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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 1.1 Product identifier

**Product name** 4 COMPONENT MIXTURE (NO, CO, CO<sub>2</sub>, BALANCE NITROGEN)  
**Synonym(s)** 2918 - SDS NUMBER • SPECIAL GAS MIXTURE

### 1.2 Uses and uses advised against

**Use(s)** CALIBRATION

### 1.3 Details of the supplier of the product

**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)  
**Website** <http://www.boc.com.au>

### 1.4 Emergency telephone number(s)

**Emergency** 1800 653 572 (24/7) (Australia only)

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## 2. HAZARDS IDENTIFICATION

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### 2.1 Classification of the substance or mixture

CLASSIFIED AS HAZARDOUS ACCORDING TO AUSTRALIAN WHS REGULATIONS

**GHS classification(s)** Gases Under Pressure: Compressed gas  
Acute Toxicity: Inhalation: Category 4  
Toxic to Reproduction: Category 1A  
Specific Target Organ Systemic Toxicity (Repeated Exposure): Category 1

### 2.2 Label elements

**Signal word** DANGER

**Pictogram(s)**



### Hazard statement(s)

H280 Contains gas under pressure; may explode if heated.  
H332 Harmful if inhaled.  
H360 May damage fertility or the unborn child.  
H372 Causes damage to organs through prolonged or repeated exposure.

### Prevention statement(s)

P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
P260 Do not breathe dust/fume/gas/mist/vapours/spray.  
P264 Wash thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P271 Use only outdoors or in a well-ventilated area.  
P281 Use personal protective equipment as required.

**PRODUCT NAME 4 COMPONENT MIXTURE (NO, CO, CO2, BALANCE NITROGEN)****Response statement(s)**

P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

**Storage statement(s)**

P405 Store locked up.  
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

**Disposal statement(s)**

P501 Dispose of contents/container in accordance with relevant regulations.

**2.3 Other hazards**

No information provided.

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**3. COMPOSITION/ INFORMATION ON INGREDIENTS**

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**3.1 Substances / Mixtures**

Ingredient	CAS Number	EC Number	Content (v/v)
CARBON MONOXIDE	630-08-0	211-128-3	10%
NITRIC OXIDE	10102-43-9	233-271-0	0.25%
NITROGEN	7727-37-9	231-783-9	Remainder
CARBON DIOXIDE	124-38-9	204-696-9	20%

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**4. FIRST AID MEASURES**

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**4.1 Description of 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** Ingestion is not considered a potential route of exposure.  
**First aid facilities** No information provided.

**4.2 Most important symptoms and effects, both acute and delayed**

See Section 11 for more detailed information on health effects and symptoms.

**4.3 Immediate medical attention and special treatment needed**

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**5.1 Extinguishing media**

Use water fog to cool containers from protected area.

**5.2 Special hazards arising from the substance or mixture**

Non flammable.

**5.3 Advice for firefighters**

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.

**5.4 Hazchem code**

2TE  
2 Fine Water Spray.  
T Wear full fire kit and breathing apparatus. Dilute spill and run-off.  
E Evacuation of people in and around the immediate vicinity of the incident should be considered.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

### 6.2 Environmental precautions

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

### 6.3 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.

### 6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe 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.

### 7.2 Conditions for safe storage, including any incompatibilities

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.

### 7.3 Specific end use(s)

No information provided.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1 Control parameters

#### Exposure standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
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	--	--
Nitric oxide	SWA (AUS)	25	31	--	--
Nitrogen	SWA (AUS)	Asphyxiant			

#### Biological limits

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

Reference: ACGIH Biological Exposure Indices

### 8.2 Exposure controls

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

## PRODUCT NAME 4 COMPONENT MIXTURE (NO, CO, CO2, BALANCE NITROGEN)

### PPE

<b>Eye / Face</b>	Wear safety glasses.
<b>Hands</b>	Wear leather gloves.
<b>Body</b>	Wear safety boots.
<b>Respiratory</b>	Where an inhalation risk exists, wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.



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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### 9.1 Information on basic physical and chemical properties

<b>Appearance</b>	COLOURLESS GAS
<b>Odour</b>	ODOURLESS
<b>Flammability</b>	NON FLAMMABLE
<b>Flash point</b>	NOT RELEVANT
<b>Boiling point</b>	NOT AVAILABLE
<b>Melting point</b>	NOT AVAILABLE
<b>Evaporation rate</b>	NOT APPLICABLE
<b>pH</b>	NOT APPLICABLE
<b>Vapour density</b>	NOT AVAILABLE
<b>Specific gravity</b>	NOT APPLICABLE
<b>Solubility (water)</b>	INSOLUBLE
<b>Vapour pressure</b>	NOT AVAILABLE
<b>Upper explosion limit</b>	NOT RELEVANT
<b>Lower explosion limit</b>	NOT RELEVANT
<b>Partition coefficient</b>	NOT AVAILABLE
<b>Autoignition temperature</b>	NOT AVAILABLE
<b>Decomposition temperature</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE
<b>Explosive properties</b>	NOT AVAILABLE
<b>Oxidising properties</b>	NOT AVAILABLE
<b>Odour threshold</b>	NOT AVAILABLE

### 9.2 Other information

<b>% Volatiles</b>	100 %
<b>Density</b>	NOT AVAILABLE

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## 10. STABILITY AND REACTIVITY

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### 10.1 Reactivity

Carefully review all information provided in sections 10.2 to 10.6.

### 10.2 Chemical stability

Stable under recommended conditions of storage.

### 10.3 Possibility of hazardous reactions

Polymerization will not occur.

### 10.4 Conditions to avoid

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

### 10.5 Incompatible materials

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.

### 10.6 Hazardous decomposition products

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

## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

**Acute toxicity**

**Information available for the product:**

Harmful if inhaled. 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. Some 6 to 24 hours after exposure further symptoms develop: lips become blue and soon breathing becomes difficult, accelerated and irregular choking, cyanosis and tightness of the chest follow and palpitations may occur.

**Information available for the ingredient(s):**

Ingredient	Oral Toxicity (LD50)	Dermal Toxicity (LD50)	Inhalation Toxicity (LC50)
CARBON DIOXIDE	--	--	470000 ppm/30M (rat)
CARBON MONOXIDE	--	--	1807 ppm/4H (rat)
NITRIC OXIDE	--	--	115 ppm (rat)

**Skin**

Not classified as a skin irritant.

**Eye**

Not classified as an eye irritant.

**Sensitization**

Not classified as causing skin or respiratory sensitisation.

**Mutagenicity**

Not classified as a mutagen.

**Carcinogenicity**

Not classified as a carcinogen.

**Reproductive**

May cause harm to the unborn child. Exposure to carbon monoxide can result in developmental defects on foetuses without maternal symptoms.

**STOT – single exposure**

Asphyxiant. Effects are proportional to oxygen displacement. Over exposure may result in dizziness, drowsiness, weakness, fatigue, breathing difficulties and unconsciousness.

**STOT – repeated exposure**

Increased evidence of cardiovascular problems have been demonstrated upon chronic exposure to carbon monoxide. 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.

**Aspiration**

Not classified as causing aspiration.

## 12. ECOLOGICAL INFORMATION

### 12.1 Toxicity

No information provided.

### 12.2 Persistence and degradability

No information provided.

### 12.3 Bioaccumulative potential

No information provided.

### 12.4 Mobility in soil

No information provided.

### 12.5 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

### 13.1 Waste treatment methods

**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

**PRODUCT NAME 4 COMPONENT MIXTURE (NO, CO, CO2, BALANCE NITROGEN)**

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



	LAND TRANSPORT (ADG)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
<b>14.1 UN Number</b>	1956	1956	1956
<b>14.2 Proper Shipping Name</b>	COMPRESSED GAS, N.O.S. (Contains Carbon Monoxide).	COMPRESSED GAS, N.O.S. (Contains Carbon Monoxide).	COMPRESSED GAS, N.O.S. (Contains Carbon Monoxide).
<b>14.3 Transport hazard class</b>	2.2	2.2	2.2
<b>14.4 Packing Group</b>	None Allocated	None Allocated	None Allocated

**14.5 Environmental hazards** No information provided**14.6 Special precautions for user**

<b>Hazchem code</b>	2TE
<b>GTEPG</b>	2C1
<b>EMS</b>	F-C, S-V

**Other information** Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.**15. REGULATORY INFORMATION****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

<b>Poison schedule</b>	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).	
<b>Classifications</b>	Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.  The classifications and phrases listed below are based on the Approved Criteria for Classifying Hazardous Substances [NOHSC: 1008(2004)].	
<b>Hazard codes</b>	Repr.	Reproductive toxin
	T	Toxic
	Xn	Harmful
<b>Risk phrases</b>	R20	Harmful by inhalation.
	R48/23	Toxic: danger of serious damage to health by prolonged exposure through inhalation.
	R61	May cause harm to the unborn child.
<b>Safety phrases</b>	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.
<b>Inventory listing(s)</b>	<b>AUSTRALIA: AICS (Australian Inventory of Chemical Substances)</b> 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.

**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.

**PRODUCT NAME 4 COMPONENT MIXTURE (NO, CO, CO2, BALANCE NITROGEN)****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 report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

**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
EMS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
GHS	Globally Harmonized System
GTEPG	Group Text Emergency Procedure Guide
IARC	International Agency for Research on Cancer
LC50	Lethal Concentration, 50% / Median Lethal Concentration
LD50	Lethal Dose, 50% / Median Lethal Dose
mg/m <sup>3</sup>	Milligrams per Cubic Metre
OEL	Occupational Exposure Limit
pH	relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm	Parts Per Million
STEL	Short-Term Exposure Limit
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
SWA	Safe Work Australia
TLV	Threshold Limit Value
TWA	Time Weighted Average

**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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