BOC
A Member of The Linde Group

SAFETY DATA SHEET

 # 0174

Product Name **STENCH GAS**

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)	0174 - SDS NUMBER • BOC STENCH GAS • PRODUCT CODE: 283
Use(s)	WARNING DEVICE - UNDERGROUND MINES
SDS date	25 January 2013

2. HAZARDS IDENTIFICATION

CLASSIFIED AS HAZARDOUS ACCORDING TO SAFE WORK AUSTRALIA CRITERIA

RISK PHRASES

R12	Extremely Flammable.

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.

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

UN number	3161	**DG division**	2.1
Packing group	None Allocated	**Subsidiary risk(s)**	None Allocated
Hazchem code	2WE		

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Identification	Classification	Content
ETHYL MERCAPTAN	CAS: 75-08-1 EC: 200-837-3	F;R11 Xn;R20 N;R50/53	15%
CARBON DIOXIDE	CAS: 124-38-9 EC: 204-696-9	Not Available	85%

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. For advice, contact a Poison Information Centre on 13 11 26 (Australia Wide) or a doctor.

Skin Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) 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.

Ingestion Due to product form and application, ingestion is considered unlikely.

Advice to doctor Treat symptomatically.

5. FIRE FIGHTING MEASURES

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

Fire and explosion 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. Heating ethyl mercaptan or contact with acid, acid vapour, water or steam will produce toxic fumes of sulphur oxides.

Extinguishing Stop flow of gas if safe to do so, such as by slowly closing the cylinder valve. Remove cool cylinders from the path of the fire. Evacuate if unable to keep cylinders cool. If a flame from the cylinder is impinging on flammable materials or other cylinders then evacuate the area. If the cylinder is standing alone then let the flame continue until all gas has been consumed. Ensure work area is thoroughly ventilated before re-entry.

Hazchem code 2WE

2	Water Fog (or fine water spray if fog unavailable)
W	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

Personal precautions 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 ignition sources. Consider the risk of potentially explosive atmospheres.

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 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. Also store removed from oxidising agents, acids, water/steam, acryaldehyde, aziridine, metal acetylides and sodium peroxide.

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
Ethyl mercaptan	SWA (AUS)	0.5	1.3	--	--

Biological limits No biological limit allocated.

Engineering controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Flammable/explosive vapours may accumulate in poorly ventilated areas. 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	PENETRATING GARLIC-LIKE ODOUR
Flammability	HIGHLY FLAMMABLE
Flash point	17°C (Ethyl mercaptan)
Boiling point	-78°C (Approximately)
Melting point	NOT AVAILABLE
Evaporation rate	NOT APPLICABLE
pH	NOT APPLICABLE
Vapour density	NOT AVAILABLE
Specific gravity	NOT APPLICABLE
Solubility (water)	0.759 cm^3/cm^3 (Carbon dioxide)
Vapour pressure	6300 kPa @ 25°C (Approximately)
Upper explosion limit	18.2 % (Ethyl mercaptan)
Lower explosion limit	2.8 % (Ethyl mercaptan)
Autoignition temperature	570°C (Ethyl mercaptan)
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT AVAILABLE
Partition coefficient	NOT AVAILABLE
Critical pressure	7,380 kPa (Approximately)
% Volatiles	100 %
Density	1.5 (Air = 1)

10. STABILITY AND REACTIVITY

Material to avoid	Ethyl mercaptan can react vigorously with oxidising materials. Will react with acid, acid vapour, water or steam to produce toxic and flammable vapours. Dust of aluminium, chrome, manganese ignite then explode when heated in carbon dioxide. Incompatible with acrylaldehyde, aziridine, metal acetylides, sodium peroxide. Material compatibility: Carbon dioxide is corrosive when moist. Not compatible with most rubbers or plastics. Ethyl mercaptan is not corrosive. The manufacturer reports that aluminium, chrome and manganese dust may heat and explode when heated in carbon dioxide. Also incompatible with oxidising agents (eg. hydrogen peroxide), acids (eg. hydrochloric acid), water/steam (evolving toxic and flammable gases), acryaldehyde, aziridine, metal acetylides and sodium peroxide.
Hazardous Decomposition Products	May evolve toxic gases if heated to decomposition.
Hazardous Reactions	Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Asphyxiant. Escaping liquid from the cylinder can form a dry ice powder like snow and leave a liquid ethyl mercaptan residue. Uncontrolled release of compressed gas may result in physical injuries. 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. 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. Ethyl mercaptan has very strong, unpleasant odour at very low levels which are of low toxicity, however at high levels of exposure central nervous system depression with narcotic effects may occur. Ensure safe work practices to avoid exposure.

Eye Irritant. Contact with spray mist may result in irritation. Contact with dry ice powder could result in frostbite or cold burns. Ethyl mercaptan is an eye irritant.

Inhalation Asphyxiant. Inhalation of ethyl mercaptan may result in central nervous system effects. Carbon dioxide in low concentrations of 3 to 5% by volume in air can cause increased respiration and headache. Concentrations of 8 to 15% can cause headache, nausea and vomiting which may lead to unconsciousness. High level exposure may result in rapid circulatory insufficiency leading to coma and death.

Skin Irritant. Skin contact with dry ice powder could result in frostbite or cold burns. Ethyl mercaptan is a skin irritant.

Ingestion Ingestion is considered unlikely due to product form. Ingestion of the dry ice powder cause severe cold burns to mouth and throat

Toxicity data

ETHYL MERCAPTAN (75-08-1)

LC50 (inhalation)	2770 ppm/4 hours (mouse)
LD50 (ingestion)	682 mg/kg (rat)
LD50 (intraperitoneal)	226 mg/kg (rat)

CARBON DIOXIDE (124-38-9)

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

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. TERRESTRIAL FATE: Ethyl mercaptan has a relatively high vapour pressure and therefore surface transport (by volatilisation) to the atmosphere is expected to be an important fate process. AQUATIC FATE: Volatilisation is expected to be an important transport process for ethyl mercaptan in water. ATMOSPHERIC FATE: Ethyl mercaptan is expected to exist primarily in the vapour-phase in the ambient atmosphere. It will degrade readily in the atmosphere by the vapour-phase reaction with photochemically produced hydroxyl radicals (estimated half-life of about 8 hours) (HSDB).

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	3161	-	-

Proper shipping name	LIQUEFIED GAS, FLAMMABLE, N.O.S.	-	-
DG class/ Division	2.1	-	-
Subsidiary risk(s)	None Allocated	-	-
Packing group	None Allocated	-	-
GTEPG	2A1		

Hazchem code 2WE

Other information Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

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: Cylinder or manifolded cylinders connected to fixed pipework distribution system.

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
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
1.1	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