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## 1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

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### 1.1 Product identifier

**Product name** NITRIC OXIDE  
**Synonyms** 075 - SDS NUMBER • CCS401952D - MATERIAL NUMBER • NITROGEN OXIDE • PRODUCT CODES:  
160, 175

### 1.2 Uses and uses advised against

**Uses** CHEMICAL REAGENT

### 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 numbers

**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 SAFE WORK AUSTRALIA CRITERIA

#### Physical Hazards

Oxidizing Gases: Category 1  
Gases Under Pressure: Compressed gas

#### Health Hazards

Skin Corrosion/Irritation: Category 1B  
Serious Eye Damage / Eye Irritation: Category 1  
Acute Toxicity: Inhalation: Category 1  
Specific Target Organ Toxicity (Repeated Exposure): Category 2

#### Environmental Hazards

Not classified as an Environmental Hazard

### 2.2 GHS Label elements

**Signal word** DANGER

**Pictograms**



**PRODUCT NAME NITRIC OXIDE****Hazard statements**

H270	May cause or intensify fire; oxidizer.
H280	Contains gas under pressure; may explode if heated.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H330	Fatal if inhaled.
H373	May cause damage to organs through prolonged or repeated exposure.

**Prevention statements**

P220	Keep/Store away from clothing/incompatible materials/combustible materials.
P244	Keep reduction valves free from grease and oil.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P264	Wash thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P284	Wear respiratory protection.

**Response statements**

P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/physician.
P314	Get medical advice/attention if you feel unwell.
P320	Specific treatment is urgent - see first aid instructions.
P363	Wash contaminated clothing before reuse.
P370 + P376	In case of fire: Stop leak if safe to do so.

**Storage statements**

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 statements**

P501	Dispose of contents/container in accordance with relevant regulations.
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**2.3 Other hazards**

No information provided.

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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)
NITRIC OXIDE	10102-43-9	233-271-0	>99%

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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 available. For advice, contact a Poisons 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. Continue flushing with water until advised to stop by a Poisons Information Centre or a doctor.
<b>Ingestion</b>	Due to product form and application, ingestion is considered unlikely.
<b>First aid facilities</b>	Eye wash facilities should be available.

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

Immediate effect is irritation of the nose and throat. Symptoms may be slight at first. Headache, dizziness, lassitude, nausea and vomiting may occur in some cases. Some 6 to 24 hours after exposure further symptoms develop: lips become blue and soon breathing becomes difficult, accelerated and irregular choking, cyanosis and tightness of the chest follow and palpitations may occur. Brief exposure to high concentrations causes sudden onset of pulmonary oedema which can be rapidly fatal.

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

Treat symptomatically.

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**5. FIRE FIGHTING MEASURES**

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**5.1 Extinguishing media**

Use water fog to cool containers from protected area.

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

Non flammable - oxidising agent. Supports combustion and may cause fire/explosion in contact with incompatible substances, strong acids, reducing agents, combustibles and flammables.

**5.3 Advice for firefighters**

Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Remove cool cylinders from the path of the fire. Evacuate the area if unable to keep cylinders cool. Do not approach cylinders or containers suspected of being hot.

**5.4 Hazchem code**

2RE

2 Fine Water Spray.

R 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.

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**6. ACCIDENTAL RELEASE MEASURES**

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**6.1 Personal precautions, protective equipment and emergency procedures**

If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

**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.

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**7. HANDLING AND STORAGE**

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**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 materials. Cylinders should be stored below 65°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.

**7.3 Specific end uses**

No information provided.

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**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

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**8.1 Control parameters**

**Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Nitric oxide	SWA [AUS]	25	31	--	--

**PRODUCT NAME NITRIC OXIDE****Biological limits**

Ingredient	Determinant	Sampling Time	BEI
NITRIC OXIDE	Methemoglobin in blood	During or end of shift	1.5% of hemoglobin

Reference: ACGIH Biological Exposure Indices

**8.2 Exposure controls****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 a Type NO (Nitrogen Oxides) respirator. At high vapour levels, 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**

Appearance	COLOURLESS GAS
Odour	ODOURLESS
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)	0.074 cm <sup>3</sup> /cm <sup>3</sup>
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	OXIDISING GAS
Odour threshold	NOT AVAILABLE

**9.2 Other information**

% Volatiles	100 %
Cylinder pressure (when full)	3,450 kPa @ 15°C

**10. STABILITY AND REACTIVITY****10.1 Reactivity**

May be corrosive to metals.

**10.2 Chemical stability**

Stable under recommended conditions of storage.

**PRODUCT NAME NITRIC OXIDE**

**10.3 Possibility of hazardous reactions**

Polymerization will not occur.

**10.4 Conditions to avoid**

Avoid shock, friction, heavy impact, heat, sparks, open flames and other ignition sources.

**10.5 Incompatible materials**

Nitric oxide reacts in air to form nitrogen dioxide which is highly oxidising. Reacts violently with fluorine and chlorine in the presence of moisture. Combustible materials such as oil and grease can spontaneously ignite at low temperatures in oxygen enriched atmospheres. Materials which burn in air, will burn more vigorously in oxygen enriched atmospheres.

**10.6 Hazardous decomposition products**

This material will not decompose to form hazardous products other than that already present.

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**11. TOXICOLOGICAL INFORMATION**

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**11.1 Information on toxicological effects**

**Acute toxicity** Fatal if inhaled. Headache, dizziness, lassitude, nausea and vomiting may occur in some cases. Some 6 to 24 hours after exposure further symptoms develop: lips become blue and soon breathing becomes difficult, accelerated and irregular choking, cyanosis and tightness of the chest follow and palpitations may occur. Brief exposure to high concentrations causes sudden onset of pulmonary oedema which can be rapidly fatal.

NITRIC OXIDE  
LC50 (inhalation): 115 ppm/1 hour (rat)

**Information available for the ingredients:**

Ingredient	Oral LD50	Dermal LD50	Inhalation LC50
NITRIC OXIDE	--	--	57 ppm/4h (rat)

**Skin** Causes burns. Contact may result in irritation, redness, pain, rash, dermatitis and possible severe burns.

**Eye** Causes burns. Contact may result in irritation, lacrimation, pain, redness, corneal burns and possible permanent damage.

**Sensitisation** Not classified as causing skin or respiratory sensitisation.

**Mutagenicity** Not classified as a mutagen. However, some animal studies have shown possible evidence for mutagenic effects.

**Carcinogenicity** Not classified as a carcinogen.

**Reproductive** Not classified as a reproductive toxin.

**STOT - single exposure** Over exposure may result in irritation of the nose and throat. High level exposure may result in significant toxicity effects to the respiratory system. Symptoms include shortness of breath (dyspnoea), cyanosis, dizziness, headache, nausea, and a build up of fluids in the lungs (pulmonary oedema). High level exposure may reduce the blood's ability to transport oxygen causing a blue colour to the skin and lips (methemoglobinemia).

**STOT - repeated exposure** Repeated exposure may result in chronic bronchitis and shortness of breath.

**Aspiration** Not classified as causing aspiration.

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**12. ECOLOGICAL INFORMATION**

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**12.1 Toxicity**

No information provided.

**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**

Nitrogen oxides react with volatile organic compounds to produce ozone, a principal factor in photochemical smog. Will form nitric acid in contact with water. Nitrates can persist for prolonged periods in water. Not expected to concentrate in the food chain.

### 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste treatment methods

**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)
<b>14.1 UN Number</b>	1660	1660	1660
<b>14.2 Proper Shipping Name</b>	NITRIC OXIDE, COMPRESSED	NITRIC OXIDE, COMPRESSED	NITRIC OXIDE, COMPRESSED
<b>14.3 Transport hazard classes</b>	2.3, 5.1, 8	2.3, 5.1, 8	2.3, 5.1, 8
<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** 2RE  
**GTEPG** 2B5  
**EMS** F-C, S-W  
**Other information** Ensure cylinder is separated from driver and that outlet of relief device is not obstructed.

### 15. REGULATORY INFORMATION

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

**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).  
**Classifications** Safework Australia criteria is based on the Globally Harmonised System (GHS) of Classification and Labelling of Chemicals.  
**Inventory listings** **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: Gas regulator of suitable pressure and flow rating fitted to cylinder or manifold with low pressure gas distribution to equipment.

**PRODUCT NAME NITRIC OXIDE****PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:**

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as form of product, 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: form of product; 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 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

**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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