MATERIAL SAFETY DATA SHEET (MSDS)
SULPHUR DIOXIDE
(Please ensure that this MSDS is received by the appropriate person)

DATE: April 2017 Version 3

Ref. No.: MS 026

1 PRODUCT AND COMPANY IDENTIFICATION

Product Names	SULPHUR DIOXIDE
Synonym	Sulfurous Acid Anhydride
Chemical Formula	SO_2
Trade Name	Sulphur Dioxide
Colour coding	Brunswick green (H.O7) body with a Golden yellow (B49) shoulder Valve CGA 240 – Steel 3/8 inch 18 NGT right hand female
Company Identification	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel. No: (011) 490-0400 Fax No: (011) 490-0506
Emergency Number	**0860 020 020 or** **0860 111 185 [24 hours]**

2 HAZARDS IDENTIFICATION

Main Hazards
All cylinders are portable gas containers, and must be regarded as pressure vessels at all times. Sulphur dioxide is a highly irritating gas; it readily elicits respiratory reflexes. It is intensely irritating to the eyes, throat, and respiratory tract.

Adverse Health effects
Inhalation of this gas in concentrations of 8-12ppm in air causes throat irritation, coughing, constriction of the chest, lachrimation, and smarting of the eyes. A concentration of 150 ppm can be endured only a few minutes, because of eye irritation and the effect on the membranes of the nose, throat and lungs. Exposure to a concentration of 500 ppm by volume in air for a few minutes is very dangerous.

Chemical hazards
Sulphur dioxide dissolves in water forming sulphurous acid, which is unstable toward heat. In many of its reactions, sulphur dioxide behaves as a reducing agent.

Biological Hazards
Liquid Sulphur dioxide may cause skin and eye burns upon contact with these tissues, which results from the freezing effect of the liquid on the skin or eyes. Low (1%) concentrations of the vapour are irritating to moist skin within a period of 3 minutes.

Vapour Inhalation
Acute exposure through inhalation may result in dryness and irritation of the nose and throat, choking, sneezing, coughing, and bronchospasm. Severe overexposure may cause death through systemic acidosis, from pulmonary oedema, or from respiratory arrest.

Eye Contact
Corneal burns, opacification of the cornea, and blindness may result if liquid Sulphur dioxide is splashed in the eyes. Sulphur dioxide can penetrate the intact cornea and cause iritis.

Skin Contact
Liquid sulphur dioxide can cause frostbite and skin burns, and it converts to sulphurous acid in moist environments, which may cause skin irritation.

Ingestion
Severe burns to the mouth, throat, and gastrointestinal system may occur.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Sulphur Dioxide
Chemical Family	Inorganic, acidic gas
CAS No.	7446-09-5
UN No.	1079
ERG No.	125
Hazchem Warning	Toxic and corrosive gas

4 FIRST AID MEASURES

Move victims of sulphur dioxide inhalation to fresh air. If breathing has ceased, begin artificial respiration immediately. Administer oxygen if exposure has been severe and breathing is difficult. Skin exposure first aid treatment includes flushing the contaminated skin with copious amounts of water, and continuing as required in order to control burning sensation. Medical attention should be sought if irritation persists, or if skin is broken or blistered. In the event of eye contact, flush eyes immediately with copious amounts of water for at least 15 minutes. Eyelids should be held apart to ensure complete irrigation. Seek medical attention immediately.

5 FIRE FIGHTING MEASURES

Extinguishing Media
As sulphur dioxide is non-flammable, the correct extinguishing media should be used for the surrounding fire.

Specific Hazards
Water should never be sprayed at or into a tank or system which is leaking sulphur dioxide. The presence of water causes sulphur dioxide to be very corrosive, and water directed into a tank would also increase the venting rate.

Emergency Actions
A sulphur dioxide container exposed to a fire should be removed. If for any reason it cannot be removed, the container should be kept cool with a water spray until well after the fire is out. Fire fighting personnel should be equipped with protective clothing and respiratory equipment. CONTACT THE NEAREST AFROX BRANCH.

Protective Clothing
Exposed fire fighters should wear approved self- contained breathing apparatus with full face mask.

Environmental Precautions
When sulphur dioxide is released to the environment, the appropriate regulatory agency should be notified. In the event of a release however, provincial, municipal, and/or local reporting regulations must be complied with. It is most important that the response groups in the area affected be notified as quickly as possible.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions
It is essential that every facility handling sulphur dioxide has an emergency plan outlining the actions that employees should take in case of specific emergencies. These actions should include alerting fellow employees and area emergency control groups of the nature and extent of the emergency. The plan should also include co-ordination procedures with area emergency control groups in the event of a major release. If, despite all precautions, persons should become trapped in a sulphur dioxide atmosphere, they should breathe as little as possible and open their eyes only when necessary. Partial protection may be gained by holding a wet cloth over the nose and mouth.

Environmental Precautions
Only personnel trained for and designated to handle emergencies should attempt to stop a leak. Respiratory equipment of a type suitable for sulphur dioxide must be worn. All persons not so equipped must leave the affected area until the leak has been stopped.

Small spills
If sulphur dioxide is released, the irritating effect of the vapour will force personnel to leave the area long before they have been exposed to dangerous concentrations. Sulphur dioxide is fairly soluble in cool water and therefore the vapour concentration can be reduced by the use of spray or fog nozzles. If disposal of sulphur dioxide becomes necessary, such as from a leaking container or vessel, it can be vented into a lime or caustic soda solution. The resulting salt solution should be taken to a plant treating unit for neutralisation and disposal.

Large spills
See "Personal Precautions" above.

6 HANDLING AND STORAGE

Sulphur dioxide should be handled only in a well-ventilated area, preferably a hood with forced ventilation. Personnel handling sulphur dioxide should wear chemical safety goggles and/or plastic face shields, approved safety shoes, and rubber gloves. Additional gas masks, air-line gas masks, and self- contained breathing apparatus should be conveniently located for use in emergencies. Instant-acting safety showers should be available in convenient locations. Cylinders should always be transported in the upright position, with the valve uppermost, and be firmly secured. Use the "first in - first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Compliance with all relevant legislation is essential. Keep away from children.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational exposure hazards
Prolonged or repeated exposure may cause impaired lung function, bronchitis, hacking cough, nasal irritation and discharge, increased fatigue, alteration in the sense of taste and smell, and longer duration of common colds.

TLV	2 ppm
STEL	(15 minutes) 5 ppm
IDLH	100 ppm

Engineering control measures
Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, and control of process conditions. Administrative controls and personal protective equipment may also be required
.

Personal protection
Use an approved gas mask or self contained breathing apparatus when entering a sulphur dioxide contaminated area.

Eyes
Wear a chemical safety goggle or full face shield when handling cylinders.

Hands
Wear suitable protective gloves when handling cylinders.

Feet
Wear protective foot wear when working with cylinders.

Skin
Wear suitable protective clothing to prevent the gas from coming into direct contact with skin.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

Chemical Symbol	SO_2
Molecular Weight	64,063
Specific volume	@ 20°C & 101,325 kPa 366.9 ml/g
Relative density of gas	@ 101,325 kPa (Air = 1) 2,263
Boiling point	@ 101,325 kPa - 10°C
Colour	None
Taste	Acidic
	Odour Pungent, Sulphurous

10 STABILITY AND REACTIVITY

Conditions to avoid
Overheating of cylinders. Never use cylinders as rollers or supports; or for any other purpose than the storage of sulphur dioxide.

Incompatible Material
Moist sulphur dioxide is corrosive to carbon steel; therefore, other materials of construction have to be considered in this case.

Hazardous Decomposition Products
Sulphur dioxide is not flammable, or explosive, in either the gaseous or liquid state. It is a relatively stable chemical. Temperatures above 2000ºC are required to bring about detectable decomposition of sulphur dioxide.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity
In extreme cases, dental cavities, loss of fillings, gum disorders, and the rapid and painless destruction of teeth may result from repeated overexposure. See section 3.

Skin & eye contact
See Section 3

Chronic Toxicity
See Section 3

Carcinogenicity
No known effect

Mutagenicity
No known effect

Reproductive Hazards
No known effect

12 ECOLOGICAL INFORMATION Environment

Poses a severe hazard to the ecology in the form of "acid rain".

13 DISPOSAL CONSIDERATIONS

Disposal Methods
Due to the complexity and scope of sulphur dioxide disposal procedures, care must be taken to ensure that all existing regulations are complied with. For more detailed information or guidance.
CONTACT THE NEAREST AFROX BRANCH.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

UN No.	1079
Class	2.3
Subsidiary risk	Toxic and corrosive gas
ERG No	125
Hazchem warning	Toxic and corrosive gas

SEA TRANSPORTATION
IMDG 1079
Class 2.3
Label Toxic gas

AIR TRANSPORTATION

ICAO/IATA Code	1079
Class	2.3
Subsidiary risk	Toxic and corrosive gas

Packaging instructions
- Cargo 200
- Passenger Forbidden
Maximum quantity allowed
  - Cargo 25 kg
  - Passengers forbidden

15 REGULATORY INFORMATION

EEC Hazard class: Toxic, Corrosive gas.
National legislation OHSact and Regulations 85 of 1993.
Reference SANS 10234 and its supplement.

16 OTHER INFORMATION

Ensure all national/local regulations are observed. Ensure operators understand the toxicity hazard. Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard. Before using this product in any new process or experiment, a through material compatibility and safety study should be carried out.

Bibliography

Bibliography
Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson Gas Data Book - 6th Edition
SANS 11014 - Safety data sheet for chemical products: Content and order of sections
SANS 10265 – Classification and Labelling of Dangerous Substances

EXCLUSION OF LIABILITY