

SAFETY DATA SHEET

M47014 - ANSI - EN



PERCHLOROETHYLENE, ALL GRADES

SDS No.: M47014

SDS Revision Date: 20-Feb-2015

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 5005 LBJ Freeway P.O. Box 809050 Dallas, TX 75380-9050 1-800-752-5151
24 Hour Emergency Telephone Number:	1-800-733-3665 or 1-972-404-3228 (USA); CHEMTREC (within USA and Canada): 1-800-424-9300; CHEMTREC (outside USA and Canada): +1 703-527-3887; CHEMTREC Contract No: CCN16186
To Request an SDS:	MSDS@oxy.com or 1-972-404-3245
Customer Service:	1-800-752-5151 or 1-972-404-3700
Product Identifier:	PERCHLOROETHYLENE, ALL GRADES
Trade Name:	PERCHLOROETHYLENE, TECHNICAL; PERCHLOROETHYLENE, FLUOROCARBON (PTAP); PERCHLOROETHYLENE, INDUSTRIAL; PERCHLOROETHYLENE, VAPOR DEGREASING; PERCHLOROETHYLENE, ISOMERIZATION
Synonyms:	1,1,2,2 TETRACHLOROETHENE, TETRACHLOROETHENE, TETRACHLOROETHYLENE, PERCHLOROETHYLENE, PERCHLOROETHENE
Product Use:	Petroleum industry, Refrigerant manufacturing, Metal cleaning, Paint stripping, Aerosol carrier
Uses Advised Against:	NOT FOR USE IN DRY CLEANING.

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2. HAZARDS IDENTIFICATION

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

EMERGENCY OVERVIEW:

Color:	Colorless
Physical state	Volatile liquid
Appearance:	Clear liquid
Odor:	Mildly sweet odor, Chloroform-like odor
 Signal Word:	 <u>DANGER</u>

MAJOR HEALTH HAZARDS: HARMFUL IF INHALED. MAY CAUSE DROWSINESS OR DIZZINESS. MAY BE HARMFUL IF SWALLOWED. MAY BE HARMFUL IF SWALLOWED AND ENTERS AIRWAYS. MAY BE HARMFUL IN CONTACT WITH SKIN. CAUSES SKIN IRRITATION. CAUSES EYE IRRITATION. CAUSES DAMAGE TO CENTRAL NERVOUS SYSTEM (CNS), LIVER, RESPIRATORY SYSTEM. MAY CAUSE DAMAGE TO CENTRAL NERVOUS SYSTEM (CNS), LIVER, KIDNEY, RESPIRATORY SYSTEM THROUGH PROLONGED OR REPEATED EXPOSURE. MAY CAUSE CANCER.

AQUATIC TOXICITY: TOXIC TO AQUATIC LIFE WITH LASTING EFFECTS.

PRECAUTIONARY STATEMENTS: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist, vapors, or spray. Use with adequate ventilation and wear respiratory protection when exposure to dust, mist, or spray is possible. Use only outdoors or in a well-ventilated area. Avoid contact with eyes, skin and clothing. Wear protective gloves, protective clothing, eye, and face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

GHS CLASSIFICATION:

GHS: CONTACT HAZARD - SKIN:	Category 2 - Causes skin irritation.
GHS: CONTACT HAZARD - EYE:	Category 2B - Causes eye irritation
GHS: ACUTE TOXICITY - INHALATION:	Category 4 - Harmful if inhaled
GHS: ASPIRATION HAZARD:	Category 2 - May be harmful if swallowed and enters airways
GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):	Category 1 - Causes damage to Central Nervous System (CNS), Liver, Respiratory System
GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):	Category 3 - May cause drowsiness or dizziness
GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE):	Category 2 - May cause damage to Liver, Kidney, Central Nervous System (CNS), Respiratory System through prolonged or repeated exposure

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GHS: CARCINOGENICITY:	Category 1B - May cause cancer.
GHS: HAZARDOUS TO AQUATIC ENVIRONMENT - ACUTE HAZARD:	Category 2 - Toxic to aquatic life
GHS: HAZARDOUS TO AQUATIC ENVIRONMENT - CHRONIC HAZARD:	Category 2 - Toxic to aquatic life with long lasting effects

UNKNOWN ACUTE TOXICITY:

Not applicable. This product was tested as a whole. This information only pertains to untested mixtures.

GHS SYMBOL:

Health hazard, Exclamation mark, Environmental hazard



GHS SIGNAL WORD: DANGER

GHS HAZARD STATEMENTS:**GHS - Health Hazard Statement(s)**

May be harmful if swallowed and enters airways

Harmful if inhaled

May cause drowsiness or dizziness

Causes eye irritation

Causes skin irritation

Causes damage to organs : (Central Nervous System (CNS), Liver, Respiratory System)

May cause damage to organs through prolonged or repeated exposure: (Central Nervous System (CNS), Liver, Kidney, Respiratory System)

May cause cancer

GHS - Environmental Hazard Statement(s)

Toxic to aquatic life

Toxic to aquatic life with long lasting effects

GHS - Precautionary Statement(s) - Prevention

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Do not breathe mist, vapors, or spray

Use only outdoors or in a well-ventilated area

Wear eye protection, face protection, protective gloves

Use personal protective equipment as required

Wash thoroughly after handling

Do not eat, drink or smoke when using this product

Avoid release to the environment

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GHS - Precautionary Statement(s) - Response

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Call a POISON CENTER or doctor/physician if you feel unwell

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

IF ON SKIN: Wash with plenty of water

If skin irritation occurs: Get medical advice/attention

Take off contaminated clothing and wash it before reuse

IF exposed or concerned: Get medical advice/attention

Get medical advice/attention if you feel unwell

Specific treatment (see Section 4 of the safety data sheet and/or the First Aid information on the product label)

Collect spillage. Hazardous to the aquatic environment

GHS - Precautionary Statement(s) - Storage

Store in a well-ventilated place. Keep container tightly closed

Store locked up

GHS - Precautionary Statement(s) - Disposal

Dispose of contents and container in accordance with applicable local, regional, national, and/or international regulations

Hazards Not Otherwise Classified (HNOC)

None Known

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms: 1,1,2,2 TETRACHLOROETHENE, TETRACHLOROETHENE, TETRACHLOROETHYLENE, PERCHLOROETHYLENE, PERCHLOROETHENE

Component	Percent [%]	CAS Number
Tetrachloroethylene [Perc]	99.0 - 100.0	127-18-4
Carbon Tetrachloride	<0.45	56-23-5

4. FIRST AID MEASURES

INHALATION: If inhaled and adverse effects occur, remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician. See Notes to Physician below and Section 11 for more information.**SKIN CONTACT:** If on skin, wash with plenty of water. If skin irritation occurs: Get medical advice/ attention. Take off contaminated clothing and wash before reuse. See Notes to Physician below and Section 11 for more information.

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EYE CONTACT: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

INGESTION: If swallowed, rinse mouth with water (only if the person is conscious). Never give anything by mouth to an unconscious or convulsive person. If feeling unwell, contact a poison center or doctor/physician.

Most Important Symptoms/Effects (Acute and Delayed) :

Acute Symptoms/Effects: Listed below.

Inhalation (Breathing): Respiratory System Effects: Central Nervous System (CNS) effects are characteristic following inhalation of chlorinated hydrocarbons and can range from lightheadedness at low level exposures to loss of consciousness at high levels. CNS effects are an early warning that exposure to high levels has occurred and there is risk of cardiac effects (palpitations, low blood pressure, arrhythmia, arrest). CNS effects include the following symptoms: abdominal pain, nausea, vomiting, headache, lightheadedness, blurry or double vision, personality changes, weakness, slurred speech, stupor, incoordination (disequilibrium, ataxia), coma, and respiratory arrest. May irritate upper airways.

Skin: Skin Irritation. Skin exposure may cause irritation, rough red, dry skin, edema, blisters.

Eye: Eye Irritation. Eye exposure may cause irritation, tearing, pain, conjunctivitis, clouding of cornea.

Ingestion (Swallowing): Ingesting this material may cause gastrointestinal irritation, nausea, vomiting, headache, breathing difficulty, reduced blood pressure, weak and rapid pulse, Central Nervous System (CNS) depression, and Central Nervous System (CNS) symptoms such as sedation, headache, tremor, nystagmus and memory problems. Ingestion may cause unconsciousness and death.

Other Health Effects: Most people can smell perchloroethylene at levels of 5-50 ppm (OSHA PEL is 100 ppm). Odor is an adequate warning for high dose acute exposures, but might not be adequate for prolonged exposure due to olfactory fatigue. Vapors are heavier than air, can collect in low lying areas and cause asphyxiation. CNS effects have been observed at exposures of 100 to 300 ppm. Exposures of 1000 to 1500 ppm for less than 2 hours have caused symptoms of mood changes, slight ataxia, faintness and dizziness. Exposure to higher concentrations for longer periods can lead to collapse, coma, or death.

Delayed Symptoms/Effects:

- Respiratory System Effects: May cause chemical or irritant induced asthma or bronchoconstriction. May cause a chemical pneumonitis. Reduced renal output (oliguria), elevation of liver enzymes, to renal failure and liver failure
- May cause effects to the skin such as chronic dermatitis, dermal hypersensitivity
- May cause eye damage such as corneal damage, decreased vision
- May cause delayed liver and kidney effects
- Prolonged exposures may result in memory and concentration impairment, vision disturbances, dizziness, irritability, ataxia (difficulty walking), and peripheral neuropathy

Interaction with Other Chemicals Which Enhance Toxicity: May potentiate other agents that cause Central Nervous System (CNS) depression and respiratory system depression. Liver toxicity may be enhanced by other agents that cause liver damage, such as alcohol, acetaminophen. Catecholamine administration MAY pose increased risk of cardiac arrhythmias.

Medical Conditions Aggravated by Exposure: May increase potential for cardiac arrhythmia. Liver disorders, kidney disorders, respiratory system disorders.

Protection of First-Aiders: Protect against vapor/gas exposure. Do not breathe gas, fumes, vapor, mist, or spray. Avoid contact with skin and eyes. Use personal protective equipment. Refer to Section 8 for specific personal protective equipment recommendations. Consider the possibility of high levels of gas in confined/unventilated spaces or low-lying areas.

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Notes to Physician: There is no antidote for perchloroethylene poisoning. Treatment consists of support of respiratory and cardiovascular functions. Catecholamine administration after exposure to this compound MAY pose enhanced risk of cardiac arrhythmia. For ingestion, nasogastric aspiration is recommended if volume ingested is of sufficient volume to aspirate. Protect the airway. Epinephrine and other sympatomimetic amines may initiate cardiac arrhythmias in individuals exposed and experiencing symptoms from this material. Absorption from skin is slow, and unless prevented from evaporating, systemic toxicity is unlikely. This compound is absorbed rapidly by oral administration and causes similar effects to inhalation exposure. Activated charcoal may be administered. Liver injury may be delayed several days after exposure.

5. FIRE-FIGHTING MEASURES

Fire Hazard: Negligible fire hazard.

Extinguishing Media: Use media appropriate for surrounding fire.

Fire Fighting: Avoid inhalation of material or combustion by-products. Wear NIOSH approved positive-pressure self-contained breathing apparatus. Stay upwind and keep out of low areas. Move container from fire area if it can be done without risk. Cool containers with water from unmanned hose holder or monitor nozzles until well after the fire is out. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Keep water runoff out of water supplies and sewers (see Section 6 of the SDS).

Component	Immediately Dangerous to Life/ Health (IDLH)
Tetrachloroethylene [Perc] 127-18-4	150 ppm IDLH
Carbon Tetrachloride 56-23-5	200 ppm IDLH

Hazardous Combustion Products: Thermal decomposition or combustion products: hydrogen chloride, chlorine, phosgene, oxides of carbon

Sensitivity to Mechanical Impact: Not sensitive.

Sensitivity to Static Discharge: Not sensitive.

Lower Flammability Level (air): Not flammable

Upper Flammability Level (air): Not flammable

Flash point: Not flammable

Auto-ignition Temperature: Not applicable

6. ACCIDENTAL RELEASE MEASURES

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Personal Precautions:

Keep unnecessary and unprotected persons away. Isolate hazard area and deny entry. Evacuation of surrounding area may be necessary for large spills. Shut off ventilation system if needed. Do not get in eyes, on skin or on clothing. Do not breathe vapors, mist, or spray. Ventilate closed spaces before entering. Most vapors are heavier than air and will spread along ground and collect in low or confined areas (drains, basements, tanks). Wear appropriate personal protective equipment recommended in Section 8, Exposure Controls / Personal Protection, of the SDS.

Methods and Materials for Containment and Cleaning Up:

Stop leak if possible without personal risk. Ventilate closed spaces before entering. Completely contain spilled materials with dikes, sandbags, etc. Remove contaminated soil or collect with appropriate absorbent and place into suitable container. Keep container tightly closed and properly labeled. Liquid material may be removed with a properly rated vacuum truck. Properly dispose of in accordance with all applicable regulations. See Section 13, Disposal considerations, for additional information.

Environmental Precautions:

Keep out of water supplies, sewers and soil. Avoid discharge into drains, surface water or groundwater. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

Precautions for Safe Handling:

Most vapors are heavier than air and will spread along ground and collect in low or confined areas (drains, basements, tanks). Use only in well-ventilated areas. Avoid breathing vapor, mist, or spray. Avoid contact with skin, eyes and clothing. Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the SDS. Do not taste or swallow. Wash thoroughly after handling. Do not eat, drink or smoke in areas where this material is used.

Safe Storage Conditions:

Store and handle in accordance with all current regulations and standards. Keep container properly labeled and tightly closed. Store in a cool, dry area. Store in a well-ventilated area. Store away from open flames, and combustibles. Do not enter confined spaces without following proper confined space entry procedures. Do not store in aluminum container or use aluminum fittings or transfer lines. Protect from sunlight. Do not reuse drum without recycling or reconditioning in accordance with any applicable federal, state or local laws. Do not use cutting or welding torches, open flames or electric arcs on empty or full containers. Keep separated from incompatible substances (see below or Section 10 of the Safety Data Sheet).

Incompatibilities/ Materials to Avoid:

acids. bases. Strong oxidizing agents. Oxygen. Peroxides. Reactive metals. aluminum.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Regulatory Exposure Limit(s): Listed below for the product components that have regulatory occupational exposure limits (OEL's).

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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): Listed below for the product components that have non-regulatory occupational exposure limits (OEL's).

- *The Non-Regulatory United States Occupational Safety and Health Administration (OSHA) limits, if shown, 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: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits. Monitoring should be performed regularly to determine exposure limit level(s).

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear safety glasses with side-shields. Wear chemical safety goggles with a face-shield 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 chemical resistant clothing to prevent skin contact. Contaminated clothing should be removed, then discarded or laundered. Always place pants legs over boots.

Hand Protection: Wear appropriate chemical resistant gloves. Consult a glove supplier for assistance in selecting an appropriate chemical resistant glove.

Protective Material Types: Polyvinyl alcohol (PVA), Teflon®, Viton®, 4H®/Silver Shield®, CPF® 3, Responder®, Trelchem®, Tychem®

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

Component	Immediately Dangerous to Life/ Health (IDLH)
Tetrachloroethylene [Perc] 127-18-4	150 ppm IDLH
Carbon Tetrachloride 56-23-5	200 ppm IDLH

9. PHYSICAL AND CHEMICAL PROPERTIES

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Physical state	Volatile liquid
Appearance:	Clear liquid
Color:	Colorless
Odor:	Mildly sweet odor, Chloroform-like odor
Odor Threshold [ppm]:	50 ppm (may cause olfactory fatigue).
Molecular Weight:	165.82
Molecular Formula:	C2-Cl4
Boiling Point/Range:	250 °F (121 °C)
Freezing Point/Range:	-2 °F (-19 °C).
Vapor Pressure:	13 mmHg @ 20 °C
Vapor Density (air=1):	5.8
Relative Density/Specific Gravity (water=1):	1.62 @ 25°C
Water Solubility:	0.015%
pH:	No data available
Volatility:	100%
Evaporation Rate (ether=1):	0.1 (ether=1)
Partition Coefficient (n-octanol/water):	2.88
Flash point:	Not flammable
Flammability (solid, gas):	Not flammable
Lower Flammability Level (air):	Not flammable
Upper Flammability Level (air):	Not flammable
Auto-ignition Temperature:	Not applicable
Viscosity:	No data available

10. STABILITY AND REACTIVITY

Reactivity: Not reactive under normal temperatures and pressures.

Chemical Stability: Stable at normal temperatures and pressures.

Possibility of Hazardous Reactions:

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Avoid contact with incompatible substances and conditions due to generation of phosgene and other toxic and irritating substances.

Conditions to Avoid:

(e.g., static discharge, shock, or vibration) -. None known.

Incompatibilities/ Materials to Avoid:

acids. bases. Strong oxidizing agents. Oxygen. Peroxides. Reactive metals. aluminum.

Hazardous Decomposition Products: Thermal decomposition or combustion products: hydrogen chloride, chlorine, phosgene, oxides of carbon

Hazardous Polymerization: Will not occur.

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11. TOXICOLOGICAL INFORMATION**TOXICITY DATA:****PRODUCT TOXICITY DATA:** Perchloroethylene, All Grades

LD50 Oral: 2629 mg/kg oral-rat LD50	LD50 Dermal: >3228 mg/kg skin-rabbit LD50	LC50 Inhalation: 5200 ppm (4 hr. - Rat)
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COMPONENT TOXICITY DATA:

Note: The component toxicity data is populated by the LOLI database and may differ from the product toxicity data given.

Component	LD50 Oral:	LD50 Dermal:	LC50 Inhalation:
Tetrachloroethylene [Perc] 127-18-4	2629 mg/kg (Rat)	2800 mg/kg (Mouse)	27.8 mg/L (4 hr-Rat)
Carbon Tetrachloride 56-23-5	2350 mg/kg (Rat)	5070 mg/kg (Rat)	8000 ppm (4 hr-Rat)

Summary of Toxicity Studies:

Single-dose LD50 values of 3835 and 3005 mg/kg were determined for male and female rats by gavage. Death occurred within 24 hours after dosing and was preceded by tremors, ataxia, and CNS depression. Congestion of the lungs was reported in rats exposed intermittently to 1600 ppm for 13 weeks. In mice exposed intermittently at 100 ppm for 103 weeks, acute passive congestion of the lungs was observed. In animals, hypertrophy, fatty degeneration, and peroxisome proliferation characterize liver effects. Kidney effects, including cancer, have been noted in animals, predominantly male rats. The mechanism for the development of kidney effects in rats (protein droplet nephropathy) may differ from that in humans. The carcinogenicity of perchloroethylene has been documented in certain strains of mice and rats exposed by inhalation or oral routes. Other long-term inhalation studies in rats failed to show tumorigenic response. Human data are limited and have not established an association between perchloroethylene exposure and cancer. Hepatic effects were not detected in workers exposed up to 20 ppm for up to 10 years; however, in 141 workers exposed at an average concentration of 11.3 ppm, total GGT was significantly increased. Workers exposed for up to 14 years at an estimated TWA of 10 ppm had increased urinary enzyme levels suggestive of mild tubular damage. Forestomach ulcers were observed in male rats exposed to intermittently to 400 ppm orally for 103 weeks. Classification as a carcinogen is largely based on animal evidence.

POTENTIAL HEALTH EFFECTS:

- Eye contact:** Eye contact may cause tearing, redness, pain, conjunctival irritation, corneal edema, whitening, corneal erosion, decreased vision.
- Skin contact:** Skin contact may cause irritation, rough, red, dry skin, edema, blisters.
- Inhalation:** Inhaling this material may cause sedation, bronchospasm, shortness of breath, lightheadedness, loss of consciousness, cardiotoxicity, palpitations, low blood pressure, arrhythmia, arrest, nausea, vomiting, headache, alterations of light perception, weakness, stupor, incoordination (disequilibrium, ataxia), coma, and respiratory arrest. May irritate upper airways.

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Ingestion: This material can get into the lungs during swallowing or vomiting. Ingestion of this material may cause gastrointestinal irritation, central nervous system (CNS) depression, central nervous system symptoms such as tremor, ataxia (difficulty walking), and memory problems; nausea, vomiting, headache, difficulty breathing, reduced blood pressure, weak and rapid pulse. Ingestion may cause unconsciousness and death.

Chronic Effects: The carcinogenicity of perchloroethylene has been documented in certain strains of mice and rats exposed by inhalation or oral routes. Other long-term inhalation studies in rats failed to show tumorigenic response. Human data are limited and have not established an association between perchloroethylene exposure and cancer.

SIGNS AND SYMPTOMS OF EXPOSURE:

Inhalation (Breathing): Respiratory System Effects: Central Nervous System (CNS) effects are characteristic following inhalation of chlorinated hydrocarbons and can range from lightheadedness at low level exposures to loss of consciousness at high levels. CNS effects are an early warning that exposure to high levels has occurred and there is risk of cardiac effects (palpitations, low blood pressure, arrhythmia, arrest). CNS effects include the following symptoms: abdominal pain, nausea, vomiting, headache, lightheadedness, blurry or double vision, personality changes, weakness, slurred speech, stupor, incoordination (disequilibrium, ataxia), coma, and respiratory arrest. May irritate upper airways.

Skin: Skin Irritation. Skin exposure may cause irritation, rough red, dry skin, edema, blisters.

Eye: Eye Irritation. Eye exposure may cause irritation, tearing, pain, conjunctivitis, clouding of cornea.

Ingestion (Swallowing): Ingesting this material may cause gastrointestinal irritation, nausea, vomiting, headache, breathing difficulty, reduced blood pressure, weak and rapid pulse, Central Nervous System (CNS) depression, and Central Nervous System (CNS) symptoms such as sedation, headache, tremor, nystagmus and memory problems. Ingestion may cause unconsciousness and death.

Other Health Effects: Most people can smell perchloroethylene at levels of 5-50 ppm (OSHA PEL is 100 ppm). Odor is an adequate warning for high dose acute exposures, but might not be adequate for prolonged exposure due to olfactory fatigue. Vapors are heavier than air, can collect in low lying areas and cause asphyxiation. CNS effects have been observed at exposures of 100 to 300 ppm. Exposures of 1000 to 1500 ppm for less than 2 hours have caused symptoms of mood changes, slight ataxia, faintness and dizziness. Exposure to higher concentrations for longer periods can lead to collapse, coma, or death.

TOXICITY:

Chlorinated hydrocarbons can act as simple asphyxiants, posing a risk by their displacement of oxygen in the air, thus causing hypoxic environmental conditions leading to reduced oxygen uptake and hypoxemia. Some direct toxicity is also likely, especially at very high exposure levels. The toxic mechanisms include direct myocardial depression and sensitization of the myocardium to endogenous catecholamines. With very high level, as in inhalation abuse, both direct toxicity and reduced oxygen concentrations may exist and can interact to further increase risk. Sudden death may occur. Effects of low level, accidental exposure to chlorinated aliphatic hydrocarbons are usually limited to mild upper respiratory tract irritation and/or mild CNS effects. Direct pulmonary toxicity is usually of little clinical concern; however, moderate to high levels of exposure may result in significant upper airway irritation, pneumonitis and CNS depressant effects. Very high exposures may result in severe respiratory depression or failure. Cardiac arrhythmias are generally associated with moderate to severe exposures. Exposure to high levels produces direct liver and kidney toxicity. The onset of elevated liver enzymes and indicators of renal impairment may be delayed.

Interaction with Other Chemicals Which Enhance Toxicity: May potentiate other agents that cause Central Nervous System (CNS) depression and respiratory system depression. Liver toxicity may be enhanced by other agents that cause liver damage, such as alcohol, acetaminophen. Catecholamine administration MAY pose increased risk of cardiac arrhythmias.

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GHS HEALTH HAZARDS:

GHS: ACUTE TOXICITY - INHALATION: Category 4 - Harmful if inhaled.

Skin Absorbent / Dermal Route? Yes.

GHS: CONTACT HAZARD - SKIN: Category 2 - Causes skin irritation

GHS: CONTACT HAZARD - EYE: Category 2B - Causes eye irritation

GHS: CARCINOGENICITY:
Category 1B - May cause cancer.

Component	NTP:	IARC (GROUP 1):	IARC (GROUP 2):	OSHA:
Tetrachloroethylene [Perc]	Reasonably Anticipated To Be A Human Carcinogen	Not listed	Group 2	Listed
Carbon Tetrachloride	Reasonably Anticipated To Be A Human Carcinogen	Not listed	Group 2	Listed

SPECIFIC TARGET ORGAN TOXICITY (Single Exposure):
Category 1 - Central Nervous System (CNS), Liver, Respiratory System
Category 3 - Narcotic Effects

SPECIFIC TARGET ORGAN TOXICITY (Repeated or Prolonged Exposure):
Category 2 - Central Nervous System (CNS), Liver, Kidney, Respiratory System

MUTAGENIC DATA:
Not classified as a mutagen per GHS criteria. Overall both in vitro and in vivo genetic toxicity studies showed an absence of genotoxicity.

REPRODUCTIVE TOXICITY:
Not classified as a developmental or reproductive toxicant. In laboratory animal studies, effects on the fetus and reproductive system have been seen only at doses that produced significant toxicity to the parent animal.

ASPIRATION HAZARD:
Category 2 - May be harmful if swallowed and enters airways

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

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Fish Toxicity:

LC50 Fathead minnow (96 hr.) = 18.4 ppm
LC50 Bluegill sunfish (96 hr.) = 12.9 ppm
LC50 Rainbow trout (96 hr.) = 5 ppm
LC50 Sheephead minnow (96 hr.) = 29.4-52.2 ppm

Invertebrate Toxicity:

LC50 (Static) Mysid shrimp (96 hr.) = 10.2 ppm
LC50 Daphnia magna (48 hr.) = 18 mg/L

FATE AND TRANSPORT:

BIODEGRADATION: Biodegradation may occur under anaerobic conditions (in the absence of oxygen).

PERSISTENCE: AIR: Vapors in air are subject to photooxidation, but do not contribute to tropospheric ozone formation. Half-life estimates range from 3 months to less than 1 hour. SOIL: Average Koc of 237 suggests moderate mobility in soil. This material can leach rapidly through sandy soil to reach groundwater. Soil adsorption potential is low. Will not significantly hydrolyze in soil or water under normal environmental conditions. WATER: Slow biodegradation may occur in groundwater where acclimated populations of microorganisms exist. Does not readily adsorb to sediment. This material in water is subject to volatilization, with half-life estimates ranging from less than one day to several weeks.

BIOCONCENTRATION: Bioconcentration potential is low to moderate with a BCF of 26-77.

13. DISPOSAL CONSIDERATIONS

Waste from material:

Reuse or reprocess, if possible. Keep out of water supplies, sewers and soil. Recovered liquids may be sent to a licensed reclaimer or incineration facility. Dispose in accordance with all applicable regulations.

Container Management:

Dispose of container in accordance with applicable local, regional, national, and/or international regulations. Container rinsate must be disposed of in compliance with applicable regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT**U.S. DOT 49 CFR 172.101:**

UN NUMBER:	UN1897
PROPER SHIPPING NAME:	Tetrachloroethylene
HAZARD CLASS/ DIVISION:	6.1
PACKING GROUP:	III

PERCHLOROETHYLENE, ALL GRADES

SDS No.: M47014

SDS Revision Date: 20-Feb-2015

LABELING REQUIREMENTS: 6.1

MARINE POLLUTANT: Tetrachloroethylene
RQ (lbs): RQ 100 lbs (Tetrachloroethylene)
 RQ 10 Lbs. (Carbon tetrachloride)

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

UN NUMBER: UN1897
SHIPPING NAME: Tetrachloroethylene
CLASS OR DIVISION: 6.1
PACKING/RISK GROUP: III
LABELING REQUIREMENTS: 6.1
CAN. MARINE POLLUTANT: Tetrachloroethylene

MARITIME TRANSPORT (IMO / IMDG) :

UN NUMBER: UN1897
PROPER SHIPPING NAME: Tetrachloroethylene
HAZARD CLASS / DIVISION: 6.1
Packing Group: III
MARINE POLLUTANT: Tetrachloroethylene

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:
Tetrachloroethylene [Perc]	1 lb (final RQ) 100 lb (final RQ)
Carbon Tetrachloride	1 lb (final RQ) 10 lb (final RQ)

SARA EHS Chemical (40 CFR 355.30)

Not regulated

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

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Acute Health Hazard, Chronic Health Hazard

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:
Tetrachloroethylene [Perc]	0.1 %
Carbon Tetrachloride	0.1 %

OSHA PROCESS SAFETY (PSM) (29 CFR 1910.119):

Not regulated

Safe Drinking Water Act - MCLs: Subject to 40 CFR Part 41 Safe Drinking Water Act (SDWA). A maximum contaminant level 0.005 mg/L. Subject to 40 CFR Part 63 Subsection T: NESHAP's Halogenated Solvent Cleaning

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 contains a chemical known to the State of California to cause cancer, and/or birth defects, and/or other reproductive harm as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act.

Component	California Proposition 65 Cancer WARNING:	California Proposition 65 CRT List - Male reproductive toxin:	California Proposition 65 CRT List - Female reproductive toxin:	Massachusetts Right to Know Hazardous Substance List	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List
Tetrachloroethylene [Perc] 127-18-4	Listed	Not Listed	Not Listed	Listed	1810	carcinogen
Carbon Tetrachloride 56-23-5	Listed	Not Listed	Not Listed	Listed	0347	carcinogen

Component	New Jersey - Environmental Hazardous Substance List	Pennsylvania Right to Know Hazardous Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List	Rhode Island Right to Know Hazardous Substance List
Tetrachloroethylene [Perc] 127-18-4	Listed	Listed	Present	Present	Listed
Carbon Tetrachloride 56-23-5	Listed	Listed	Present	Present	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

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WHMIS - Classifications of Substances:

- D1B - Poisonous and Infectious Material; Materials causing immediate and serious toxic effects - Toxic material
 - D2A - Poisonous and Infectious Material; Materials causing other toxic effects - Very toxic material
 - D2B - Poisonous and Infectious Material; Materials causing other toxic effects - Toxic material
-

16. OTHER INFORMATION

Prepared by: OxyChem Corporate HESS - Product Stewardship

Rev. Date: 20-Feb-2015

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

Health Rating: 2*

Flammability Rating: 0

Reactivity Rating: 0

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

Health Rating: 2

Flammability: 0

Reactivity Rating: 0

Reason for Revision:

- Changed the SDS format to meet the GHS requirements of the revised 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)
- Updated the (M)SDS header
- Updated 24 Hour Emergency Telephone Number: SEE SECTION 1
- Product Identifier has been added or updated: SEE SECTION 1
- Updated Uses Advised Against information: SEE SECTION 1
- Added OSHA Status: SEE SECTION 2
- Emergency Overview was revised: SEE SECTION 2
- Added GHS Information: SEE SECTION 2
- Added synonym(s): SEE SECTION 3
- Updated First Aid Measures: SEE SECTION 4
- Modified Fire Fighting Measure Recommendations: SEE SECTION 5
- Revised Accidental Release Measures: SEE SECTION 6
- Revised Handling and Storage Recommendations: SEE SECTION 7
- Revised Exposure Controls/Personal Protection information: SEE SECTION 8
- Updated Physical and Chemical Properties. SEE SECTION 9
- Stability and Reactivity recommendations: SEE SECTION 10
- Toxicological Information has been revised: SEE SECTION 11
- Updated Disposal Considerations. SEE SECTION 13
- Updated Transportation Information: SEE SECTION 14
- Regulatory Information Changes: SEE SECTION 15
- Revised Preparer Information: SEE SECTION 16
- Added SDS Revision Date: SEE SECTION 16
- Added/Updated Revision Log: SEE SECTION 16

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SDS Revision Date: 20-Feb-2015

IMPORTANT:

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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