The Chloramone Co.
a division of KUEHNE CHEMICAL COMPANY, INC.

P.O. BOX 294
RIVER ROAD & RED LION CREEK
DELAWARE CITY, DELAWARE 19706
PHONE (302) 834-4557

MSDS NUMBER : M4734

MSDS DATE : 03-15-94

PRODUCT NAME : LIQUID CHLORINE

RECEIVED
FEB 25 1998
ACTION BOARD OF HEALTH

24 HOUR EMERGENCY PHONE: (302) 834-4558

I. PRODUCT IDENTIFICATION

HMIS HAZARD RATINGS

HEALTH HAZARD 3 FIRE HAZARD 0 REACTIVITY 1

Based on the National Paint & Coatings Association HMIS rating system.

SARA/TITLE III HAZARD CATEGORIES (See Section X)

Immediate (ACUTE) Health: YES
Delayed (Chronic) Health: NO
Fire Hazard: YES
Reactive Hazard: NO
Sudden Release of Pressure: YES

MANUFACTURER'S NAME AND ADDRESS : Occidental Chemical Corporation
Customer Service, Occidental Tower,
P.O. Box 809050, Dallas, Texas 75380
Telephone (1-800-752-5151)

CHEMICAL NAME: Chlorine CAS NUMBER: 7782-50-5

SYNONYMS/COMMON NAMES: Chlorine Gas

CHEMICAL FORMULA: Cl2

PRODUCT USE: Water Purification, Chemical Processes, Plastic manufacture

DOT PROPER SHIPPING NAME: Chlorine

DOT HAZARD CLASS: 2.3

DOT I.D. NUMBER: UN1017

DOT PACKING GROUP: Not Applicable

DOT HAZARDOUS SUBSTANCE: RQ = 10 lbs.

DOT MARINE POLLUTANT. Chlorine

ADDITIONAL DESCRIPTION REQUIREMENT: Poison Inhalation Hazard, Zone B

CAS : Chemical Abstract Service Number
PEL : OSHA Permissible Exposure Limit
TLV : ACGIH Threshold Limit Value, Current
NE : No relevant information found or not available
CEAR : Corporate Exposure Limit
NA : Not applicable
* : See Chronic Effects Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY, OR GUARANTY, EXPRESS OR IMPLIED IS MADE REGARDING PERFORMANCE, STABILITY, OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws.

MSDS NUMBER: M4734
PRODUCT NAME: LIQUID CHLORINE

I. PRODUCT IDENTIFICATION

TDG PROPER NAME: Chlorine

TDG PRIMARY CLASS(ES): 2.4

TDG SUBSIDIARY CLASS(ES): Not Applicable

TDG PRODUCT ID NUMBER: UN 1017

TDG PACKING GROUP: X

RL FOR DIVISION 9.2: Not Applicable

ADDITIONAL DESCRIPTION INFORMATION: Schedule XII for quantities exceeding 1000 kg or liters per shipment.

II. HEALTH HAZARD INFORMATION

EMERGENCY AND FIRST AID PROCEDURES

EYES:
IMMEDIATELY flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire eye surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

SKIN:
Treat for inhalation first. Remove contaminated clothing under safety shower. Flush exposed skin with water. Wash with soap and water. If irritation is present after washing, GET MEDICAL ATTENTION.

INHALATION:
Remove to fresh air. Administer oxygen until victim breathes easily. Keep warm and at rest. In mild cases, give milk to relieve irritation. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

INGESTION:
NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (if available, give several glasses of milk). If vomiting occurs spontaneously, keep airway clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY.

ROUTES OF EXPOSURE

INHALATION:
May cause severe irritation to respiratory tract followed by coughing, burning, chest pain, vomiting, headache, anxiety and feeling of suffocation. Severe exposure may cause pneumonitis and pulmonary edema. Repeated exposure to chlorine may result in reduced pulmonary capacity and dental erosion.

SKIN:
Contact with liquid chlorine may cause burns, blistering and tissue destruction.

EYE CONTACT:
Liquid and/or high concentrations of chlorine gas in contact with the eyes will cause extreme irritation and/or burns.

INGESTION:
Unlikely to occur.

II. HEALTH HAZARD INFORMATION (Continued)

EFFECTS OF OVEREXPOSURE

ACUTE:

Liquid contact with skin or eyes may cause burns. Vapors may cause severe irritation to skin, eyes and respiratory tract. Inhalation of large concentrations may cause pneumonitis and pulmonary edema.

CHRONIC:

There are no known chronic effects from exposure to chlorine vapors at or below the accepted occupational limits for exposure. Repeated exposure to chlorine above the TLV may result in reduced pulmonary capacity and dental erosion.

TOXICOLOGY DATA:

Chlorine gas is a primary irritant of the respiratory tract.

Severe exposure to vapor can be fatal. Exposure to liquid can cause burns on contact. Prompt treatment is important to minimize effects.

The hazard at different concentrations is reported to be as follows:

0.2-0.5 ppm	= No toxic, long term effect
1-3 ppm	= Definite odor; irritation of eyes and nose
5-8 ppm	= Throat, eye, and mucous membrane irritation
30 ppm	= Intense coughing fits
34-51 ppm	= Lethal in 1 to 1.5 hours exposure
40-60 ppm	= Exposure for 30-60 minutes without effective respiration may cause bronchitis, pulmonary edema or bronchopneumonia
100 ppm	= May be lethal after 60 minutes of exposure (estimated)
430 ppm	= Lowest concentration known to cause lethality after 30 minutes of exposure.
1000 ppm	= May be fatal with a few deep breaths

NOTES TO PHYSICIAN:

Treatment is symptomatic. Because there is no known antidote for chlorine gas inhalation, effective and immediate relief of symptoms is the primary goal. Steroid therapy, if given early, has been reported effective in preventing pulmonary edema.

SYNERGISTIC MATERIALS:

None known.

III. IMPORTANT COMPONENTS

CAS NUMBER / NAME
7782505 Chlorine

EXPOSURE LIMITS
PEL: 0.5 ppm; 1.5 mg/m3 TWA
STEL 1 ppm; 3 mg/m3
TLV: 0.5ppm; 1.5 mg/m3 TWA
STEL 1 ppm; 2.9 mg/m3

PERCENTAGE
VOL ND
WT 99.50-100

COMMON NAMES:

Listed On(List Legend Below):
01 02 13 16 18 45

All components of this product that are required to be on the TSCA Inventory are listed on the inventory.

Not listed as carcinogen - IARC, NTP, OSHA

LIST LEGEND
1 SARA EXTR HAZ SUB, SECTION 302
2 SARA TOXIC CHEM, SECTION 313
13 PA ENVIROMENTAL HAZ SUBSTANCE
16 NJ WORKPLACE HAZ SUBSTANCE LST
18 NY HAZARDOUS SUBSTANCES
45 EPA/OSHA ACCIDENTAL RELEASE

IV. FIRE AND EXPLOSION DATA

FLASH POINT: Not applicable AUTOIGNITION TEMPERATURE: Not applicable

FLAMMABLE LIMITS IN AIR % BY VOLUME- UPPER: Nonflammable
LOWER: Nonflammable

EXTINGUISHING MEDIA:
Use water to keep fire-exposed containers cool. If it is necessary to stop the flow of gas, use water spray to direct escaping gas away from persons effecting the shut-off. Wear full protective clothing. Use extinguishing media as appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:
In case of fire, chlorine containers should be removed from fire zone immediately. Tank cars or barges should be disconnected and pulled out of the danger area. If no chlorine is escaping, water should be applied to cool containers that cannot be moved. All unauthorized persons should be kept at a safe distance. Fire fighters must use self-contained breathing apparatus, eye protection and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARD:
Chlorine gas or liquid, is nonexplosive and nonflammable. However, like oxygen, it is capable of supporting combustion of certain substances. Reacts explosively, or forms explosive compounds, with many chemicals, such as acetylene, turpentine, ether, ammonia gas, hydrogen, and finely divided metals.

SENSITIVITY TO MECHANICAL IMPACT:
Not sensitive.

SENSITIVITY TO STATIC DISCHARGE:
Not sensitive.

V. SPECIAL PROTECTION

VENTILATION REQUIREMENTS:

Provide general and local exhaust ventilation to meet OSHA Ceiling exposure limit of 1 ppm. Provide venting for low-lying areas. Use closed systems when possible.

SPECIFIC PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY:

Use a NIOSH/MSHA approved respirator following manufacturer's recommendations where gas leaks may occur. Use supplied air respirator in positive pressure mode following ANSI Z117.1 for tank and confined space entry.

EYE:

Face shield and chemical goggles should be worn.

GLOVES:

Impervious gloves should be worn. Natural rubber or latex have been used. Contaminated gloves should be discarded.

OTHER CLOTHING AND EQUIPMENT:

Standard work clothing. Wash contaminated clothing with soap and water and dry before reuse. Emergency shower and eyewash facility should be in close proximity.

VI. PHYSICAL DATA

BOILING POINT @ 760 mm Hg: -34°C (-29.3°F)

FREEZING POINT: -101°C (-150°F)

VAPOR PRESSURE: 2748mm Hg @ 0°C

SPECIFIC GRAVITY (H2O=1): 1.4 @ 15.4°C

SOLUBILITY IN H2O % BY WT: 0.7 % @ 20°C

VAPOR DENSITY (Air=1): 2.5

APPEARANCE AND ODOR: Amber color liquid. Greenish-yellow gas. Pungent irritating odor.

ODOR THRESHOLD (ppm): Approximately 2 ppm

pH: 0.7% solution has pH 5.5

% VOLATILES BY VOL.: 100%

EVAPORATION RATE: Not applicable; gas under atmospheric conditions

COEFFICIENT WATER/OIL DISTRIBUTION: Not available

VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY:

Chlorine is stable. Avoid the release of chlorine to the atmosphere. Do not place chlorine containers near heat or fire. Never use water or the source of a chlorine leak. Water spray may be used to direct the flow of escaping chlorine gas.

INCOMPATIBILITY:

Reducing agents, combustible materials. Keep away from materials such as acetylene, turpentine and other hydrocarbons, ammonia, hydrogen, ether, powdered metals, sulfur and aluminum. Reacts with hydrogen sulfide and water forming hydrochloric acid. Combines with carbon monoxide and sulfur dioxide forming phosgene and sulfuryl chloride. Moist chlorine is highly corrosive to most metals. Chlorine reaction to some organic compounds can be explosive. Strong oxidizer.

HAZARDOUS DECOMPOSITION PRODUCTS:

None.

CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION:

None

VIII. HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

Store chlorine containers in a well ventilated area of low fire potential and away from incompatible materials (acetylene, turpentine, other hydrocarbons, ammonia, hydrogen, ether, powdered metals, sulfur, aluminum, reducing agents and combustible materials). Keep away from heat and source of ignition. Protect container from weather and physical damage. Follow safety procedures for containers of compressed gases. Provide special training to workers handling chlorine. Regularly test and inspect piping and containment used for chlorine service. Liquid levels should be less than 85% of tank or cylinder capacity.

IX. ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

If a material is spilled or released to the atmosphere, keep up-wind, provide ventilation, wear full protective equipment and shut off supply at source. Exclude non-essential personnel. Contain liquids and prevent discharges to streams or sewer systems; and control or stop the loss of volatile materials to the atmosphere. Large leaks may require environmental consideration and possible evacuation. Do not apply water to leak.

Spills or releases should be reported, if required, to the appropriate local, state and federal agencies.

NEUTRALIZING CHEMICALS:

Chlorine can be absorbed into an alkaline solution, i.e., caustic soda (NaOH), caustic potash (KOH), lime, etc.

WASTE DISPOSAL METHOD:

Move leaking container to isolated area. Position to release gas, not liquid. Absorb in alkaline solution of caustic soda, soda ash or hydrated lime.

Dispose in accordance with all federal, state, and local health and pollution regulations. Depending upon the particular situation involved, special equipment may be required. Consult your chlorine supplier.

X. ADDITIONAL INFORMATION

Spills of chlorine of 10 or more pounds must be reported to the National Response Center, 1-800-424-8802.

Chlorine is contained on a list as required under Sec 101(14) of CERCLA, which includes substances designated pursuant to SEC 311 of the Clean Water Act, Hazardous Wastes under SEC 3001 of RCRA, Toxic Pollutants under SEC 307 of the Clean Water Act, Hazardous Air Pollutants under Sec 112 of the Clean Air Act, Imminently hazardous Chemicals under Sec 7 of TSCA. Chlorine is designated a hazardous substance by 29 CFR Sec 1910, Subpart Z. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) is applicable if chlorine is used as a pesticide or in water or sewer treatment applications.

OSHA Standard 29CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

To aid our customers in complying with regulatory requirements, SARA Title III hazard categories for this product are indicated in Section I. If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR Part 370. Please consult those regulations for details.

This product contains a toxic chemical or chemicals subject to the reporting requirements of SECTION 313 of TITLE III of the SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 and 40 CFR PART 372. (See Section III, List Legend 02)

WHMIS CLASSIFICATION A, C, D1A, E

XI. PREPARATION INFORMATION

For additional Non-Emergency health, safety, or environmental information telephone (610) 965-5130, or write to:

The Chloramone Company
P.O. Box 779
Emmaus, PA 18049

This MSDS replaces MSDS Number: M4734 dated 12/13/91.

WARNING LABEL INFORMATION

HANDLING AND STORAGE:

Store chlorine containers in a well ventilated area of low fire potential and away from incompatible materials (acetylene, turpentine, other hydrocarbons, ammonia, hydrogen, ether, powdered metals, sulfur, aluminum, reducing agents and combustible materials). Keep away from heat and source of ignition. Protect container from weather and physical damage. Follow safety procedures for containers of compressed gases. Provide special training to workers handling chlorine. Regularly test and inspect piping and containment used for chlorine service. Liquid levels should be less than 85% of tank or cylinder capacity.

DISPOSAL:

Vent waste chlorine gas into scrubber using dilute alkali solution. Dispose of resultant hypochlorite in accordance with local, state, and federal regulations. Return empty chlorine tank cars and tank trucks containing residual gas and/or liquid to supplier in compliance with applicable DOT regulations. Spills of 10 pounds or more must be reported to the NATIONAL RESPONSE CENTER 1-800-424-8802.

INFORMATION REQUIRED BY FEDERAL, STATE OR LOCAL REGULATIONS:

This product contains:

CAS#	NAME
7782505	Chlorine

HMIS RATING SYSTEM: HEALTH 3 FLAMMABILITY 0 REACTIVITY 1

FOR INDUSTRIAL USE ONLY

LABEL 112M4734

WARNING LABEL INFORMATION

SIGNAL WORD: DANGER

STATEMENT OF HAZARDS:

POISON
HAZARDOUS LIQUID AND GAS UNDER PRESSURE
MAY CAUSE CHEMICAL PNEUMONIA AND EVEN DEATH IN HIGH CONCENTRATIONS.
MAY CAUSE SEVERE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT.
LIQUID MAY BURN EYES AND SKIN.
CAN REACT EXPLOSIVELY WITH ORGANIC PRODUCTS.

PRECAUTIONARY STATEMENTS:

DO NOT handle or use until Material Safety Data Sheet provided by manufacturer has been read and understood.
Wear face shield, goggles, and rubber gloves when handling.
Use NIOSH/MSHA approved respirator and local exhaust ventilation where vapor may be generated.
DO NOT get in eyes, on skin, or clothing.
DO NOT heat container.
Avoid contact with organic products to prevent explosive reaction.
Corrosive to most metals in presence of moisture.

FIRST AID:

FOR EYES:
IMMEDIATELY flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire eye surface. Washing eyes within several seconds is essential to achieve maximum effectiveness. SEEK MEDICAL ATTENTION IMMEDIATELY.

FOR SKIN:
Treat for inhalation first. Remove contaminated clothing under safety shower. Flush exposed skin with water. Wash with soap and water. If irritation is present after washing, GET MEDICAL ATTENTION.

IF INHALED:
Remove to fresh air. Administer oxygen until victim breathes easily. Keep warm and at rest. In mild cases, give milk to relieve irritation. DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION AS SOON AS POSSIBLE.

IF SWALLOWED:
NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. SEEK MEDICAL ATTENTION IMMEDIATELY.

IN CASE OF:
SPILL OR LEAK:
If this material is spilled or released to the atmosphere, keep up-wind, provide ventilation, wear full protective equipment and shut off supply at source. Exclude non-essential personnel. Contain liquids and prevent discharges to streams or sewer systems; and control or stop the loss of volatile materials to the atmosphere. Large leaks may require environmental consideration and possible evacuation. Do not apply water to leak. Chlorine can be absorbed into an alkaline solution, i.e. caustic soda, caustic potash, lime etc.