BOC
A Member of The Linde Group

# SAFETY DATA SHEET

**# 1960**

**Product Name** **5 COMPONENT MIXTURE (CO, SO2, NO, CO2, BALANCE N2)**

## 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)** | 1960 - MSDS NUMBER • PRODUCT CODE: 292 • SPECIAL GAS MIXTURE |
| **Use(s)** | CALIBRATION • INDUSTRIAL APPLICATIONS |
| **SDS date** | 14 August 2013 |

## 2. HAZARDS IDENTIFICATION

**CLASSIFIED AS HAZARDOUS (GHS) ACCORDING TO SAFE WORK AUSTRALIA CRITERIA**

**RISK PHRASES**

None allocated

**SAFETY PHRASES**

None allocated

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

| | | | |
|---|---|---|---|
| **UN number** | 1956 | **DG division** | 2.2 |
| **Packing group** | None Allocated | **Subsidiary risk(s)** | None Allocated |
| **Hazchem code** | 2TE | | |

## 3. COMPOSITION/ INFORMATION ON INGREDIENTS

| Ingredient | Identification | Classification | Content |
|---|---|---|---|
| SULPHUR DIOXIDE | CAS: 7446-09-5<br>EC: 231-195-2 | T;R23 C;R34 | <0.5% |
| CARBON MONOXIDE | CAS: 630-08-0<br>EC: 211-128-3 | F+;R12 T;R23 T;R48/23 Repr.;R61 | <0.2% |
| CARBON DIOXIDE | CAS: 124-38-9<br>EC: 204-696-9 | Not Available | <30% |
| NITRIC OXIDE | CAS: 10102-43-9<br>EC: 233-271-0 | Not Available | <0.2% |
| NITROGEN | CAS: 7727-37-9<br>EC: 231-783-9 | Not Available | Remainder |

## 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). 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 for asphyxia and cold burns.

**First aid facilities** Eye wash facilities should be available.

## 5. FIRE FIGHTING MEASURES

**Flammability** Non flammable. Exposure to fire may cause containers to rupture/explode.

**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. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool. Ensure work area is thoroughly ventilated before re-entry.

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

**Hazchem code** 2TE

| | |
|---|---|
| 2 | Water Fog (or fine water spray if fog unavailable) |
| T | Self Contained Breathing apparatus and protective gloves. |
| 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. Use personal protective equipment as detailed in Section 8 of this SDS.

**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 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.

**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 | -- | -- |
| Nitric oxide | SWA (AUS) | 25 | 31 | -- | -- |
| Nitrogen | SWA (AUS) | Asphyxiant | | | |
| Sulphur dioxide | SWA (AUS) | 2 | 5.2 | 5 | 13 |

**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 |

**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 or cotton 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** NON FLAMMABLE
**Flash point** NOT RELEVANT
**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)** 0.1128 kg/kg (Sulphur dioxide)
**Vapour pressure** NOT AVAILABLE
**Upper explosion limit** NOT RELEVANT
**Lower explosion limit** NOT RELEVANT
**Partition coefficient** NOT AVAILABLE
**Autoignition temperature** NOT AVAILABLE
**Decomposition temperature** NOT AVAILABLE
**Viscosity** NOT AVAILABLE
**Explosive properties** NOT AVAILABLE
**Oxidising properties** NOT AVAILABLE
**Odour threshold** NOT AVAILABLE
**% Volatiles** 100 %

## 10. STABILITY AND REACTIVITY

**Chemical stability**
Stable under recommended conditions of storage.

**Conditions to avoid**
Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

**Material to avoid**
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. Dust of aluminium, chrome and manganese ignite and explode when heated in carbon dioxide. Incompatible with acrylaldehyde, aziridine, metal acetylides, sodium peroxide. Corrosive when moist. Sulphur dioxide may violently react with alkalis (eg. sodium hydroxide) and acids (eg. nitric acid). Corrodes most materials when moist.

**Hazardous Decomposition Products**
This material will not decompose to form hazardous products other than that already present.

**Hazardous Reactions**
Polymerization will not occur.

## 11. TOXICOLOGICAL INFORMATION

**Health Hazard Summary**
Asphyxiant gas. Severe frost-bite burns may result from exposure to cold vapour or liquid. 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 effects 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. Also contains low levels of nitric oxide, sulphur dioxide and carbon monoxide.

Nitric oxide concentrations above 25 ppm may have an immediate effect of irritating the nose and throat followed by delayed onset of respiratory difficulties. Over exposure to concentrations of nitric oxide above 100 ppm may result in sudden onset pulmonary oedema which can be rapidly fatal. Mutation data reported for nitric oxide. Results in chronic irritation of the respiratory tract in low doses.

Chronic exposure to sulphur dioxide levels above 1 ppm can lead to a decline in respiratory function. Sulphur dioxide at 5 ppm causes dryness to the mouth & throat and slight breathing difficulties. Exposure at 50 ppm causes strong eye, nose, throat and respiratory tract irritation as well as changes in breathing volume.

Carbon monoxide may result in heart damage with high level/chronic exposure.

**Eye**
Direct contact with evaporating liquid may result in cold burns, similar to frostbite injury, with possible permanent damage.

**Inhalation**
Asphyxiant. Effects are proportional to oxygen displacement. Acts as a simple asphyxiant by displacing oxygen in the lungs thereby diminishing the supply of oxygen to the blood and tissues.

**Skin**
Direct contact with the liquefied material or escaping compressed gas may cause cold burns similar to frostbite injury.

**Ingestion**
Ingestion is considered unlikely due to product form.

**Toxicity data**

SULPHUR DIOXIDE (7446-09-5)

| | |
|---|---|
| LC50 (inhalation) | 2520 ppm/1 hour (rat) |
| LCLo (inhalation) | 1000 ppm/10 minutes (human) |
| TCLo (inhalation) | 3 ppm/5 days (human) |

CARBON MONOXIDE (630-08-0)

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

CARBON DIOXIDE (124-38-9)

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

NITRIC OXIDE (10102-43-9)

| | |
|---|---|
| LC50 (inhalation) | 1068 mg/m³/4 hours (rat) |

## 12. ECOLOGICAL INFORMATION

**Toxicity** When discharged to the atmosphere in large quantities, carbon dioxide may contribute to the greenhouse effect.

**Persistence and degradability** Not applicable.

**Bioaccumulative potential** Not applicable.

**Mobility in soil** Not applicable.

**Other adverse effects** When discharged to the atmosphere, carbon dioxide may contribute to the greenhouse effect. Sulphur dioxide may contribute to acid rain and is harmful to aquatic life in very low concentrations.

## 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** | 1956 | 1956 | 1956 |
| **Proper shipping name** | | COMPRESSED GAS, N.O.S. (nitrogen) | |
| **DG class/ Division** | 2.2 | 2.2 | 2.2 |
| **Subsidiary risk(s)** | None Allocated | None Allocated | None Allocated |
| **Packing group** | None Allocated | None Allocated | None Allocated |
| **GTEPG** | 2C1 | | |

**Hazchem code** 2TE

**EMS** F-C, S-V

**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** 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.

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 |
| OEL | Occupational Exposure Limit |
| 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 |
| 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 |

**Revision history**

| Revision | Description |
|---|---|
| 2.1 | Standard SDS Review. |
| 2.0 | 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