

## SAFETY DATA SHEET

# 1538

Product Name **6 COMPONENT MIXTURE (O<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>, CO<sub>2</sub>, CO, BALANCE N<sub>2</sub>)**

### 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)** 1538 - SDS NUMBER • PRODUCT CODE: 177 • SPECIAL GAS MIXTURE  
**Use(s)** CALIBRATION • INDUSTRIAL APPLICATIONS  
**SDS Date** 30 Sep 2011

### 2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

#### RISK PHRASES

R12 Extremely Flammable.  
R23 Toxic by inhalation.  
R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.  
R61 May cause harm to the unborn child.

#### SAFETY PHRASES

S9 Keep container in a well ventilated place.  
S16 Keep away from sources of ignition - No smoking.  
S33 Take precautionary measures against static discharges.  
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 No.** 1953 **DG Class** 2.3 **Subsidiary Risk(s)** 2.1  
**Packing Group** None Allocated **Hazchem Code** 2PE

### 3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content v/v
HYDROGEN	H <sub>2</sub>	1333-74-0	10-30%
CARBON MONOXIDE	C-O	630-08-0	10-20%
METHANE	C-H <sub>4</sub>	74-82-8	<15%
OXYGEN	O <sub>2</sub>	7782-44-7	<5%
CARBON DIOXIDE	C-O <sub>2</sub>	124-38-9	<20%
NITROGEN	N <sub>2</sub>	7727-37-9	remainder

#### 4. FIRST AID MEASURES

<b>Eye</b>	None required.
<b>Inhalation</b>	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. 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.
<b>Skin</b>	None required.
<b>Ingestion</b>	Due to product form and application, ingestion is considered unlikely.
<b>Advice to Doctor</b>	Treat symptomatically.

#### 5. FIRE FIGHTING MEASURES

<b>Flammability</b>	Highly flammable. Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling.
<b>Fire and Explosion</b>	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.
<b>Extinguishing</b>	Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve.
<b>Hazchem Code</b>	2PE

#### 6. ACCIDENTAL RELEASE MEASURES

<b>Spillage</b>	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

<b>Storage</b>	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.
<b>Handling</b>	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 Stds

Ingredient	Reference	TWA		STEL	
Carbon dioxide	SWA (AUS)	5000 ppm	9000 mg/m <sup>3</sup>	30000 ppm	54000 mg/m <sup>3</sup>
Carbon dioxide in coal mines	SWA (AUS)	12500 ppm	22500 mg/m <sup>3</sup>	30000 ppm	54000 mg/m <sup>3</sup>
Carbon monoxide	SWA (AUS)	30 ppm	34 mg/m <sup>3</sup>	--	--
Hydrogen	SWA (AUS)	Asphyxiant			
Methane	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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**Engineering Controls** Provide suitable ventilation to minimise or eliminate exposure. Confined areas (eg. tanks) should be adequately ventilated or gas tested. Flammable/explosive vapours may accumulate in poorly ventilated areas. 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

<b>Appearance</b>	COLOURLESS GAS	<b>Solubility (water)</b>	0.035 cm <sup>3</sup> /cm <sup>3</sup> (Carbon monoxide)
<b>Odour</b>	ODOURLESS	<b>Specific Gravity</b>	NOT APPLICABLE
<b>pH</b>	NOT APPLICABLE	<b>% Volatiles</b>	100 %
<b>Vapour Pressure</b>	NOT AVAILABLE	<b>Flammability</b>	HIGHLY FLAMMABLE
<b>Vapour Density</b>	NOT AVAILABLE	<b>Flash Point</b>	NOT AVAILABLE
<b>Boiling Point</b>	NOT AVAILABLE	<b>Upper Explosion Limit</b>	NOT AVAILABLE
<b>Melting Point</b>	NOT AVAILABLE	<b>Lower Explosion Limit</b>	5.7 % (Hydrogen in nitrogen)
<b>Evaporation Rate</b>	NOT APPLICABLE		
<b>Autoignition Temperature</b>	571°C (Hydrogen)	<b>Cylinder Pressure</b>	13000 kPa @ 15°C
<b>Decomposition Temperature</b>	NOT AVAILABLE	<b>Partition Coefficient</b>	NOT AVAILABLE
<b>Viscosity</b>	NOT AVAILABLE		

## 10. STABILITY AND REACTIVITY

<b>Chemical Stability</b>	Stable under recommended conditions of storage.
<b>Conditions to Avoid</b>	Avoid heat, sparks, open flames and other ignition sources.
<b>Material to Avoid</b>	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. Moist carbon dioxide is corrosive, hence acid resistant materials are required (stainless steel). Certain properties of some plastics and rubbers may be affected by carbon dioxide, ie. embrittlement, leaching of plasticisers, etc.
<b>Hazardous Decomposition Products</b>	May evolve toxic gases if heated to decomposition.
<b>Hazardous Reactions</b>	Polymerization will not occur.

## 11. TOXICOLOGICAL INFORMATION

<b>Health Hazard Summary</b>	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 foetuses can occur without maternal symptoms. Carbon dioxide concentrations of 3-5 % in air cause increased respiration and headache. Concentrations of 8-15% cause headache, nausea and vomiting which may lead to unconsciousness if not moved to open air and given oxygen. Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death may follow in minutes. Adverse health affects to 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.
<b>Eye</b>	Non irritant.
<b>Inhalation</b>	Toxic. 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.

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**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)  
METHANE (74-82-8)  
LC50 (Inhalation): 326 gm/m3/2h (mouse)  
CARBON DIOXIDE (124-38-9)  
LC50 (Inhalation): 470000 ppm/30M (rat)  
LCLo (Inhalation): 9 pph/5M (human)

## 12. ECOLOGICAL INFORMATION

**Environment** When discharged to the atmosphere, carbon dioxide and methane may contribute to the greenhouse effect. Carbon monoxide is slowly oxidised in the atmosphere to carbon dioxide. Methane has a global warming potential of 21 (CO2 = 1).

## 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. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.



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

<b>Shipping Name</b>	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (contains carbon monoxide, hydrogen & methane)		
<b>UN No.</b>	1953	<b>DG Class</b>	2.3
<b>Packing Group</b>	None Allocated	<b>Hazchem Code</b>	2PE

#### IATA

<b>Shipping Name</b>	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (contains carbon monoxide, hydrogen & methane)		
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#### IMDG

<b>Shipping Name</b>	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (contains carbon monoxide, hydrogen & methane)		
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<b>Packing Group</b>	None Allocated		

## 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.

ABBREVIATIONS:  
ACGIH - American Conference of Industrial Hygienists.  
ADG - Australian Dangerous Goods.

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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/m<sup>3</sup> - 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 ChemAlert 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 ChemAlert 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.

**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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**SDS Date** 30 Sep 2011

**End of Report**