



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SULFUR DIOXIDE

1. Chemical Product and Company Identification

**BOC Gases,
Division of
The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974**

**BOC Gases
Division of
BOC Canada Limited
5975 Falbourne Street, Unit 2
Mississauga, Ontario L5R 3W6**

TELEPHONE NUMBER: (908) 464-8100

TELEPHONE NUMBER: (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

24-HOUR EMERGENCY TELEPHONE NUMBER:

CHEMTREC (800) 424-9300

(905) 501-0802

EMERGENCY RESPONSE PLAN NO: 20101

PRODUCT NAME: SULFUR DIOXIDE

CHEMICAL NAME: Sulfur Dioxide

COMMON NAMES/SYNONYMS: Bisulfite, Sulfurous Anhydride, Sulfurous Oxide, Sulfur Oxide

TDG (Canada) CLASSIFICATION: 2.3 (8)

WHMIS CLASSIFICATION: A, D1A, D2B, E

PREPARED BY: Loss Control (908)464-8100/(905)501-1700

PREPARATION DATE: 6/1/95

REVIEW DATES: 6/7/96

2. Composition, Information on Ingredients

INGREDIENT	% VOLUME	PEL-OSHA ¹	TLV-ACGIH ²	LD ₅₀ or LC ₅₀ Route/Species
Sulfur Dioxide FORMULA: SO ₂ CAS: 7446-09-5 RTECS #: WS 4550000	< 100.0	5 ppm TWA	2 ppm TWA 5 ppm STEL	LC ₅₀ 2520 ppm/1H (Rat)

¹ As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

² As stated in the ACGIH 1994-95 Threshold Limit Values for Chemical Substances and Physical Agents

3. Hazards Identification

EMERGENCY OVERVIEW
Corrosive to exposed tissues. Inhalation of vapors may result in pulmonary edema and chemical pneumonitis. Nonflammable. Reacts with water to produce sulfuric acid.

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
---------------------	-----------------------	--------------------	-------------------	-----------------

PRODUCT NAME: SULFUR DIOXIDE

HEALTH EFFECTS:

Exposure Limits Yes	Irritant Yes	Sensitization No
Teratogen Yes	Reproductive Hazard Yes	Mutagen Yes
Synergistic Effects None reported		

Carcinogenicity: -- NTP: No IARC: No OSHA: No

EYE EFFECTS:

Corrosive and irritating to the eyes. Contact with the liquid or vapor causes painful burns and ulcerations. Burns to the eyes result in lesions and possible loss of vision.

SKIN EFFECTS:

Corrosive and irritating to the skin and all living tissue. Toxic level exposure to dermal tissue causes acid-like burns and skin lesions resulting in early necrosis and scarring.

INGESTION EFFECTS:

Ingestion unlikely. Gas at room temperature.

INHALATION EFFECTS:

Corrosive and irritating to the upper and lower respiratory tract and all mucosal tissue. Initial symptoms of exposure include nose and throat irritation, becoming steadily worse, suffocating and painful. The irritation extends to the chest causing a cough reflex which may be violent and painful and may include the discharge of blood or vomiting with eventual collapse. Other symptoms include headache, general discomfort and anxiety. Chemical pneumonitis and pulmonary edema may result from exposure to the lower respiratory tract and deep lung.

Repeated or prolonged low level exposures may cause corrosion of the teeth.

Reproductive toxicity and developmental changes in newborn have been observed in experimental animals exposed to sulfur dioxide.

Sulfur dioxide is mutagenic in experimental cell assay systems.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Individuals with impaired pulmonary function may be at increased risk from exposure.

NFPA HAZARD CODES

Health: 3
Flammability: 0
Reactivity: 0

HMIS HAZARD CODES

Health: 3
Flammability: 0
Reactivity: 1

RATINGS SYSTEM

0 = No Hazard
1 = Slight Hazard
2 = Moderate Hazard
3 = Serious Hazard
4 = Severe Hazard

4. First Aid Measures

EYES:

PERSONS WITH POTENTIAL EXPOSURE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eyes with copious quantities of water. Part eyelids to assure complete flushing. Continue for a minimum of 15 minutes. Seek immediate medical attention.

SKIN:

Remove contaminated clothing as rapidly as possible. Flush affected area with copious quantities of water. Seek immediate medical attention.

INGESTION:

Not required.

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVER EXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL(%): None		UEL(%): None
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS:

None. Nonflammable.

EXTINGUISHING MEDIA:

Use media appropriate for surrounding materials. Sulfur dioxide forms sulfuric acid solutions with water.

6. Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest BOC location.

7. Handling and Storage

Electrical classification:

Nonhazardous.

Most metals corrode when in contact with wet sulfur dioxide.

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<150 psig) piping or systems. Do not heat cylinder by any means to increase rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent Hazardous back flow into cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated areas of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full & empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1 and G-3.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Sulfur Dioxide FORMULA: SO ₂ CAS: 7446-09-5 RTECS #: WS 4550000	< 100.0	5 ppm TWA	2 ppm TWA 5 ppm STEL	LC ₅₀ 2520 ppm/1H (Rat)

¹ Refer to individual state or provincial regulations, as applicable, for limits which may be more stringent than those listed here.

² As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

³ As stated in the ACGIH 1994-1995 Threshold Limit Values for Chemical Substances and Physical Agents.

IDLH: 100 ppm

ENGINEERING CONTROLS:

Hood with forced ventilation. Use local ventilation to prevent accumulation above the exposure limit.

EYE/FACE PROTECTION:

Full-face piece respirator or gas-tight goggles recommended.

SKIN PROTECTION:

Plastic or rubber.

RESPIRATORY PROTECTION:

Positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

OTHER/GENERAL PROTECTION:

Safety shoes, safety shower, eyewash "fountain", face shield.

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: 49.1	psia
Vapor density (Sulfur dioxide) (Air = 1)	: 2.26	
Evaporation point	: Not Available	
Boiling point	: -14.0	°F
	: -10.0	°C
Freezing point	: -103.9	°F
	: -75.5	°C
pH	: Not Available	
Specific gravity	: 2.26	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Soluble	
Odor threshold	: Not Available	
Odor and appearance	: Colorless gas with a highly irritating, pungent odor.	

10. Stability and Reactivity

STABILITY:

Stable

INCOMPATIBLE MATERIALS:

Reacts violently with peroxides, chromates, bichromates, permanganates and oxygen difluoride. It also reacts with chlorates to form chlorine, which may become explosive at elevated temperatures. Forms sulfuric acid solutions with water.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. Toxicological Information

REPRODUCTIVE:

Experimental inhalation exposures of rats and mice at 1.5 to 32 ppm resulted in toxicity to both the male and female reproductive systems. Effects included menstrual cycle changes and toxic effects to testes. Developmental abnormalities were observed in newborn of exposed pregnant animals.

MUTAGENIC:

Genetic changes observed in mammalian, insect bacterial and yeast cell assay systems.

TUMORIGENIC:

Experimental data for increased incidence of tumors in the respiratory systems of mice.

OTHER:

Changes observed in the red blood cells of exposed rats. Functional changes in the respiratory systems of exposed dogs.

12. Ecological Information

PRODUCT NAME: SULFUR DIOXIDE

No data given.

13. Disposal Considerations

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to BOC Gases or authorized distributor for proper disposal.

14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Sulfur Dioxide	Sulphur Dioxide
HAZARD CLASS:	2.3	2.3 (8)
IDENTIFICATION NUMBER:	UN 1079	UN 1079
SHIPPING LABEL:	POISON GAS, CORROSIVE	POISON GAS, CORROSIVE

Additional Marking Requirement: "Inhalation Hazard"

Additional Shipping Paper Description Requirement: "Poison-Inhalation Hazard, Zone C"

15. Regulatory Information

SARA TITLE III NOTIFICATIONS AND INFORMATION

Sulfur dioxide is listed as an extremely hazardous substance (EHS) subject to state and local reporting under Section 304 of SARA Title III (EPCRA) with a reportable quantity (RQ) of 1 pound.

The presence of sulfur dioxide in quantities in excess of the threshold planning quantity (TPQ) of 500 pounds requires certain emergency planning activities to be conducted.

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Chronic Health Hazard

Sudden Release of Pressure Hazard

Reactivity Hazard

16. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).