



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: CARBONYL SULFIDE

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
24-HOUR EMERGENCY TELEPHONE NUMBER:
CHEMTREC (800) 424-9300

TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER:
(905) 501-0802
EMERGENCY RESPONSE PLAN NO: 20101

PRODUCT NAME: CARBONYL SULFIDE
CHEMICAL NAME: Carbonyl Sulfide
COMMON NAMES/SYNONYMS: Carbon Oxysulfide, Carbon Oxide Sulfide
TDG (Canada) CLASSIFICATION: 2.3 (2.1)
WHMIS CLASSIFICATION: A, B1, D1A, D2A, D2B

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
Carbonyl Sulfide FORMULA: COS CAS: 463-58-1 RTECS #: FG6400000	100.0	Not Available	Not Available	LD ₅₀ 23 mg/kg (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

Irritating to the eyes, mucous membranes and respiratory system. Narcotic at high concentrations. May decompose into hydrogen sulfide within body tissues resulting in inhibition of cellular respiration, possible pulmonary paralysis, sudden collapse and death. Highly flammable.

ROUTE OF ENTRY:

Skin Contact Yes	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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PRODUCT NAME: CARBONYL SULFIDE

HEALTH EFFECTS:

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

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

EYE EFFECTS:

Low concentrations will generally cause irritation to the conjunctiva. Repeated exposure to low concentrations is reported to cause conjunctivitis, photo phobia, corneal bullae, tearing, pain and blurred vision.

SKIN EFFECTS:

May irritate the skin upon contact.

INGESTION EFFECTS:

Ingestion is unlikely.

INHALATION EFFECTS:

Irritating and a narcotic at high concentrations. May decompose into hydrogen sulfide within body tissues. Hydrogen sulfide reacts with enzymes in the bloodstream and inhibits cellular respiration resulting in pulmonary paralysis, sudden collapse and death. Continuous exposure to low (15-50 ppm) concentrations will generally cause irritation to mucous membranes, and may also cause headache, dizziness or nausea. Higher concentrations (200-300 ppm) may result in respiratory arrest leading to coma or unconsciousness. Exposures for more than 30 minutes at concentrations greater than 700 ppm have been fatal.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Blood disorders.

NFPA HAZARD CODES

Health: 3
Flammability: 4
Reactivity: 1

HMIS HAZARD CODES

Health: 3
Flammability: 4
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 TO CARBONYL SULFIDE SHOULD NOT WEAR CONTACT LENSES. Flush contaminated eyes with large amounts of water for at least 15 minutes. Part eyelids with fingers to ensure complete flushing. If irritation persists, seek medical attention immediately.

SKIN:

Flush affected area with water. If irritation persists, consult a physician.

INGESTION:

Treat in a manner similar to inhalation exposure. Seek medical attention as soon as possible.

INHALATION:

MSDS: G-21

Revised: 6/7/96

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PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND SHOULD RECOGNIZE THE HAZARDS OF OVEREXPOSURE DUE TO OLFACTORY FATIGUE. An extreme fire hazard exists when rescuing semiconscious or unconscious persons due to the flammability hazard. Avoid use of rescue equipment which may contain ignition sources or cause static discharge. 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 or a mixture of 5% carbon dioxide in oxygen. Keep victim calm and warm. Further treatment should be symptomatic and supportive. Seek medical assistance immediately.

5. Fire Fighting Measures

Conditions of Flammability: Flammable		
Flash point: Not Available	Method: Not Applicable	Autoignition Temperature: Not Available
LEL(%): 12	UEL(%): 29	
Hazardous combustion products: Sulfur Compounds		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

FIRE AND EXPLOSION HAZARDS:

Carbonyl sulfide is heavier than air and may accumulate in low areas and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture formation in low areas or pockets. Product may explode or burn over a wide range of mixtures in air.

EXTINGUISHING MEDIA:

Water, carbon dioxide, dry chemicals.

FIRE FIGHTING INSTRUCTIONS:

If possible, stop the flow of carbonyl sulfide. Use water spray to cool surrounding containers. Fire fighters should use self-contained breathing apparatus.

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:

Class I, Group D. Earth-ground and bond all lines and equipment associated with the Carbonyl Sulfide system. All electrical equipment should be non-sparking or explosion proof.

Anhydrous carbonyl sulfide can be handled at normal temperatures with most metals. Moist carbonyl sulfide should be handled in aluminum alloys 25 and 35, 316 stainless steel or 18-8 chromium-nickel steels. Teflon®, Kel-F®, Viton® or Nylon® are preferred gasket materials.

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 (<400 psig) piping or

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systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the system.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area 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 and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage area or use area. There should be no sources of ignition in the storage or use area.

For additional storage recommendations, consult Compressed Gas Association Pamphlet P-1.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection

EXPOSURE LIMITS¹:

INGREDIENT	% VOLUME	PEL-OSHA ²	TLV-ACGIH ³	LD ₅₀ or LC ₅₀ Route/Species
Carbonyl Sulfide FORMULA: COS CAS: 463-58-1 RTECS #: FG6400000	100.0	Not Available	Not Available	LD ₅₀ 23 mg/kg (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.

BOC recommends a 10 ppm 8-hr TWA limit and a 15 ppm 15-minute STEL limit based on the ACGIH TLV and STEL limits for Hydrogen Sulfide.

ENGINEERING CONTROLS:

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

EYE/FACE PROTECTION:

Gas tight chemical goggles or full-face piece respirator.

SKIN PROTECTION:

Protective gloves: Neoprene, butyl rubber, PVC, polyethylene.

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".

9. Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure at 70 °F	: 168	psia
Vapor density at STP (Air = 1)	: 2.03	
Evaporation point	: Not Available	
Boiling point	: -58.4	°F
	: -50.2	°C
Freezing point	: -216.8	°F
	: -138.2	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H2O)	: Slightly soluble	
Odor threshold	: Not Available	
Odor and appearance	: Colorless gas with rotten egg odor.	

10. Stability and Reactivity

STABILITY:

Stable

INCOMPATIBLE MATERIALS:

Reacts with oxidizers and forms explosive mixtures with oxygen. Hydrolyzes slowly in water, forming hydrogen sulfide and carbon dioxide.

HAZARDOUS DECOMPOSITION PRODUCTS:

Oxides of sulfur.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. Toxicological Information

No chronic effects data given in the Registry of Toxic Effects of Chemical Substances (RTECS) or Sax, Dangerous Properties of Industrial Materials, 7th ed.

12. Ecological Information

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.

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14. Transport Information

PARAMETER	United States DOT	Canada TDG
PROPER SHIPPING NAME:	Carbonyl Sulfide	Carbonyl Sulfide
HAZARD CLASS:	2.3	2.3 (2.1)
IDENTIFICATION NUMBER:	UN 2204	UN 2204
SHIPPING LABEL:	POISON GAS, FLAMMABLE GAS	POISON GAS, FLAMMABLE GAS

Additional Marking Requirement: "Inhalation Hazard"

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

15. Regulatory Information

Carbonyl sulfide is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

SARA TITLE III - NOTIFICATIONS AND INFORMATION

Releases of carbonyl sulfide in quantities equal to or greater than the reportable quantity (RQ) of 100 pounds are subject to reporting to the National Response Center under CERCLA, Section 304 SARA Title III.

SARA TITLE III - HAZARD CLASSES:

Acute Health Hazard

Fire Hazard

Sudden Release of Pressure Hazard

SARA TITLE III - SECTION 313 SUPPLIER NOTIFICATION:

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY VOLUME
463-58-1	CARBONYL SULFIDE	100.0

This information must be included on all MSDSs that are copied and distributed for this material.

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).