BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 2504

Product Name **15 COMPONENT MIXTURE (BALANCE HYDROGEN)**

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)	2504 - SDS NUMBER · SPECIAL GAS MIXTURE
Use(s)	CALIBRATION · INDUSTRIAL APPLICATIONS
SDS Date	17 January 2012

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R23	Toxic by inhalation.
R66	Repeated exposure may cause skin dryness or cracking.
R67	Vapours may cause drowsiness and dizziness.

SAFETY PHRASES

S9	Keep container in a well ventilated place.
S16	Keep away from sources of ignition - No smoking.
S29	Do not empty into drains.
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).
S61	Avoid release to the environment. Refer to special instructions/safety data sheets.
S62	If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

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

UN Number	1953	**DG Division**	2.3
Packing Group	None Allocated	**Subsidiary Risk(s)**	2.1
Hazchem Code	2PE		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	Cas No.	Content (v/v)
N-BUTANE	Not Available	Not Available	<5%
METHANE	C-H4	74-82-8	<15%
ETHANE	C2-H6	74-84-0	<10%
PROPANE	C3-H8	74-98-6	<10%
2,2-DIMETHYLBUTANE	C6-H14	75-83-2	<5%

ISOBUTANE	C4-H10	75-28-5	<5%
ISOPENTANE	C5-H12	78-78-4	<5%
N-HEXANE	C6-H14	110-54-3	<5%
OXYGEN	O2	7782-44-7	<5%
CARBON MONOXIDE	C-O	630-08-0	<0.2%
HYDROGEN SULPHIDE	H2S	7783-06-4	0.1%
HYDROGEN	H2	1333-74-0	Remainder
CARBON DIOXIDE	C-O2	124-38-9	<5%
N-PENTANE	Not Available	Not Available	<5%
NITROGEN	N2	7727-37-9	<5%

4. FIRST AID MEASURES

Eye Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.

Inhalation 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.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30℃) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.

Advice to Doctor Treat symptomatically.

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. Do not approach cylinders or containers suspected of being hot.

Extinguishing Use water fog to cool containers from protected area.

Hazchem Code 2PE

- 2 Water Fog (or fine water spray if fog unavailable)
- P Full protective equipment including Self Contained Breathing apparatus.
- E Evacuation of people in the vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES

Spillage If the cylinder is leaking, evacuate area of personnel. 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.

7. STORAGE AND HANDLING

Storage Do not store near incompatible materials. Cylinders should be stored below 45℃ 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 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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Standards

Ingredient	Reference	TWA		STEL	
		ppm	mg/m³	ppm	mg/m³
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	--	--
Ethane	SWA (AUS)	Asphyxiant			
Hydrogen	SWA (AUS)	Asphyxiant			
Hydrogen sulfide	SWA (AUS)	10	14	15	21
Isobutane	SWA (AUS)	1000	--	--	--
Methane	SWA (AUS)	Asphyxiant			
Nitrogen	SWA (AUS)	Asphyxiant			
Propane	SWA (AUS)	Asphyxiant			
n-Hexane	SWA (AUS)	20	72	--	--

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
N-HEXANE	ACGIH BEI	2,5-Hexanedione in urine (without hydrolysis)	End of shift at end of workweek	0.4 mg/L

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE

Eye / Face Wear safety glasses.

Hands Wear leather gloves.

Body Wear coveralls and 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 PUNGENT ODOUR
Flammability HIGHLY FLAMMABLE
Flash point < 0℃
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) NOT AVAILABLE
Vapour pressure NOT AVAILABLE
Upper explosion limit NOT AVAILABLE
Lower explosion limit NOT AVAILABLE
Autoignition temperature NOT AVAILABLE
Decomposition temperature NOT AVAILABLE

Viscosity	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
% Volatiles	100 %

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), metals, metal oxides, alkalis (eg. hydroxides), lithium, ozone, titanium and lithium tetrahydroaluminate under specific conditions.
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 - moderately toxic. This product has poor warning properties. Symptoms of asphyxiation may not be detected by exposed individuals, which can prove fatal. Carbon monoxide may result in heart damage with high level/chronic exposure. Hydrogen sulphide is highly toxic and may result in cardiac arrhythmias, neurotoxicity and eye irritation with chronic exposure. The low levels of hydrogen sulphide and carbon monoxide reduce the inhalation risk.
Eye	Irritant. Contact may result in irritation, lacrimation, pain and redness. Contact with liquid or vapour may result in corneal burns and frost-bite.
Inhalation	Moderately toxic - Asphyxiant. Over exposure 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. High concentrations may be rapidly fatal without producing significant warning properties.
Skin	Low irritant. Prolonged or repeated contact may result in mild irritation, rash and dermatitis.
Ingestion	Ingestion is considered unlikely due to product form.

Toxicity Data

METHANE (74-82-8)

LC50 (inhalation)	326 gm/m3/2h (mouse)

PROPANE (74-98-6)

LC50 (inhalation)	> 800000 ppm/15M (rat)

N-HEXANE (110-54-3)

LC50 (inhalation)	48000 ppm/4 hours (rat)
LD50 (ingestion)	25 g/kg (rat)
LD50 (skin)	3000 mg/kg (rabbit)

CARBON MONOXIDE (630-08-0)

LC50 (inhalation)	1807 ppm/4H (rat)
LCLo (inhalation)	5000 ppm/5M (human)

HYDROGEN SULPHIDE (7783-06-4)

LC50 (inhalation)	444 ppm (rat)

CARBON DIOXIDE (124-38-9)

LC50 (inhalation)	470000 ppm/30M (rat)
LCLo (inhalation)	9 pph/5M (human)

12. ECOLOGICAL INFORMATION

Environment	Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

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	1953	-	-
Proper Shipping Name	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S. (contains Hydrogen sulphide, Methane)	-	-
DG Class/ Division	2.3	-	-
Subsidiary Risk(s)	2.1	-	-
Packing Group	None Allocated	-	-
GTEPG	2A4		
Specific EPG	None Allocated		
Environmental Hazards		-	
Hazchem Code	2PE		

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 Classified as a Schedule 7 (S7) 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.

ASPHYXIANT GASES: Asphyxiant gases may displace oxygen, leading to oxygen deficiency. Where oxygen content is low, effects may include: 12-16% oxygen: increased breathing/ pulse rate, lack of coordination; 10-14%: mental disturbance, fatigue, breathing stress; 6-10%: vomiting, collapse and possible unconsciousness; 0-6%: convulsions, respiratory collapse and death.

ASPHYXIANTS (1): When present in the atmospheres in high concentrations, asphyxiants reduce the oxygen concentration by displacement. Atmospheres deficient in oxygen do not provide adequate sensory warning of danger and most simple asphyxiants are odourless. Therefore it is not appropriate to recommend an exposure standard for each asphyxiant, but to maintain oxygen concentrations. However, some asphyxiants may be given an exposure standard due to the potential for narcotic effects at high concentrations or an explosion hazard.

ASPHYXIANTS (2): There is a significant hazard associated with workers entering poorly ventilated areas (eg. tanks) where oxygen may be deficient. An air supplied breathing apparatus may be required if adequate ventilation is not ensured.

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.

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
GHS	Globally Harmonized System
IARC	International Agency for Research on Cancer
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
1.1	Standard SDS Review
1.0	Standard SDS Review

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 SDS