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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 1.1 Product identifier

**Product name** 4 COMPONENT MIXTURE (H<sub>2</sub>S, CO, CH<sub>4</sub>, BALANCE N<sub>2</sub>)  
**Synonym(s)** 1437 - SDS NUMBER • PRODUCT CODE: 292 • SPECIAL GAS MIXTURE

### 1.2 Uses and uses advised against

**Use(s)** CALIBRATION • INDUSTRIAL APPLICATIONS

### 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)** Toxic to Reproduction: Category 1A  
Acute Toxicity: Inhalation: Category 2  
Specific Target Organ Systemic Toxicity (Repeated Exposure): Category 2  
Aquatic Toxicity (Acute): Category 1  
Flammable Gases: Category 1  
Gases Under Pressure: Compressed gas

### 2.2 Label elements

**Signal word** DANGER

**Pictogram(s)**



**Hazard statement(s)**

H220 Extremely flammable gas.  
H280 Contains gas under pressure; may explode if heated.  
H330 Fatal if inhaled.  
H360 May damage fertility or the unborn child.  
H373 May cause damage to organs through prolonged or repeated exposure.  
H400 Very toxic to aquatic life.

**PRODUCT NAME 4 COMPONENT MIXTURE (H2S, CO, CH4, BALANCE N2)****Prevention statement(s)**

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P284	Wear respiratory protection.

**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.
P310	Immediately call a POISON CENTER or doctor/physician.
P320	Specific treatment is urgent - see first aid instructions.
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P391	Collect spillage.

**Storage statement(s)**

P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
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.
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**2.3 Other hazards**

Asphyxiant. Effects are proportional to oxygen displacement.

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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)
HYDROGEN SULPHIDE	7783-06-4	231-977-3	10%
CARBON MONOXIDE	630-08-0	211-128-3	4%
METHANE	74-82-8	200-812-7	1%
NITROGEN	7727-37-9	231-783-9	Remainder

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**4. FIRST AID MEASURES**

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**4.1 Description of first aid measures**

<b>Eye</b>	If in eyes, hold eyelids apart and flush continuously with running water. Continue flushing until advised to stop by a Poisons Information Centre, a doctor, or for at least 15 minutes.
<b>Inhalation</b>	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 breathing is difficult. Seek immediate medical attention. For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor.
<b>Skin</b>	If skin or hair contact occurs, remove contaminated clothing and flush skin and hair with running water.
<b>Ingestion</b>	Due to product form and application, ingestion is considered unlikely.
<b>First aid facilities</b>	No information provided.

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

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility / consciousness. Victim may not be aware of asphyxiation. Inhalation of high levels of hydrogen sulphide may be fatal. Chronic exposure may result in nerve paralysis/damage, heart damage and neurological effects. Over exposure to carbon monoxide may result in rapid breathing, nausea, lack of coordination, unconsciousness and coma. Carbon monoxide reacts with haemoglobin in the blood to prevent oxygen uptake and release.

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

If inhalation has occurred observe for premonitory signs of pulmonary oedema. Otherwise, treatment is symptomatic and supportive. Treat for cold burns if severe liquid contact.

## 5. FIRE FIGHTING MEASURES

### 5.1 Extinguishing media

Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve.

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

Extremely flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.

### 5.3 Advice for firefighters

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 in air.

### 5.4 Hazchem code

2PE

2 Fine Water Spray.

P Risk of violent reaction or explosion. Wear liquid-tight chemical protective clothing 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. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Eliminate all sources of ignition. Consider the risk of potentially explosive atmospheres.

### 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 eye or skin contact and 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 substances and sources of ignition. Replace outlet seals after use. Cylinders should be stored: upright, prevented from falling, in a secure area; below 45°C, 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 monoxide	SWA (AUS)	30	34	--	--
Hydrogen sulfide	SWA (AUS)	10	14	15	21
Methane	SWA (AUS)	Asphyxiant			
Nitrogen	SWA (AUS)	Asphyxiant			

**PRODUCT NAME 4 COMPONENT MIXTURE (H2S, CO, CH4, BALANCE N2)****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**

Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Flammable or explosive vapours may accumulate in confined or poorly ventilated areas. Vapours may travel some distance to an ignition source and flash back. Maintain atmospheric levels below the recommended exposure standard.

**PPE**

<b>Eye / Face</b>	Wear safety glasses.
<b>Hands</b>	Wear rubber gloves.
<b>Body</b>	Wear safety boots.
<b>Respiratory</b>	Wear Self Contained Breathing Apparatus (SCBA) or an Air-line respirator.

**9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on basic physical and chemical properties**

<b>Appearance</b>	COLOURLESS GAS
<b>Odour</b>	ROTTEN EGG ODOUR
<b>Flammability</b>	EXTREMELY FLAMMABLE
<b>Flash point</b>	NOT AVAILABLE
<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 AVAILABLE
<b>Lower explosion limit</b>	5.2 % (Hydrogen sulphide in nitrogen)
<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>Cylinder pressure (when full)</b>	10000 kPa @ 15°C
<b>% Volatiles</b>	100 %

**10. STABILITY AND REACTIVITY****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 heat, sparks, open flames and other ignition sources.

**10.5 Incompatible materials**

Incompatible with oxidising agents (e.g. hypochlorites), metals, metal oxides, nitrogen trichloride, alkalis (e.g. sodium hydroxide), heat and ignition sources.

**10.6 Hazardous decomposition products**

May evolve toxic gases if heated to decomposition.

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**11. TOXICOLOGICAL INFORMATION**

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**11.1 Information on toxicological effects**

**Acute toxicity** Fatal if inhaled. Exposure may cause irritation to respiratory tract, runny nose, cough, hoarseness, shortness of breath and pneumonia, followed by severe irritation, headache, nausea, vomiting and dizziness. Severe exposure may result in pulmonary oedema.

HYDROGEN SULPHIDE  
LC50 (Inhalation): 444 ppm / 4 hours (rat)

CARBON MONOXIDE  
LC50 (Inhalation): 1807 ppm / 4 hours (rat)

**Skin** Not classified as a skin irritant.

**Eye** Not classified as an eye irritant. However, contact may result in mild irritation, lacrimation, pain and redness.

**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.

**STOT – single exposure** Over exposure may result in central nervous system and respiratory system effects. Symptoms include headaches, dizziness, unconsciousness and build-up of fluid in the lungs (pulmonary oedema).

**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.

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**12. ECOLOGICAL INFORMATION**

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**12.1 Toxicity**

Very toxic to aquatic life.

**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**

Microorganisms in soil and water are involved in oxidation-reduction reactions which oxidise hydrogen sulphide to elemental sulphur. Not anticipated to bioaccumulate or concentrate in the food chain.

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**13. DISPOSAL CONSIDERATIONS**

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**PRODUCT NAME 4 COMPONENT MIXTURE (H2S, CO, CH4, BALANCE N2)****13.1 Waste treatment methods**

**Waste disposal** Return to manufacturer/supplier where possible for recycling/ reuse. Contact Waste Disposal Authorities in your State for further details and required approvals.

**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)
<b>14.1 UN Number</b>	1953	1953	1953
<b>14.2 Proper Shipping Name</b>	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Contains hydrogen sulphide)	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Contains hydrogen sulphide)	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (Contains hydrogen sulphide)
<b>14.3 Transport hazard classes</b>	2.3, 2.1	2.3, 2.1	2.3, 2.1
<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**

**Hazchem code** 2PE  
**GTEPG** 2A4  
**EMS** F-D, S-U

**Other information** Ensure cylinder is separated from driver and foodstuffs. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.

**15. REGULATORY INFORMATION****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

**Poison schedule** Classified as a Schedule 7 (S7) Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

**Classifications** 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)].

**Hazard codes**

F+	Extremely flammable
N	Dangerous for the environment
Repr.	Reproductive toxin
T+	Very toxic
Xn	Harmful

**Risk phrases**

R12	Extremely Flammable.
R26	Very toxic by inhalation.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R50	Very toxic to aquatic organisms.
R61	May cause harm to the unborn child.

**PRODUCT NAME 4 COMPONENT MIXTURE (H2S, CO, CH4, BALANCE N2)**

<b>Safety phrases</b>	S9	Keep container in a well ventilated place.
	S16	Keep away from sources of ignition - No smoking.
	S33	Take precautionary measures against static discharges.
	S36	Wear suitable protective clothing.
	S38	In case of insufficient ventilation, wear suitable respiratory equipment.
	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.
	S61	Avoid release to the environment. Refer to special instructions/safety data sheets.

**Inventory listing(s)** **AUSTRALIA: AICS (Australian Inventory of Chemical Substances)**  
All components are listed on AICS, or are exempt.

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**16. OTHER INFORMATION**

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

**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.

**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

**PRODUCT NAME 4 COMPONENT MIXTURE (H2S, CO, CH4, BALANCE N2)**

**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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