

SAFETY DATA SHEET

M30816 NA_EN



Occidental Chemical Corporation

A subsidiary of Occidental Petroleum Corporation



CHLORINE, LIQUID (PESTICIDE)

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification: Occidental Chemical Corporation
5005 LBJ Freeway
P.O. Box 809050
Dallas, TX 75380-9050

24 Hour Emergency Telephone Number: 1-800-733-3665 or 1-972-404-3228 (U.S.); CHEMTREC (U.S.): 1-800-424-9300; CHEMTREC (outside U.S.): +1 703-527-3887

To Request an SDS: MSDS@oxy.com or 1-972-404-3245

Customer Service: 1-800-752-5151 or 1-972-404-3700

Synonyms: CHLORINE, LIQUEFIED GAS

Product Use: Water treatment chemicals
This material is a registered pesticide: EPA Registration Number 935-8.

Note: This product can be sold into Canada for drinking water and wastewater treatment uses

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Color: Green to yellow gas amber liquid
Physical State: Compressed, liquefied gas
Odor: Irritating, Pungent

Signal Word: **DANGER**

PHYSICAL HAZARDS: OXIDIZER. Hazardous gas under pressure. May react explosively with organic materials. May ignite or explode on contact with combustible materials.

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

ECOLOGICAL HAZARDS: This material is highly toxic to aquatic organisms on an acute basis.

PRECAUTIONARY STATEMENTS: Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Store away from organic and combustible materials. Keep container tightly closed. Wash thoroughly after handling.

POTENTIAL HEALTH EFFECTS:

Inhalation: May cause irritation (possibly severe), chemical burns, and pulmonary edema.

Skin contact: Causes skin burns. Rapid evaporation of the material may cause frostbite.

Eye contact: Causes serious eye damage. Rapid evaporation of the material may cause frostbite.

Ingestion: Not a likely route of exposure.

Chronic Effects: Causes damage to the respiratory system through prolonged or repeated exposure.

Medical Conditions Aggravated by Exposure: Respiratory system (including asthma and other breathing disorders).

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | % | CAS Number |
|-----------|------------|------------|
| Chlorine | 99.5 - 100 | 7782-50-5 |

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation and/or Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Do not attempt to remove frozen clothing from frostbitten areas. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Not a likely route of exposure.

Notes to Physician: Delayed Pulmonary Edema may occur 48-72 hours after exposure in individuals with alveolar injury. There is no specific therapy for the injury, and supportive care is recommended. Treatments with steroids and bicarbonate have been reported.

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard. Oxidizer. Most combustibles will burn in this material causing toxic gases.

Explosive properties: May ignite or explode on contact with combustible materials. May react explosively with organic materials.

Extinguishing Media: Use extinguishing agents appropriate for surrounding fire.

Fire Fighting: Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Firefighters should wear a one piece, total-encapsulating suit of Butyl coated nylon or equivalent. Keep unnecessary people away, isolate hazard area and deny entry. Move container from fire area if it can be done without risk. Do not apply water directly to a leak. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Flame impingement on steel chlorine container will result in iron/chlorine fire causing rupture of the container.

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Flash point: Not flammable

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Evacuate unprotected personnel upwind or crosswind for at least 100 feet (800 feet for large spills) out of danger area. Wear appropriate personal protective equipment recommended in Section 8 of the SDS. Remove sources of ignition. Stop leak if possible without personal risk. If a chlorine container is leaking, try to position it so that gas rather than liquid leaks. Apply emergency kit device if possible. For other than minor leaks, immediately implement predetermined emergency plan. Do not apply water directly to a leak. Reacts with water to form corrosive, acidic solution (hydrochloric acid). Keep out of water supplies and sewers. Call supplier, CHLOREP team, or CHEMTREC when help is needed. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Storage Conditions: Do not attempt to store, handle or use without complete review of The Chlorine Institute Chlorine Manual (Phone: (202) 775-2790). Store and handle in accordance with all current regulations and standards. Keep container tightly closed. Store in a well-ventilated area. Protect from sunlight. Do not apply heat. Keep away from heat, sparks and open flames. Keep separated from incompatible substances (see Section 10 of the Safety Data Sheet). Avoid contact with water or moisture. Reacts with water to form a corrosive, acidic solution. The vapor is heavier than air. Store away from basements, pits or other confined spaces. Make daily inspections for leaks. Protect from physical damage.

Handling Procedures: Do not breathe vapours or spray mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Liquefied gas under pressure. Piping and equipment must be thoroughly cleaned of organics and moisture before use. Corrosive to most metals in the presence of moisture. Liquid lines must have suitable expansion chambers between block valves due to the high coefficient of expansion.

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure Limit(s): As listed below

| Component | OSHA Final PEL TWA | OSHA Final PEL STEL | OSHA Final PEL Ceiling |
|-----------------------|-----------------------|------------------------|------------------------------|
| Chlorine 7782-50-5 | ----- | ----- | 1 ppm 3 mg/m ³ |

OEL: Occupational Exposure Limit; **OSHA:** United States Occupational Safety and Health Administration; **PEL:** Permissible Exposure Limit; **TWA:** Time Weighted Average; **STEL:** Short Term Exposure Limit

Non-Regulatory Exposure Limit(s): As listed below

| Component | CAS Number | ACGIH TWA | ACGIH STEL | ACGIH Ceiling | OSHA TWA (Vacated) | OSHA STEL (Vacated) | OSHA Ceiling (Vacated) |
|-----------|---------------|--------------|---------------|------------------|----------------------------------|------------------------------|---------------------------|
| Chlorine | 7782-50-5 | 0.5 ppm | 1 ppm | ----- | 0.5 ppm 1.5 mg/m ³ | 1 ppm 3 mg/m ³ | ----- |

- The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits shown in the table are the Vacated 1989 PEL's (vacated by 58 FR 35338, June 30, 1993).

- The American Conference of Governmental Industrial Hygienists (ACGIH) is a voluntary organization of professional industrial hygiene personnel in government or educational institutions in the United States. The ACGIH develops and publishes recommended occupational exposure limits each year called Threshold Limit Values (TLVs) for hundreds of chemicals, physical agents, and biological exposure indices.

ENGINEERING CONTROLS: Do not use in poorly ventilated or confined spaces. Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear safety glasses with side-shields. Wear chemical safety goggles with a faceshield to protect against skin and eye contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin and Body Protection: Wear appropriate chemical resistant clothing. When responding to accidental release of unknown concentrations, wear one-piece, total encapsulating suit of Butyl coated nylon or equivalent.

Hand Protection: Wear chemical resistant, insulated gloves such as Perfect Fit NL-56(TM) or Best 6781R(TM). Consult a glove supplier for assistance in selecting an appropriate chemical resistant glove.

Protective Material Types: Perfect Fit NL-56(TM), Best 6781R(TM), Best Nitri Solve 727(TM), Tychem 10000 (TM)

| Component | Immediately Dangerous to Life/ Health (IDLH) |
|-----------|--|
| Chlorine | 10 ppm |

Respiratory Protection: Where vapor concentration exceeds or is likely to exceed applicable exposure limits, a NIOSH approved respirator is required. When an air-purifying respirator is not adequate or for spills and/or emergencies of unknown concentrations, a NIOSH approved self-contained breathing apparatus or airline respirator with full-face piece is required. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|-----------------------------------|
| Physical State: | Compressed, liquefied gas |
| Color: | Green to yellow gas, amber liquid |
| Odor: | Irritating, Pungent |
| Odor Threshold: | 0.31 ppm (approximate) |
| Molecular Weight: | 70.91 |
| Molecular Formula: | Cl ₂ |
| Boiling Point/Range: | -29.27 °F (-34.04 °C) |
| Freezing Point/Range: | -150 °F (-101 °C) |
| Vapor Pressure: | 5830 mmHg @ 25 °C |
| Vapor Density (air=1): | 2.4 |
| Specific Gravity (water=1): | 1.4 @ 15.6 °C |
| Density: | 11.7 lbs/gal @ 15.6 °C |
| Water Solubility: | 0.7% @ 20 °C |
| pH: | Not applicable |
| Volatility: | 100% |
| Evaporation Rate (ether=1): | No data available |
| Partition Coefficient (n-octanol/water): | No data available |
| Flash point: | Not flammable |

10. STABILITY AND REACTIVITY

Reactivity/ Stability: Stable at normal temperatures and pressures.

Conditions to Avoid: Dry material is highly reactive with titanium and tin. Reacts with most metals at high temperatures or in the presence of moisture. Avoid contact with water. Reacts with water to form corrosive, acidic solution (hydrochloric acid). May react explosively with organic materials.

Incompatibilities/ Materials to Avoid: ammonia, elemental metals, metal hydrides, Carbides, nitrides, oxides, phosphides, sulfides, easily oxidized materials, Organic materials, (e.g., petrochemicals, oils, greases), unstable and reactive compounds

Hazardous Decomposition Products: None known

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

| Component | LD50 Oral: | LC50 Inhalation: | LD50 Dermal: |
|-----------|------------|--|--------------|
| Chlorine | ----- | 0.86 mg/L (1 hr-Rat) 293 ppm (1 hr-Rat) | ----- |

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

ACUTE TOXICITY:

This material is corrosive to the skin, eyes, and respiratory tract. Breathing this material is harmful and can cause death. Harmful effects include burns and permanent damage to the airways, including the nose, throat, and lungs. The extent of injury following chlorine exposure depends upon concentration and duration of exposure as well as water content of the tissue involved. Estimated effects are as follows:

| | |
|---------------|---|
| 0.2 - 0.4 ppm | odor detection (some tolerance develops) |
| 1 - 3 ppm | mild mucous membrane irritation (can be tolerated ~ 1 hour) |
| 5 - 15 ppm | moderate irritation of upper respiratory tract |
| 30 ppm | immediate chest pain, vomiting, dyspnea, cough |
| 40 - 60 ppm | toxic pneumonitis and pulmonary edema |
| 430 ppm | lethal over 30 minutes |
| 1000 ppm | fatal within a few minutes |

Its action in the respiratory tract is due to its strong oxidizing capability; it forms both hypochlorous acid and hypochloric acid on contact with moist mucous membranes. Symptoms of pulmonary congestion and edema may develop after a latency period of several hours following severe acute exposure to chlorine.

CHRONIC TOXICITY:

Long term overexposure may produce upper airway changes leading to an increased prevalence of colds, shortness of breath, and reactive airway dysfunction syndrome.

ADDITIONAL DATA:

Odor does not provide an adequate warning of exposure. In workers exposed to chlorine for a 2 to 5 year period, all had some degree of olfactory impairment. Sensory irritation tolerance developed in rats when they were pretreated with 1 ppm chlorine.

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

MUTAGENIC DATA: This material has tested positive in one or more in vitro mutagenicity studies.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

- **Aquatic Toxicity:** This material is highly toxic to fish and aquatic organisms.

- **Freshwater Fish Toxicity:**
LC50 Fathead minnow: 0.07 to 0.15 (96 hour)
LC50 Bluegill: 0.44 mg/l (96 hour)

- **Invertebrate Toxicity:**
LC50 Daphnia: 30 to 150 ug/L (48 hour)

FATE AND TRANSPORT:

BIODEGRADATION: This material is an element and not subject to biodegradation.

PERSISTENCE: The atmospheric half-life and lifetime of this material due to photolysis is estimated at 10 and 14 minutes, respectively. The half-life of free residual material in fresh water has been estimated at 1.3 to 5 hours.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited toxicity to terrestrial organisms.

ECOLOGICAL HAZARDS: This material is highly toxic to aquatic organisms on an acute basis.

13. DISPOSAL CONSIDERATIONS

Use or process if possible. Chlorine may be absorbed into an alkaline solution such as caustic soda, soda ash or hydrated lime. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

UN NUMBER: UN1017
PROPER SHIPPING NAME: Chlorine
HAZARD CLASS/ DIVISION: 2.3
LABELING 2.3, 5.1, 8
REQUIREMENTS:
ADDITIONAL INFORMATION: Toxic-Inhalation Hazard Zone B.
MARINE POLLUTANT: Chlorine
RQ (lbs): RQ 10 Lbs. (Chlorine)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1017
SHIPPING NAME: Chlorine
CLASS OR DIVISION: 2.3, 5.1, 8
OTHER INFORMATION: Emergency Response Assistance Plan (ERAP) may be required

15. REGULATORY INFORMATION

U.S. REGULATIONS

- **OSHA REGULATORY STATUS:**
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)
- **CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):** If a release is reportable under CERCLA section 103, notify the state emergency response commission and local emergency planning committee. In addition, notify the National Response Center at (800) 424-8802 or (202) 426-2675

| Component | CERCLA Reportable Quantities: |
|-----------|-------------------------------|
| Chlorine | 10 lb (final RQ) |

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

EPCRA EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):

If a release is reportable under EPCRA, notify the state emergency response commission and local emergency planning committee. If the TPQ is met, facilities are subject to reporting requirements under EPCRA Sections 311 and 312.

| Component | EPCRA RQs | Threshold Planning Quantity (TPQs) |
|-----------|------------------|------------------------------------|
| Chlorine | 10 lb (EPCRA RQ) | 100 lb (TPQ) |

EPCRA SECTIONS 311/312 HAZARD CATEGORIES (40 CFR 370.10):

Acute Health Hazard, Fire Hazard, Sudden Release of Pressure

EPCRA SECTION 313 (40 CFR 372.65):

The following chemicals are listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements

| Component | Status: |
|-----------|---------|
| Chlorine | Listed |

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119): CHLORINE: 1500 LBS TQ

FIFRA REGULATIONS: Registered pesticide under 40 CFR 152.10, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), EPA Reg. No. 935-8 (Chlorine Liquefied Gas)

NATIONAL INVENTORY STATUS

U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA): All components are listed or exempt

TSCA 12(b): This product is not subject to export notification

Canadian Chemical Inventory: All components of this product are listed on either the DSL or the NDSL

STATE REGULATIONS

California Proposition 65: This product is not listed, but it may contain impurities/trace elements known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

| Chlorine | |
|---|------------|
| California Proposition 65 Cancer WARNING: | Not Listed |
| California Proposition 65 CRT List - Male reproductive toxin: | Not Listed |
| California Proposition 65 CRT List - Female reproductive toxin: | Not Listed |
| Massachusetts Right to Know Hazardous Substance List | Listed |
| New Jersey Right to Know Hazardous Substance List | sn 0367 |
| New Jersey Special Health Hazards Substance List | Not Listed |
| New Jersey - Environmental Hazardous Substance List | Listed |
| Pennsylvania Right to Know Hazardous Substance List | Listed |
| Pennsylvania Right to Know Special Hazardous Substances | Not Listed |
| Pennsylvania Right to Know Environmental Hazard List | Listed |
| Rhode Island Right to Know Hazardous Substance List | Listed |

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations

CHLORINE, LIQUID (PESTICIDE)

M30816 NA_EN

MSDS No.: M30816

Rev. Date: 01-Aug-2012

Rev. Num. 05

| | |
|---|---|
| WHMIS - Classifications of Substances: | <ul style="list-style-type: none">• A - Compressed Gas• C - Oxidizing Material• D1A - Poisonous and Infectious Material; Materials causing immediate and serious toxic effects - Very toxic material• E - Corrosive material |
|---|---|

16. OTHER INFORMATION

Prepared by: OxyChem Corporate HESS - Product Stewardship

HMIS: (SCALE 0-4) (Rated using National Paint & Coatings Association HMIS: Rating Instructions, 2nd Edition)

Health: 3 **Flammability:** 0 **Reactivity:** 1

NFPA 704 - Hazard Identification Ratings (SCALE 0-4)

Health: 4 **Flammability:** 0 **Reactivity:** 0

Reason for Revision:

- Updated the (M)SDS header
- Updated 24 Hour Emergency Telephone Number: SEE SECTION 1
- Added or revised product notes: SEE SECTION 1
- PPE recommendations have been modified: SEE SECTION 8
- Format change to sections: 8
- Updated Transportation Information: SEE SECTION 14
- Revised Canadian Domestic Substance List language: SEE SECTION 15
- Revised California Proposition 65 Statement: SEE SECTION 15
- WHMIS Rating was revised: SEE SECTION 15
- Revised Preparer Information: SEE SECTION 16
- Added Revision log: SEE SECTION 16
- Added "End of Safety Data Sheet" phrase

IMPORTANT:

The information presented herein, while not guaranteed, was prepared by technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling, storage, disposal and other factors that may involve other or additional legal, environmental, safety or performance considerations, and OxyChem assumes no liability whatsoever for the use of or reliance upon this information. While our technical personnel will be happy to respond to questions, safe handling and use of the product 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 to violate any Federal, State, local or foreign laws.

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, 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 Safety Data Sheet available to your employees.

End of Safety Data Sheet