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MATERIAL
SAFETY
DATA SHEET

No. 19

PRODUCT NAME Chlorine	**CAS #** 7782-50-5
TRADE NAME AND SYNONYMS Chlorine	**DOT I.D. No.:** UN 1017 RQ 10(4.54)
CHEMICAL NAME AND SYNONYMS Chlorine	**DOT Hazard Class:** Division 2.3
ISSUE DATES AND REVISIONS Revised April 1998	**Formula** Cl_2
	Chemical Family: Halogen

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

0.5 Molar PPM with an A4 (Not Classifiable as a Human Carcinogent) carcinogen rating. STEL = 1 Molar PPM and an A4 carcinoqen ratinq (ACGIH 1997). (Continued on Page 4).

SYMPTOMS OF EXPOSURE

Corrosive and irritating to the upper and lower respiratory tract, all mucosal tissue, skin and eyes.

Inhalation: Initial symptoms are irritation of the eyes, nose and throat becoming steadily worse, suffocating and painful. (Continued on Page 4)

TOXICOLOGICAL PROPERTIES

Irritating and corrosive to all living tissue. Toxic level exposure to dermal tissues causes acid-like burns and skin lesions resulting in early necrosis and scarring. Chemical pneumonitis and pulmonary edema result from exposure to the lower respiratory tract and deep lung. Burns to the eye result in lesions and possible loss of vision.

Chlorine is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.

Persons in ill health where such illness would be aggravated by exposure to chlorine should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS REQUIRED IN ALL CASES OF OVEREXPOSURE TO CHLORINE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Unconscious persons should be moved to an uncontaminated area and given assisted respiration and supplemental oxygen. Keep the victim warm and quiet. Assure that mucus or vomited material does not obstruct the airway by positional drainage. Further treatment should be symptomatic and supportive.

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO CHLORINE SHOULD NOT WEAR CONTACT LENSES. (Continued on Page 4)

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

High reactivity with organic and inorganic compounds may cause explosions and can cause or aggravate fires. Most hazardous reactions are with OF_2, O_2F_2, F_2, NH_3, phosphorus and arsenic.

PHYSICAL DATA

BOILING POINT -29.3°F (-34.1°C)	**LIQUID DENSITY AT BOILING POINT** 97.4 lb/ft^3 (1560 kg/m^3)
VAPOR PRESSURE @ 70°F (21.1°C) = 100.2 psia (691 kPa)	**GAS DENSITY AT 70°F. 1 atm** .185 lb/ft^3 (2.96 kg/m^3)
SOLUBILITY IN WATER Very soluble	**FREEZING POINT** -149.8°F (-101°C)
EVAPORATION RATE N/A, (Gas)	**SPECIFIC GRAVITY (AIR=1)** 70°F (21.1°C) = 2.47

APPEARANCE AND ODOR Liquid is amber colored. Gas is greenish-yellow with a sharp, suffocatinq odor.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	**AUTO IGNITION TEMPERATURE** N/A	**FLAMMABLE LIMITS % BY VOLUME (See Page 4)** LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable gas		**ELECTRICAL CLASSIFICATION** Nonhazardous

SPECIAL FIRE FIGHTING PROCEDURES

If cylinders are involved in a fire, safely relocate or keep cool with water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Most combustible materials burn in chlorine as they do in oxygen.

REACTIVITY DATA

STABILITY		**CONDITIONS TO AVOID**
Unstable		None
Stable	X	

INCOMPATIBILITY (Materials to avoid) Hydrocarbons, ammonia, ether

HAZARDOUS DECOMPOSITION PRODUCTS None

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
May Occur		None
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

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

WASTE DISPOSAL METHOD

Do not attempt to dispose of 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 your supplier. For emergency disposal assistance, contact- your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION Hood with forced ventilation	**LOCAL EXHAUST** To prevent accumulation above the TWA	**SPECIAL** N/A
	MECHANICAL (Gen.) N/A	**OTHER** N/A
PROTECTIVE GLOVES PVC, Teflon® or Kel-F®. Natural rubber has poor resistance to chlorine as does Neoprene® and Nylon®		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash “fountain”		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Chlorine DOT Hazard Class: Division 2.3
DOT Shipping Label: Toxic Gas; Corrosive I.D. No.: UN 1017 (RQ 10/4.54)

SPECIAL HANDLING RECOMMENDATIONS

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 (<250 psig) piping or 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 cylinder.

For additional handling recommendations, consult Compressed Gas Association’s Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS

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 125F (52C). 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.

For additiona1 storage recommendations, consult Compressed Gas Association’s Pamphlet P-1.

SPECIAL PACKAGING RECOMMENDATIONS

Most metals are corroded by chlorine at ambient temperatures if moisture is present. Systems must be kept scrupulously dry. Lead, gold, tantalum and Hasteloy® offer the best corrosion resistance to moist chlorine.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page 4)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

OSHA 1995 lists a 1 Molar PPM Ceiling Limit.

SYMPTOMS OF EXPOSURE: (Continued)

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 may include headache, general discomfort and anxiety.

Skin and Eye Contact: Contact with the liquid or vapor causes painful burns and ulcerations.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Flush contaminated eye(s) with copious quantities of water. Part eyelids to assure complete flushing. Continue for a minimum of 15 minutes.

Skin Contact: Flush affected area with copious quantities of water. Remove contaminated clothing as rapidly as possible.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Chlorine is a toxic chemical and subject to the reporting requirements of SARA, Title III, Section 313.

NFPA 704 No. for chlorine = 3 O O OX