PRODUCT INFORMATION

PRODUCT: Cyanogen Chloride
TRADE NAME: Cyanogen Chloride
CHEMICAL NAME: Cyanogen Chloride
SYNONYMS: Cyanogen Chloride, Inhibited
FORMULA: CNCl
CHEMICAL FAMILY: Organic Cyano Halide
SUPPLIER’S NAME: MEGS Inc.
SUPPLIER’S ADDRESS: 2675 De Miniac
Ville St-Laurent, Qc, H4S 1E5
EMERGENCY PHONE NUMBER: (514) 956-7503
MOLECULAR WEIGHT: 61.47
PRODUCT USE: Various
PRODUCT IDENTIFICATION NUMBER: UN 1589

HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>CHEMICAL ID</th>
<th>CONCENTRATION</th>
<th>CAS #</th>
<th>LD(50)</th>
<th>LC(50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanogen Chloride</td>
<td>99+ %</td>
<td>506-77-4</td>
<td>SCU-Mouse</td>
<td>Inhl-Rat</td>
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<td></td>
<td>39 mg/kg</td>
<td>3000 ppm/2 min</td>
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PHYSICAL DATA

PHYSICAL STATE: Liquid and gas under pressure
APPEARANCE: Colorless liquid and gas
ODOR: Extremely irritating odor
ODOR THRESHOLD: 1.0 molar ppm
SPECIFIC GRAVITY (H₂O = 1): 1.25
VAPOR PRESSURE: 133 kPa
VAPOR DENSITY (air = 1): 2.12
EVAPORATION RATE: Unknown
BOILING POINT: 12.95°C
FREEZING POINT: -6.9°C
pH: Unknown
GAS DENSITY: 2.603 kg/m³ @ 15°C, 101.3 kPa
COEFFICIENT OF WATER/OIL: Very soluble in water

FIRE OR EXPLOSION HAZARD

CONDITIONS OF FLAMMABILITY: Nonflammable gas
MEANS OF EXTINCTION: Nonflammable gas
FLASHPOINT AND METHOD OF DETERMINATION: Nonflammable gas
UPPER EXPLOSION LIMIT (% BY VOL): Nonflammable gas
LOWER EXPLOSION LIMIT (% BY VOL): Nonflammable gas
AUTO-IGNITION TEMPERATURE: Nonflammable gas
FLAMMABILITY CLASSIFICATION: Nonflammable gas
HAZARDOUS COMBUSTION PRODUCTS: Nonflammable gas
EXPLOSION DATA: Nonflammable gas
SENSITIVITY TO STATIC DISCHARGE: None

REACTIVITY DATA

CHEMICAL STABILITY: Pure product is unstable. This product contains an inhibitor to prevent polymerization.

INCOMPATIBLE MATERIALS: Water and water vapor
CONDITIONS OF REACTIVITY: None if heat and moisture are avoided
HAZARDOUS DECOMPOSITION PRODUCTS: 2,4,6-Trichloro-S-Triazine on violent polymerization.

TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY:
**SKIN CONTACT:** Irritation at very low (<10 molar ppm) concentrations for 10 minutes.

**SKIN ABSORPTION:** Unknown

**EYE:** Yes, extremely irritating in low concentrations.

**INHALATION:** Exposure is by inhalation of the vapors which in very low concentrations (<10 molar ppm) for as little as 10 minutes exposure will cause severe irritation of the upper respiratory tract and all mucous membranes. Severe lachrymation of eyes also occurs. Continued exposure leads to a slowdown of the breathing rate, bronchial hemorrhage and pulmonary edema. Breathing just a few breaths of high concentrations leads to immediate anoxia and death.

**INGESTION:** Unknown

**ACUTE OVER EXPOSURE EFFECTS:** Inhalation effects are similar to that for cyanogen (interference with the oxygen transfer oxygen-reduction reactions at the cell level) coupled with extremely irritating effect of the gas on the mucous membranes and the eyes. Long exposure without expiration will yield both the toxic poisonous effects on the nervous system as well as pulmonary edema from the irritant.

**CHRONIC OVER EXPOSURE EFFECTS:** None known

**EXPOSURE LIMITS:** Ceiling limit = 0.3 molar ppm (ACGIH 1995-1996)

**IRRITANCY OF PRODUCT:** Yes, eye-human = 100 mg/m³ for 2M is severe

**SENSITIZATION TO MATERIAL:** None known

**CARCINOGENICITY, REPRODUCTIVE EFFECTS:** None known

**TERATOGENICITY, MUTAGENICITY:** None known

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** Yes, possibly (CN) compounds

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**PREVENTIVE MEASURES**

**PERSONAL PROTECTIVE EQUIPMENT:** Plastic or rubber gloves. Safety goggles or glasses plus a face shield. Safety shoes, safety shower and eyewash "fountain" and chemical resistant overgarments.

**SPECIFIC ENGINEERING CONTROLS:** Dry cyanogen chloride is compatible
with most materials of construction. Recommended metals of construction are Monel®, Inconel® and Tantalum. Teflon® and Kel-F® are the preferred gasket materials.

**LEAK AND SPILL PROCEDURES:** 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 on container or container valve, contact the closest MEGS location.

**WASTE DISPOSAL:** 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 MEGS for proper disposal. For emergency disposal, contact the closest MEGS location.

**HANDLING PROCEDURES AND EQUIPMENT:** USE ONLY IN WELL-VENTILATED AREAS.
Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to the point of use. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. 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. Close valve after each use and when empty.

**STORAGE REQUIREMENTS:** Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C. Cylinders must 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.

**TDG CLASSIFICATION:** 2.3

**WHMIS CLASSIFICATION:** A, D1, E

**SPECIAL SHIPPING INFORMATION:** 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.

**FIRST AID MEASURES**

**SPECIFIC FIRST AID PROCEDURES:** PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CYANOGEN
CHLORIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH APPROPRIATE PROTECTIVE EQUIPMENT (SELF-CONTAINED BREATHING APPARATUS AND APPROPRIATE PROTECTIVE CLOTHING).

**INHALATION:** Move exposed personnel to an uncontaminated area. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Keep victim warm and quiet. Assure that mucous or vomited material does not obstruct the airway by use of positional drainage. Delayed pulmonary edema may occur. Keep patient under medical observation for at least 24 hours. Treatment with amyl nitrite as with cyanogen poisoning may also be required.

**EYE CONTACT:** PERSONS WITH POTENTIAL EXPOSURE TO CYANOGEN CHLORIDE SHOULD NOT WEAR CONTACT LENSES.

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

**SKIN CONTACT:** Flush affected area with copious quantities of water. Remove affected clothing as rapidly as possible.