


Material Safety Data Sheet  Pure Solutions Pittsburg Plant	MSDS Number: K005 DATE: September 20, 2011
SUBJECT: CHLORINE	PAGE: 1 of 9

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification: K2 Pure Solutions, L.P.
 260 Queen Street West, 4th Floor
 Toronto, Ontario M5V 1Z8
 Canada
 Telephone: (647) 436-7873
 Facsimile: (647) 436-0063

24 Hour Emergency Telephone Number: (925) 948-8090
Synonyms: Chlorine
Product Use: Process chemical, water treatment chemicals, plastic manufacture

2. HAZARDS IDENTIFICATION

GHS Classification

Physical Hazards

- Oxidizing gases Category 1
- Gases under pressure Liquefied gas

Human Health Hazards

- Acute toxicity (Inhalation: Gases) Category 2
- Skin corrosion/irritation Category 1A-1C
- Serious eye damage/eye irritation Category 1
- Specific target organ toxicity - Single exposure Category 1(respiratory system)
- Specific target organ toxicity - Repeated exposure Category 1(respiratory system)

Environmental Hazards

- Acute toxicity to the aquatic environment Category 1
- Chronic toxicity to the aquatic environment Category 1

Label Elements

Pictogram and Symbol



Signal Word: Danger

Hazard Statement:

- May cause or intensify fire; oxidizer
- Contains gas under pressure; may explode if heated
- Fatal if inhaled (Gases)
- Causes severe skin burns and eye damage
- Causes serious eye damage
- Causes damage to respiratory system, nervous system
- Causes damage to respiratory system, kidney, olfactory organ through prolonged or repeated exposure May cause damage to teeth through prolonged or repeated exposure
- Very toxic to aquatic life
- Very toxic to aquatic life with long lasting effects

Precaution

Prevention

- Keep/Store away from clothing/combustible materials.
- Keep valves and fittings free from grease and oil.
- Do not breathe gas.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Avoid release to the environment.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Wear respiratory protection.

Response

- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/physician.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician.
- Wash contaminated clothing before reuse.
- In case of fire: Stop leak if safe to do so.
- Collect spillage.

Storage

- Store in a secure area.
- Protect from sunlight. Store in a well-ventilated place.

Disposal

- Dispose of contents/container in accordance with local/regional/ national/international regulations.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	Percentage	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 **GET MEDICAL ATTENTION IMMEDIATELY.**

- Fatal if inhaled (Gases) (Acute toxicity (Inhalation: Gases) Category 2)
- Causes damage to respiratory system, nervous system (Specific target organ toxicity - Single exposure Category 1 (respiratory system, nervous system))
- Causes damage to respiratory system, kidney, olfactory organ through prolonged or repeated exposure May cause damage to teeth through prolonged or repeated exposure (Specific target organ toxicity - Repeated exposure Category 1 (respiratory system, kidney, olfactory organ), 2 (teeth))

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.**

- Causes severe skin burns and eye damage (Skin corrosion/irritation Category 1A-1C)

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.**

- Causes serious eye damage (Serious eye damage/eye irritation Category 1)

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.

5. FIRE-FIGHTING MEASURES

Fire Hazard: Chlorine is not combustible, but it enhances the combustion of other substances. Most combustibles will burn in this material producing irritating, corrosive, and/or toxic gases. In water, chlorine is a strong acid, corrosive, and an oxidizer. Run-off from fire control may cause pollution. If the situation allows, control and properly dispose of run-off (effluent).

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

Fire Fighting: Wear NIOSH approved positive-pressure self-contained breathing apparatus operated in pressure demand mode. Avoid inhalation of material or combustion by-products. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Do not direct water at the source of the leak or at safety devices; icing may occur. Flame impingement on steel chlorine container will result in iron/chlorine fire causing rupture of the container. For small fires, use water only; do not use dry chemical, carbon dioxide, or Halon®. Contain the fire and let it burn. If the fire must be fought, water spray or fog is recommended. Do not get water inside containers. Move containers from the fire area if it is possible to do so without risk to personnel. Damaged cylinders should be handled only by trained specialists and who are properly protected by PPE as described in Section 8. For large fires and fires involving tanks or tank cars, fight the fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at the source of the leak, icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tanks. Always stay away from tanks engulfed in fire, withdraw from the area and let the fire burn.

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. 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 (hypochlorous 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). 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 vapors 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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure limit(s):

Component	CAS Number	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Chlorine	7782-50-5	----	----	1 ppm 3 mg/m3

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

Non-Regulatory Exposure Limit(s):

- The Non-Regulatory United States Occupational Safety and Health Association (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.

Component	CAS Number	ACGIH Full Shift 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/m3	1 ppm 3 mg/m3	----

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 face shield to protect against eye and skin 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 appropriate chemical resistant gloves.

Protective Material Types: Natural rubber, Neoprene, Nitrile, Polyvinyl chloride (PVC).

Respiratory Protection:

Component	Immediately Dangerous to Life / Health (IDLH)
Chlorine	10 mg/m ³ IDLH

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 for spills and/or emergencies of unknown concentrations, an approved self-contained breathing apparatus operated in the pressure demand mode is required. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

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
Flash point:	Not flammable
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 (noctanol/water):	No data available

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 (hypochlorous 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.

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.

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

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:

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

15. REGULATORY INFORMATION

U.S. REGULATIONS

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (US).

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)

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 370.21):
Fire Hazard, Sudden Release of Pressure, Acute Health Hazard

EPCRA SECTION 313 (40 CFR 372.65):
Chlorine is listed in 40 CFR 372.65 and may be subject to Community Right-to Know Reporting requirements.

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

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

STATE REGULATIONS

California Proposition 65: This product may contain contaminants known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

16. OTHER INFORMATION

Prepared by: K2 Pure Solutions

National Fire Protection Association (NFPA) Rating Hazardous Materials Identification System (HMIS) Rating

	NFPA	HMIS
HEALTH	4	3
FIRE	0	0
REACTIVITY / INSTABILITY	0	0
SPECIAL HAZARDS	N/A	N/A

IMPORTANT:

THIS INFORMATION IS DRAWN FROM RECOGNIZED SOURCES BELIEVED TO BE RELIABLE. K2 PURE SOLUTIONS MAKES NO GUARANTEES NOR ASSUMES ANY LIABILITY IN CONNECTION WITH THIS INFORMATION. THE USER SHOULD BE AWARE OF CHANGING TECHNOLOGY, RESEARCH, REGULATIONS AND ANALYTICAL PROCEDURES THAT MAY REQUIRE CHANGES HEREIN. THE ABOVE DATA IS SUPPLIED ON THE CONDITION THAT PERSONS WILL EVALUATE THIS INFORMATION AND THEN DETERMINE ITS SUITABILITY FOR THEIR USE.