

SAFETY DATA SHEET

1071

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

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier name **BOC LIMITED (AUSTRALIA)**
Address 10 Julius Avenue, North Ryde, NSW, 2113, AUSTRALIA
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) 1071 - MSDS NUMBER • PRODUCT CODES: 285, 288 • SPECIAL GAS MIXTURE
Use(s) CALIBRATION • INDUSTRIAL APPLICATIONS
SDS date 01 February 2013

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R20 Harmful by inhalation.
R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R61 May cause harm to the unborn child.

SAFETY PHRASES

S45 In case of accident or if you feel unwell seek medical advice immediately (show the label where possible).
S53 Avoid exposure - obtain special instructions before use.

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

UN number	1956	DG division	2.2
Packing group	None Allocated	Subsidiary risk(s)	None Allocated
Hazchem code	2TE		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
CARBON MONOXIDE	CAS: 630-08-0 EC: 211-128-3	T;R23 Repr.;R61 T;R48/23 F+;R12	3 to 4%
HYDROGEN	CAS: 1333-74-0 EC: 215-605-7	F+;R12	0.25 to 0.5%
NITROGEN	CAS: 7727-37-9 EC: 231-783-9	Not Available	12 to 16%
CARBON DIOXIDE	CAS: 124-38-9 EC: 204-696-9	Not Available	6 to 8%
HELIUM	CAS: 7440-59-7 EC: 231-168-5	Not Available	Remainder

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	Hyperbaric oxygen treatment at 2 to 2.5 atmospheres reduces the biological half life of carboxyhaemoglobin to 24 minutes. Avoid stimulant drugs including carbon dioxide. Do not inject methylene blue. Absolute bed rest for at least 48 hours should be ensured. After recovery observe for late neurological and/or cardiac complaints. Carboxyhaemoglobin levels in blood used as biological monitoring index.

5. FIRE FIGHTING MEASURES

Flammability	Non flammable.
Fire and explosion	Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool. Do not approach cylinders or containers suspected of being hot.
Extinguishing	Use water fog to cool containers from protected area.
Hazchem code	2TE 2 Water Fog (or fine water spray if fog unavailable) T Self Contained Breathing apparatus and protective gloves. E Evacuation of people in the vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use personal protective equipment as detailed in Section 8 of this SDS.
Environmental precautions	Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Methods of cleaning up	Carefully move material to a well ventilated remote area, then allow to discharge if safe to do so. Do not attempt to repair leaking valve or cylinder safety devices.
References	See Sections 8 and 13 for exposure controls and disposal.

7. STORAGE AND HANDLING

Storage	Do not store near 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 standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m ³	ppm	mg/m ³
Carbon dioxide	SWA (AUS)	5000	9000	30000	54000
Carbon dioxide in coal mines	SWA (AUS)	12500	22500	30000	54000
Carbon monoxide	SWA (AUS)	30	34	--	--
Helium	SWA (AUS)	Asphyxiant			
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

Engineering controls

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

Eye / Face

Wear safety glasses.

Hands

Wear leather gloves.

Body

Wear safety boots.

Respiratory

Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	COLOURLESS GAS
Odour	ODOURLESS
Flammability	NON FLAMMABLE
Flash point	NOT RELEVANT
Boiling point	NOT AVAILABLE
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	NOT AVAILABLE
Specific gravity	NOT APPLICABLE
Solubility (water)	0.035 L/L (Carbon monoxide)
Vapour pressure	NOT AVAILABLE
Upper explosion limit	NOT RELEVANT
Lower explosion limit	NOT RELEVANT
Cylinder pressure (when full)	13000 kPa @ 15°C
% Volatiles	100 %

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended conditions of storage.

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Conditions to avoid	Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.
Material to avoid	Carbon monoxide can react with iron, nickel and other metals. Below 3,500 kPa corrosion is negligible and common materials can be used. Incompatible with acrylaldehyde, aziridine, sodium peroxide. Corrosive when moist.
Hazardous Decomposition Products	May evolve toxic gases if heated to decomposition.
Hazardous Reactions	Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Asphyxiant gas - toxic. Carbon monoxide effects depend on the percentage of carboxyhaemoglobin: 10-20% mild headache and breathlessness on mild exertion; 20-30% headache, irritability, rapid fatigue and impaired memory; 30-40% severe headache, weakness, nausea, vomiting, dizziness, visual impairment and confusion; 40-50% increasing confusion, ataxia and collapse; 50-60% coma; >80% rapid death. Chronic exposure to carbon monoxide may result in an increase in cardiovascular problems. Can aggravate some diseases of the cardiovascular system such as coronary artery disease. The effect is enhanced by cigarette smoking. Adverse behavioural effects have been noted including impairment of vigilance, co-ordination, timing, behaviour, visual perception and certain cognitive functions. Some adaptation occurs in individuals repeatedly exposed to moderate concentrations. Developmental defects on fetuses can occur without maternal symptoms. Carbon dioxide is the body's regulator of the breathing function. It is normally present in the air at a concentration of 340 ppm by volume. An increase above this level may result in accelerated breathing and heart rate. Adverse health affects of long term exposure to carbon dioxide have not been reported. However, in environments such as submarines where exposure to levels of 0.5-1.0% may occur, specialist medical opinion should be sought on the effects of long term exposure.								
Eye	Non irritant.								
Inhalation	Toxic. Over exposure to carbon monoxide may result in rapid breathing, nausea, lack of coordination, unconsciousness and coma. Reacts with blood haemoglobin to prevent oxygen uptake.								
Skin	Non irritant.								
Ingestion	Ingestion is considered unlikely due to product form.								
Toxicity data	CARBON MONOXIDE (630-08-0)<table><tr><td>LC50 (inhalation)</td><td>1807 ppm/4H (rat)</td></tr><tr><td>LCLo (inhalation)</td><td>5000 ppm/5M (human)</td></tr></table> CARBON DIOXIDE (124-38-9)<table><tr><td>LC50 (inhalation)</td><td>470000 ppm/30M (rat)</td></tr><tr><td>LCLo (inhalation)</td><td>9 pph/5M (human)</td></tr></table>	LC50 (inhalation)	1807 ppm/4H (rat)	LCLo (inhalation)	5000 ppm/5M (human)	LC50 (inhalation)	470000 ppm/30M (rat)	LCLo (inhalation)	9 pph/5M (human)
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12. ECOLOGICAL INFORMATION

Toxicity	No information provided.
Persistence and degradability	No information provided.
Bioaccumulative potential	No information provided.
Mobility in soil	No information provided.
Other adverse effects	When discharged to the atmosphere, carbon dioxide may contribute to the greenhouse effect. Carbon monoxide is slowly oxidised in the atmosphere to carbon dioxide.

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

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



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
UN number	1956	-	-
Proper shipping name	COMPRESSED GAS, N.O.S.	-	-
DG class/ Division	2.2	-	-
Subsidiary risk(s)	None Allocated	-	-
Packing group	None Allocated	-	-
GTEPG	2C1		
Hazchem code	2TE		
Other information	Ensure cylinder is separated from driver and that outlet of relief device is not obstructed. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.		

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 Medicines and Poisons (SUSMP)
Inventory Listing(s)	AUSTRALIA: AICS (Australian Inventory of Chemical Substances) All components are listed on AICS, or are exempt.

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. RESPIRATORS: In general the use of respirators should be limited and engineering controls employed to avoid exposure. If respiratory equipment must be worn ensure correct respirator selection and training is undertaken. Remember that some respirators may be extremely uncomfortable when used for long periods. The use of air powered or air supplied respirators should be considered where prolonged or repeated use is necessary. PERSONAL PROTECTIVE EQUIPMENT GUIDELINES: The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made. 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 ChemAlert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.
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Abbreviations	ACGIH	American Conference of Governmental Industrial Hygienists
	CAS #	Chemical Abstract Service number - used to uniquely identify chemical compounds
	CNS	Central Nervous System
	EC No.	EC No - European Community Number
	GHS	Globally Harmonized System
	IARC	International Agency for Research on Cancer
	LD50	Lethal Dose, 50% / Median Lethal Dose
	mg/m ³	Milligrams per Cubic Metre
	PEL	Permissible Exposure Limit
	pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
	ppm	Parts Per Million
	REACH	Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals
	STOT-RE	Specific target organ toxicity (repeated exposure)
	STOT-SE	Specific target organ toxicity (single exposure)
	SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
	TLV	Threshold Limit Value
	TWA/OEL	Time Weighted Average or Occupational Exposure Limit

Revision history

Revision	Description
2.0	Standard SDS Review.
1.0	Initial SDS creation

Report status

This document has been compiled by RMT on behalf of the manufacturer, importer or supplier of the product and serves as their Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer, importer or supplier 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, importer or supplier.

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 SDS