

SAFETY DATA SHEET

Product Name **5 COMPONENT MIXTURE (O2, CO, CO2, N2, BALANCE H2)**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name BOC LIMITED (AUSTRALIA)
Address 10 Julius Avenue, North Ryde, NSW, AUSTRALIA, 2113
Telephone 131 262, (02) 8874 4400
Fax 132 427 (24 hours)
Emergency 1800 653 572 (24/7) (Australia only)
Web Site <http://www.boc.com.au/>
Synonym(s) PRODUCT CODE: 288 • SPECIAL GAS MIXTURE
Use(s) CALIBRATION • INDUSTRIAL APPLICATIONS
SDS Date 03 Sep 2010

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R11 Highly flammable.
R20 Harmful by inhalation.

SAFETY PHRASES

S7/9 Keep container tightly closed and in a well ventilated place.
S44 If you feel unwell, contact a doctor or Poisons Information Centre immediately (show label where possible).

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No. 1954 **DG Class** 2.1 **Subsidiary Risk(s)** None Allocated
Packing Group None Allocated **Hazchem Code** 2SE

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
HYDROGEN	H2	1333-74-0	60%
CARBON MONOXIDE	C-O	630-08-0	3%
OXYGEN	O2	7782-44-7	1%
NITROGEN	N2	7727-37-9	30%
CARBON DIOXIDE	CO2	124-38-9	6%

4. FIRST AID MEASURES

Eye	None required.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor.
Skin	None required.
Ingestion	Due to product form and application, ingestion is considered unlikely.
Advice to Doctor	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flammability	Highly flammable. Product will add fuel to a fire. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.
Fire and Explosion	Temperatures in a fire may cause cylinders to rupture and internal pressure relief devices to be activated. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot. This material is capable of forming explosive mixtures with air.
Extinguishing	Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. If the gas source cannot be isolated, do not extinguish the flame, since re-ignition and explosion could occur. Await arrival of emergency services or manufacturer's advisor. Drench and cool cylinders with water spray from protected area at a safe distance. If it is absolutely necessary to extinguish the flame, use only a dry chemical powder extinguisher. Do not move cylinders for at least 24 hours. Avoid shock and bumps to cylinders.
Hazchem Code	2SE

6. ACCIDENTAL RELEASE MEASURES

Spillage	If the cylinder is leaking, eliminate all potential ignition sources and evacuate area of personnel. Prevent spreading of vapours through drains and ventilation systems. Inform manufacturer/supplier of leak. Use personal protective equipment. Carefully move material to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder safety devices.
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7. STORAGE AND HANDLING

Storage	Do not store near sources of ignition or incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.
Handling	Use of safe work practices are recommended to avoid inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Std

Ingredient	Reference	TWA		STEL	
Carbon dioxide	SWA (AUS)	5000 ppm	9000 mg/m3	30000 ppm	54000 mg/m3
Carbon dioxide in coal mines	SWA (AUS)	12500 ppm	22500 mg/m3	30000 ppm	54000 mg/m3
Carbon monoxide	SWA (AUS)	30 ppm	34 mg/m3	--	--
Hydrogen	SWA (AUS)	Asphyxiant			
Nitrogen	SWA (AUS)	Asphyxiant			

Biological Limits

Ingredient	Reference	Determinant	Sampling Time	BEI
CARBON MONOXIDE	ACGIH BEI	Carboxyhemoglobin in blood	End of shift	3.5% of hemoglobin
	ACGIH BEI	Carbon monoxide in end-exhaled air	End of shift	20 ppm

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Provide suitable ventilation to minimise or eliminate exposure. Confined areas (eg. tanks) should be adequately ventilated or gas tested. Maintain vapour levels below the recommended exposure standard.

PPE

Wear safety boots, leather gloves and safety glasses. Where an inhalation risk exists, wear: self Contained Breathing Apparatus (SCBA) or an Air-line respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	COLOURLESS GAS	Solubility (water)	0.018 cm ³ /cm ³ (Hydrogen)
Odour	ODOURLESS	Specific Gravity	NOT APPLICABLE
pH	NOT APPLICABLE	% Volatiles	100 %
Vapour Pressure	NOT AVAILABLE	Flammability	HIGHLY FLAMMABLE
Vapour Density	NOT AVAILABLE	Flash Point	NOT AVAILABLE
Boiling Point	NOT AVAILABLE	Upper Explosion Limit	75 % (Hydrogen)
Melting Point	NOT AVAILABLE	Lower Explosion Limit	4 % (Hydrogen)
Evaporation Rate	NOT APPLICABLE		
Autoignition Temperature	571°C (Hydrogen)	Cylinder Pressure	13000 kPa @ 15°C

10. STABILITY AND REACTIVITY

Chemical Stability Stable under recommended conditions of storage.

Conditions to Avoid Avoid heat, sparks, open flames and other ignition sources.

Material to Avoid Incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), heat and ignition sources. Do not use natural rubber flexible hoses. Also incompatible (potentially violently) with oxygen, halogens and metal halides. Dust of aluminium, chrome, manganese may ignite then explode when heated in carbon dioxide. Incompatible with acrylaldehyde, aziridine, metal acetylides, sodium peroxide. Carbon monoxide can react with iron, nickel and other metals to form highly toxic carbonyls. Reacts violent with oxygen difluoride, chlorine, barium peroxide. Carbon monoxides can cause stress corrosion cracking in steels especially if other acid gases (eg. carbon dioxide, sulphur compounds) are present. Below 3500 kPa corrosion is negligible and common metals can be used. Carbon dioxide is corrosive when moist.

Hazardous Decomposition Products This material will not decompose to form hazardous products other than that already present.

Hazardous Reactions Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary Asphyxiant gas. Symptoms of exposure are directly related to displacement of oxygen. As the amount of oxygen inhaled is reduced from 21-14% volume, the pulse rate may accelerate and the rate and volume of breathing may increase. The ability to maintain attention and think clearly is diminished, muscular co-ordination is somewhat disturbed. As oxygen decreases from 14-10% volume, judgement becomes faulty, severe injuries may result in no pain. Muscular effort may lead to rapid fatigue. Further reduction to 6% may result in nausea and vomiting. Ability to move may be lost. Permanent brain damage may result even after resuscitation from exposure to this low level of oxygen. Below 6% breathing is in gasps and convulsions may occur. Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death may follow in minutes.

Eye Non irritant.

Inhalation Asphyxiant. Effects are proportional to oxygen displacement.

Skin Non irritant.

Ingestion Ingestion is considered unlikely due to product form.

Toxicity Data
CARBON MONOXIDE (630-08-0)
LC50 (Inhalation): 1807 ppm/4H (rat)
LCLo (Inhalation): 5000 ppm/5M (human)
CARBON DIOXIDE (124-38-9)
LC50 (Inhalation): 470000 ppm/30M (rat)
LCLo (Inhalation): 9 pph/5M (human)

12. ECOLOGICAL INFORMATION

Environment No known ecological damage is caused by this product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Cylinders should be returned to the manufacturer or supplier for disposal of contents.

Legislation Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.



CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

Shipping Name COMPRESSED GAS, FLAMMABLE, N.O.S.

UN No. 1954 **DG Class** 2.1 **Subsidiary Risk(s)** None Allocated

Packing Group None Allocated **Hazchem Code** 2SE **GTEPG** 2A1

15. REGULATORY INFORMATION

Poison Schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

AICS All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Additional Information The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

APPLICATION METHOD: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

ABBREVIATIONS:

ACGIH - American Conference of Industrial Hygienists.

ADG - Australian Dangerous Goods.

BEI - Biological Exposure Indice(s).

CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.

CNS - Central Nervous System.

EC No - European Community Number.

HSNO - Hazardous Substances and New Organisms.

IARC - International Agency for Research on Cancer.

mg/m3 - Milligrams per Cubic Metre.

NOS - Not Otherwise Specified.

pH - relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).

ppm - Parts Per Million.

RTECS - Registry of Toxic Effects of Chemical Substances.

STEL - Short Term Exposure Limit.

SWA - Safe Work Australia.

TWA - Time Weighted Average.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a Chem Alert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this Chem Alert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the

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availability of engineering controls should be considered before final selection of personal protective equipment is made.

Report Status This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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End of Report