

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Sulfur Dioxide
CHEMICAL NAME: Sulfur Dioxide **FORMULA:** SO₂
SYNONYMS: Sulfurous oxide, Sulfurous Anhydride, Sulfur oxide
MANUFACTURER: Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
PRODUCT INFORMATION: (800) 752-1597
MSDS NUMBER: 1087 **REVISION:** 5
REVISION DATE: July 1997

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Sulfur dioxide is sold as pure product >99%.

CAS NUMBER: 7446-09-5

EXPOSURE LIMITS:

OSHA: PEL = 5 ppm

ACGIH: TWA/TLV = 2 ppm

NIOSH: IDLH = 100 ppm

SECTION 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Sulfur Dioxide is a nonflammable, colorless, irritating, liquefied compressed gas packaged in cylinders under its own vapor pressure (35 psig at 70°F). It has a suffocating odor, detectable at 3-5 ppm, and leaves an acidic taste in the mouth (0.3-1 ppm). It is a toxic, corrosive gas that can cause severe chemical burns if inhaled or upon skin contact. When entering release area wear Self Contained Breathing Apparatus (SCBA) if concentrations are unknown or exceed exposure limits. Fully protective suits are required in large releases. Reaction with water will produce heat and form a very corrosive acid.

EMERGENCY TELEPHONE NUMBERS

(800) 523-9374 Continental U.S., Canada, and Puerto Rico
(610) 481-7711 other locations

ACUTE POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE:

EYE CONTACT: Irritation and/or burns to the cornea that may lead to vision impairment or loss.

INHALATION: Corrosive and irritating to the respiratory tract and mucous membranes. Excessive exposure to concentrations above the exposure limits may result in chemical pneumonitis (inflammation), pulmonary hemorrhage (bleeding) and edema fluid buildup.

SKIN CONTACT: Chemical burn similar to one that is caused by an inorganic acid.

POTENTIAL HEALTH EFFECTS OF REPEATED EXPOSURE:

ROUTE OF ENTRY: Inhalation, eye or skin contact.

TARGET ORGANS: Airway, lungs, eyes, and skin.

SYMPTOMS: Burning/irritation in the eyes. Coughing, irritation in the throat and nasal tract. Irritation and/or burns of exposed areas.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Asthma, emphysema, or other respiratory diseases.

CARCINOGENICITY: This product is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA.

SECTION 4. FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.

INHALATION: Move exposed personnel to uncontaminated area. If not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention and continue with administration of oxygen. If airway obstruction occurs the placement of an artificial airway by an emergency medical technician may be necessary.

SKIN CONTACT: Immediately flush with large amounts of water. Remove contaminated clothing, including shoes, after flushing has begun. Applications of ice water compresses for 30 minutes after flushing may help limit extent of burn.

NOTES TO PHYSICIAN: Bronchospasm may be treated with the use of a bronchodilator such as albuterol and an anticholinergic inhalant such as Atrovent.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT:

Not applicable

AUTOIGNITION:

Not applicable

FLAMMABLE RANGE:

Nonflammable

EXTINGUISHING MEDIA: Product is nonflammable. Use extinguishing media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING INSTRUCTIONS: Evacuate all personnel from area. If possible without risk, move cylinders away from fire area. Keep cylinders cool with water spray until well after fire is out. Runoff from fire fighting may be contaminated; check pH. Cylinders exposed to high heat or flame may vent rapidly and may rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures found in fire situations.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Upon exposure to intense heat or flame, cylinder will vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a cylinder can build up due to heat and it may rupture if pressure relief devices should fail to function.

HAZARDOUS COMBUSTION PRODUCTS: None known.

SECTION 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate immediate area. If spill is small, ventilate area or remove cylinder to an outdoor location. Use appropriate protective equipment. If spill is large, evacuate all personnel from affected area. Increase ventilation to release area. Use appropriate protective equipment. Materials that are contacted by releasing product must be decontaminated. Regardless of spill size, shut off source of leak if possible. Isolate any leaking cylinder. If leak is from container, pressure relief device or its valve, contact your supplier. If leak is in user's system, close cylinder valve, safely vent pressure and purge with inert gas before attempting repairs.

SECTION 7. HANDLING AND STORAGE

STORAGE: Store cylinders in a well-ventilated, secure area, protected from the weather. Cylinders should be stored upright with valve outlet seals and valve protection caps in place. Do not allow storage temperature to exceed 125 °F (52 °C). Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Full and empty cylinders should be segregated. Use a first-in first-out inventory system to prevent full containers from being stored for long periods of time. Visually inspect stored cylinders on a routine basis, at least weekly, for any indication of leakage or other problems.

HANDLING: Do not drag, roll, slide or drop cylinder. Use a suitable hand truck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Use piping and equipment adequately designed to withstand pressures to be encountered. Never apply flame or localized heat directly to any part of the cylinder. Once cylinder has been connected to process, open cylinder valve slowly and carefully. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

Most metals are corroded by this product in the presence of moisture. Systems should be kept free of moisture. Purge system with dry inert gas (e.g. helium or nitrogen) before this product is introduced and when system is out of service. Carbon steel, stainless steel, Monel, or copper are suitable materials of construction for use when no moisture is present. Hastelloy, platinum or gold offer good resistance to corrosion when moisture is present. Kel-F or teflon are the preferred gasket materials. Pressure requirements should be considered when selecting materials and designing systems.

Use a "FULL", "IN USE", and "EMPTY" tag system on cylinders. This reduces the chances of inadvertently connecting or operating the wrong cylinder.

SPECIAL PRECAUTIONS: Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, Inc. (telephone 703-412-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

VENTILATION: Provide good ventilation and/or local exhaust to prevent accumulation of concentrations above exposure limits.

RESPIRATORY PROTECTION:

Emergency Use: Use SCBA or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits.

EYE PROTECTION: Safety glasses and face shield.

SKIN PROTECTION:

General Use: Leather gloves, safety shoes, and safety glasses for handling cylinders. Acid resistant gloves and splash suit when connecting, disconnecting, or opening cylinders.

Emergency Use: Totally encapsulated chemical resistant suit.

CAUTION: Contact with cold, evaporating liquid on gloves or suit may cause cryogenic burns or frostbite. Cold temperatures may also cause embrittlement of PPE material resulting in breakage and exposure.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, ODOR AND STATE: Colorless gas with sharp, suffocating, acidic odor.

MOLECULAR WEIGHT: 64.1

BOILING POINT (At 1 atm): 13.9 °F

SPECIFIC GRAVITY (also called vapor density) (Air =1): 2.25
FREEZING POINT / MELTING POINT (At 1 atm): -103.92 °F
VAPOR PRESSURE (At 70 °F (21.1 °C)): 35 PSIG
GAS DENSITY (At 70 °F (21.1 °C) and 1 atm): 0.168 lb/ft³

SECTION 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

CONDITIONS TO AVOID: Cylinders should not be exposed to temperatures in excess of 125 °F (52 °C).

INCOMPATIBILITY (Materials to Avoid): Moisture, brass, zinc, and zinc alloys

REACTIVITY:

A) **HAZARDOUS DECOMPOSITION PRODUCTS:** None

B) **HAZARDOUS POLYMERIZATION:** Will not occur

SECTION 11. TOXICOLOGICAL INFORMATION

LC₅₀ (Inhalation): 2520 ppm (1 hr. rat)

LD₅₀ (Oral): Not available

LD₅₀ (Dermal): Not available

CARCINOGENICITY: No data

SKIN CORROSIVITY: Can cause chemical burns similar to those caused by inorganic acids.

ADDITIONAL NOTES TO PHYSICIAN: Sulfur Dioxide is toxic, causing severe irritation of the upper respiratory tract upon inhalation, and irritation of the eyes and the skin on contact. Inhalation of high concentrations can cause inflammation (chemical pneumonitis) and fluid build-up (pulmonary edema) in the lungs or spasm of the larynx which can result in death.

SECTION 12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY: Sulfur dioxide is not listed as a marine pollutant by DOT (49 CFR 171).

MOBILITY: Not available

PERSISTENCE AND BIODEGRADABILITY: Not available

POTENTIAL TO BIOACCUMULATE: Not available

REMARKS: Do not release large amounts of this product to the atmosphere. It does not contain any Class I or Class II ozone depleting chemicals.

SECTION 13. DISPOSAL CONSIDERATIONS

UNUSED PRODUCT / EMPTY CONTAINER: Return container and unused product to supplier. Do not attempt to dispose of residual or unused quantities. Ensure cylinder valve is properly closed, valve outlet seal has been reinstalled, and valve protection cap is secured before shipping cylinder.

DISPOSAL INFORMATION: Small amounts of this product may be disposed of by slowly discharging the gas into a scrubber or other suitable vessel containing approximately 20 percent sodium hydroxide, potassium hydroxide, or other alkali and water. It is necessary to place a reverse-flow check-valve or trap in the discharge line to prevent the caustic solution from drawing back through the lines.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: Sulfur Dioxide

HAZARD CLASS: 2.3

IDENTIFICATION NUMBER: UN 1079

SHIPPING LABEL(s): Poison Gas (Primary), Corrosive

PLACARD (When required): Poison Gas

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well-ventilated truck. Never transport in passenger compartment of a vehicle. Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. The filling and shipping of a compressed gas cylinder without the written consent of the cylinder's owner is in violation of federal law (49 CFR 173.301).

NAERG #: 125

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

EPA - ENVIRONMENTAL PROTECTION AGENCY

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
(40 CFR Parts 117 and 302)

Reportable Quantity (RQ): None

SARA TITLE III: Superfund Amendment and Reauthorization Act

SECTIONS 302/304: Emergency Planning and Notification (40 CFR Part 355)

Extremely Hazardous Substances: Sulfur dioxide is listed.

Threshold Planning Quantity (TPQ): 500 lbs.

Reportable Quantity (RQ): 500 lbs.

SECTIONS 311/312: Hazardous Chemical Reporting (40 CFR Part 370)

IMMEDIATE HEALTH: Yes PRESSURE: Yes

DELAYED HEALTH: No REACTIVITY: Yes

FIRE: No

SECTION 313: Toxic Chemical Release Reporting (40 CFR Part 372)

This product does not require reporting under Section 313.

CLEAN AIR ACT:

SECTION 112 (r): Risk Management Programs for Chemical Accidental Release
(40 CFR PART 68)

This product is listed as a regulated substance.

Threshold Planning Quantity (TPQ): 5,000 lbs.

TSCA: Toxic Substance Control Act

This product is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR Part 1910.119: Process Safety Management of Highly Hazardous Chemicals

This product is listed in Appendix A as a highly hazardous chemical.

Threshold Planning Quantity (TPQ): 1000 lbs.

STATE REGULATIONS:

CALIFORNIA:

Proposition 65: Sulfur dioxide is not a listed substance which the State of California requires warning under this statute.

SECTION 16. OTHER INFORMATION

NFPA RATINGS:

HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 0

HMIS RATINGS:

HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

This Material Safety Data Sheet was reformatted in September 1998.