AS2473 Type 30 (0.860"-14TP1-BWS-RH-Ext)

### Material Compatibility:

Use only materials which have been fully degreased to "oxygen standards". Rust and scale can cause ignitions with N<sub>2</sub>O. Recommended materials are copper alloys or stainless steel. Most lubricants are NOT compatible. Use only Oxygen approved products.

# Nitrous Oxide, Compressed, (N<sub>2</sub>O)

GASES GROUP	
M.S.D.S. No.	0 7 2
DATE	9/93
ISSUE/REV	C/0
PAGE 4 OF 4	

## For Further Information Contact Your Nearest CIG Centre:

Sydney:	(02) 689 4800 (B/Hrs) (008) 04 4149 (A/Hrs)	Brisbane:	(07) 212 4222 (B/Hrs) (07) 277 6520 (A/Hrs)
Melbourne:	(03) 287 8444 (B/Hrs) (03) 287 8487 (A/Hrs)	Townsville:	(077) 20 7890 (B/Hrs) (077) 79 1168 (A/Hrs)
Adelaide:	(08) 354 9111 (B/Hrs) (08) 354 9112 (A/Hrs)	Darwin:	(089) 84 3811 (B/Hrs) (089) 84 3430 (A/Hrs)
Perth:	(09) 381 0444 (B/Hrs) (09) 419 2114 (A/Hrs)	Hobart:	(002) 30 9400 (B/Hrs) (002) 34 2333 (A/Hrs)

## Contact Point:

Technical Manager: (02) 936 3702 (B/Hrs)  
(02) 936 3725 (B/Hrs)

# IDENTIFICATION MARKS ON TYPICAL CYLINDER NECKS



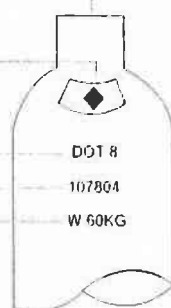
Cylinder Specification: BS 5045/1/CM  
 Serial Number: A 41078 V 50L  
 Test Date: 5-96 TW 68.2KG  
 Fill Pressure: 200 BAR TP300 BAR



Test Date (on Aluminium Ring)



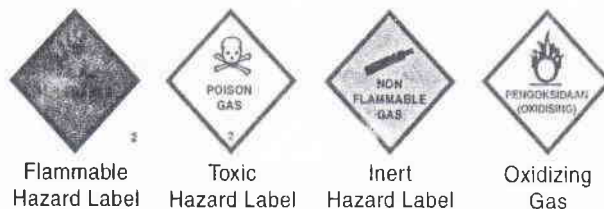
Cylinder Specification: DOT 8  
 Serial Number: 107804  
 Tare Weight: W 60KG



CYLINDER GASES CONTENT REFERENCE CHART

TYPE OF GAS	NOMINAL WATER CAPACITY (litres)	SETTLED PRESSURE (psig)	STANDARD VOLUME
OXYGEN (industrial)	47	2180	7.2 m3
	49	2460	8.4 m3
	50	3100	10.7 m3
Nitrogen / OFN	47	2100	6.3 m3
	50	2450	7.7 m3
	50	3070	9.6 m3
Air (industrial)	47	2080	6.4 m3
Argon	47	2180	7.1 m3
	50	2460	8.5 m3
	50	3080	10.7 m3
Argoshield	50	2900	11.0 m3
Stainshield	50	2900	10.0 m3
Alushield	50	2900	9.0 m3
Carbon Dioxide Food Grade CO2	41	-	25 kg
	47	-	30 kg
	50	-	33 kg
Hydrogen	47	2070	6.1 m3
	50	2450	7.2 m3

INFO GATHERED WITH CARE AND KNOWLEDGE AVAILABLE ON THE DATE OF ISSUE. MOX WARRANTIES IS EXCLUDED. MOX RESPONSIBILITY DOES NOT SUBSTITUTE USERS' RESPONSIBILITY.



This colour codes are a guide only, the full chemical name are shown on cylinder shoulder labels.  
 The colour numbers shown correspond to BS 381C.  
 This colour code conforms to Malaysian Standard MS 1023; 1986.

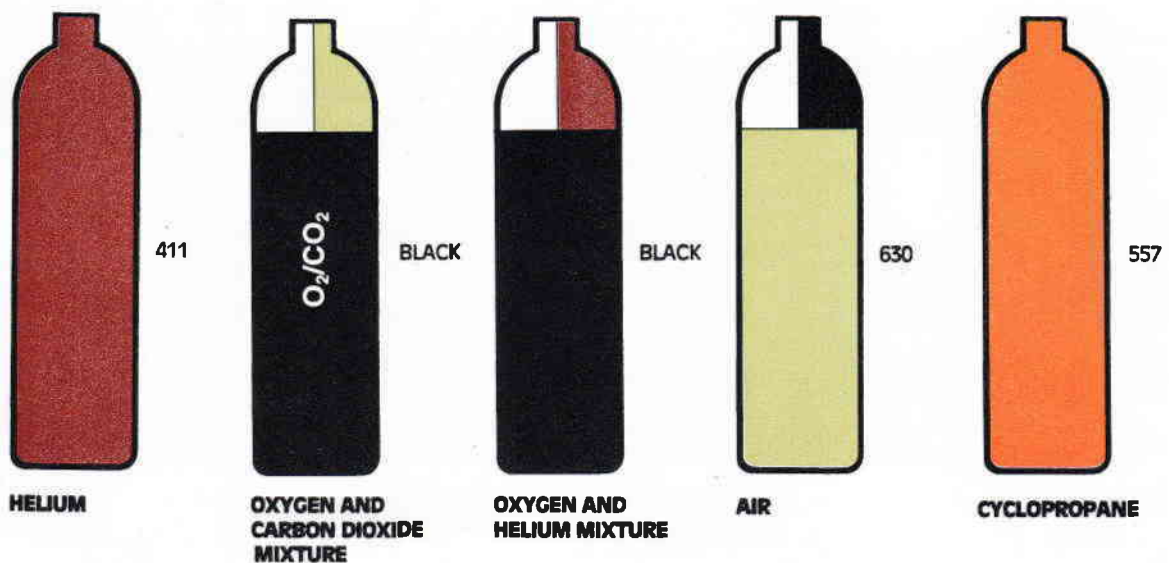
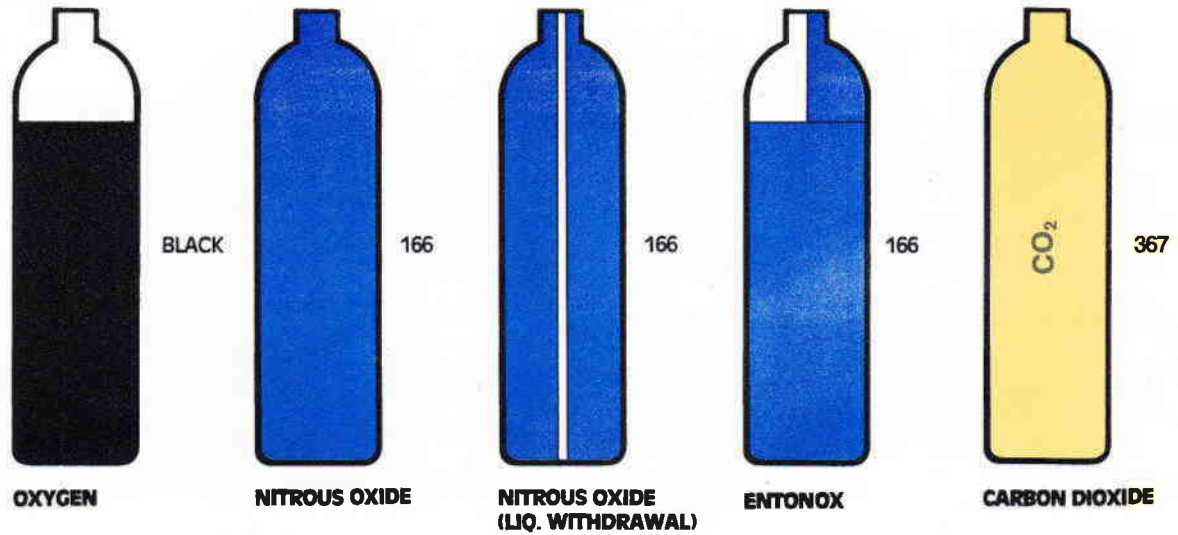


## MALAYSIAN OXYGEN BERHAD(3928-D)

(Incorporated in Malaysia)

HEAD OFFICE : 13 JALAN 222, 46100 PETALING JAYA, SELANGOR, MALAYSIA  
 POSTAL ADDRESS : P.O. BOX 10633, 50720 KUALA LUMPUR, MALAYSIA  
 TEL NO : 03-79554233 CUSTOMER SERVICE TEL NO. 1-800-388388  
 FAX NO : 03-79566389 CUSTOMER SERVICE FAX NO. 1-800-388288  
 E-MAIL : ncsc.mox@mox.boc.com  
 : www.mox.com.my

# MEDICAL CYLINDER IDENTIFICATION COLOURS



**MALAYSIAN OXYGEN BERHAD (3928-D)**  
(Incorporated in Malaysia)

No. 13, Jalan 222, 46100 Petaling Jaya, Selangor Darul Ehsan,  
P.O. Box 10633, 50720 Kuala Lumpur,  
Tel: 7554233 Fax: (03) 7566389

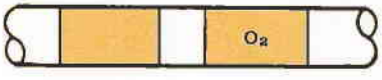







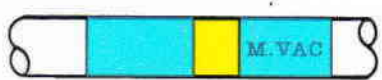
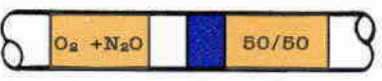






The colour codes are a guide only, the full chemical names are shown on cylinder shoulder labels.  
The numbers shown correspond to BS 381C colours.





# Colour Code Identification for Medical Gas Pipe Installations

ID/TDS/1/0788

Pipe installation	Medical gas cylinder end colour	Pipe installation	Medical gas cylinder end colour
<b>Oxygen</b>			
		<b>Medical Air</b>	
			
			
<b>Nitrous Oxide</b>			
		<b>Medical Vacuum</b>	
			
<b>O<sub>2</sub> + N<sub>2</sub>O Mixture (Entonox/BOC Trade Name)</b>			
		<b>Spare Medical Gas</b>	
			
<b>Carbon Dioxide</b>			
		<b>Exhaust</b>	
			
<b>Pathology</b>			
Medical Vacuum for Pathology use			
		<b>Anaesthetic Gas Scavenging</b>	
			
All pathology services identified by additional terracotta band			

Base colours as follows:



BS 4800  
12 B 21



BS 381 C  
309



BS 4800  
00 E 53



BS 4800  
20 E 51



BS 4800  
20 D 45



BS 4800  
00 E 55



BS 4800  
08 C 35

The 'H' Symbol, the words Ohmeda, BOC Health Care, Entonox and the majority of other product names displayed herein are BOC Group Trade Marks. The right is reserved to change the specification of the items described herein at any time. BOC Health Care. The technical data contained in this document is accurate at the time of printing, but is subject to change. You should contact Ohmeda Steaveley offices for confirmation of the continuing accuracy of the data and details of any changes.



**MALAYSIAN OXYGEN BERHAD (3928-D)**  
(Incorporated in Malaysia)

No. 13, Jalan 222, 46100 Petaling Jaya, Selangor Darul Ehsan.  
P.O. Box 10633, 50720 Kuala Lumpur.  
Tel: 7554233 Fax: (03) 7566389