

SAFETY DATA SHEET



PERCHLOROETHYLENE

SDS No.: M47014
North America EN

Rev. Date: 28-Jun-2021

SECTION 1. CHEMICAL PRODUCT / COMPANY IDENTIFICATION

Company Identification:	Occidental Chemical Corporation 14555 Dallas Parkway, Suite 400 Dallas, Texas 75254-4300
24 Hour Emergency Telephone Number:	1-800-733-3665 (USA); CANUTEC (Canada): 1-613-996-6666; 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
Trade Name:	PERCHLOROETHYLENE, TECHNICAL; PERCHLOROETHYLENE, FLUOROCARBON (PTAP); PERCHLOROETHYLENE, INDUSTRIAL; 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.
Restrictions on Use (United States):	EPA 40 CFR Part 63 National Perchloroethylene Air Emission Standards for Dry Cleaning Facilities restricts/bans the use of Perchloroethylene in dry cleaning operations.
Other Global Restrictions on Use:	NOT FOR SALE FOR USE IN DRY CLEANING OPERATIONS REGARDLESS OF NATIONAL, REGIONAL OR LOCAL REGULATIONS. Other restrictions on

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use based on local, regional, or national regulations may exist and must be determined on a case-by-case basis.

Chemical Family: Aliphatic halogenated solvent

SECTION 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: Liquid
Appearance: Clear liquid
Odor: Chloroform-like odor

Signal Word: **DANGER**

MAJOR HEALTH HAZARDS: MAY BE HARMFUL IF SWALLOWED. MAY BE HARMFUL IF SWALLOWED AND ENTERS AIRWAYS. CAUSES SKIN IRRITATION. CAUSES EYE IRRITATION. MAY CAUSE DROWSINESS OR DIZZINESS. MAY CAUSE CANCER. MAY CAUSE DAMAGE TO LIVER, KIDNEY, IMMUNE AND HEMATOLOGIC SYSTEMS THROUGH PROLONGED OR REPEATED EXPOSURE. CAUSES DAMAGE TO NERVOUS SYSTEM, INCLUDING VISUAL EFFECTS. THIS MATERIAL IS A POTENTIAL ENDOCRINE DISRUPTOR.

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. Wash hands thoroughly after handling. Use only outdoors or in a well-ventilated area. Do not eat, drink, or smoke when using this product. Wear protective gloves, protective clothing, eye, and face protection. Use respiratory protection as required. Avoid release to the environment.

HAZARD CLASSIFICATION:

GHS: CONTACT HAZARD - SKIN:	Category 2 - Causes skin irritation
GHS: CONTACT HAZARD - EYE:	Category 2B - Causes eye irritation
GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):	Category 1 - Causes damage to nervous system including visual effects Category 3 - May cause drowsiness or dizziness
GHS: TARGET ORGAN TOXICITY (REPEATED)	Category 2 - May cause damage to liver, kidney, immune

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EXPOSURE):	and hematologic systems through prolonged or repeated exposure
GHS: CARCINOGENICITY:	Category 1B - May cause cancer
HAZARDS NOT OTHERWISE CLASSIFIED (HNOC):	- ACUTE TOXICITY - ORAL: Category 5 (May be harmful if swallowed) - ASPIRATION HAZARD - CATEGORY 2: May be harmful if swallowed and enters airways - AQUATIC TOXICITY - ACUTE: Category 2 (Toxic to aquatic life) - AQUATIC TOXICITY - CHRONIC : Category 2: Toxic to aquatic life with long lasting effects

GHS SYMBOL: Health hazards, Exclamation mark, Environmental hazard



GHS SIGNAL WORD: **DANGER**

GHS HAZARD STATEMENTS:

GHS - Health Hazard Statement(s)

- May be harmful if swallowed
- May be harmful if swallowed and enters airways
- Causes skin irritation
- Causes eye irritation
- May cause drowsiness or dizziness
- May cause cancer
- Causes damage to nervous system, including visual effects
- May cause damage to liver, kidney, immune and hematologic systems through prolonged or repeated exposure

GHS - Environmental Hazard Statement(s)

- 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
- Wash hands thoroughly after handling
- Do not eat, drink or smoke when using this product
- Use only outdoors or in a well-ventilated area
- Wear eye protection, face protection, protective gloves, protective clothing
- Use respiratory protection as required
- Avoid release to the environment

GHS - Precautionary Statement(s) - Response

- IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing
- IF ON SKIN: Wash with plenty of soap and water

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- If skin irritation occurs: Get medical advice/attention
 - Take off contaminated clothing and wash it before reuse
 - 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 exposed or concerned: Get medical advice/attention
 - Get medical advice/attention if you feel unwell

GHS - Precautionary Statement(s) - Storage

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

GHS - Precautionary Statement(s) - Disposal

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

Hazard Not Otherwise Classified (HNOC)-Health

- Potential endocrine disruptor
- The transfer of tetrachloroethylene in milk was reported in laboratory animals and women

See Section 11: TOXICOLOGICAL INFORMATION

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	Percent [%]
Tetrachloroethylene [Perc]	127-18-4	99.0 - 100.0

SECTION 4. FIRST AID MEASURES

General Advice: If exposed or concerned, or if you feel unwell: Get medical advice/attention.

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 if you feel unwell. Provide fresh air, assisted ventilation. Consider ECG monitoring. See Notes to Physician below and Section 11 for more information.

SKIN CONTACT: IF ON SKIN: Wash with plenty of soap and 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.

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: Immediately call a POISON CENTER OR LICENSED HEALTH CARE PROVIDER.

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Do NOT induce vomiting. This material is an aspiration hazard.

Most Important Symptoms/Effects (Acute and Delayed):

Acute Symptoms/Effects:

Inhalation (Breathing): The initial effects of exposure to vapor are transient, slight eye irritation and possibly lightheadedness. 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: The distinctive odor of perchloroethylene does not necessarily provide adequate warning. Because perchloroethylene quickly desensitizes olfactory responses, persons can suffer exposure to vapor concentrations in excess of occupational exposure levels without smelling it. 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

Target Organ Effects: Repeated exposure to more than 200 ppm is associated with neurotoxicity, (central nervous system depression, sleeplessness, irritability), and liver damage. Acute prolonged exposure around the PEL has been associated with local anesthetic effects on the peripheral nervous system, and caused behavioral effects such as hallucinations and distorted perceptions.

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

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 sympathomimetic amines may initiate cardiac

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arrhythmias in individuals exposed and experiencing symptoms from this material. Anti-arrhythmic agents may help prevent recurrent ventricular arrhythmias. 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.

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.

SECTION 5. FIRE-FIGHTING MEASURES

Fire Hazard: Non-flammable liquid.

Explosive properties: In fire situation, storage containers and parts of containers may rocket great distances, in many directions. Mixtures with lithium shavings are impact-sensitive and will explode, sometimes violently. The presence of 0.5% of trichloroethylene as impurity in perchloroethylene during unheated drying over solid sodium hydroxide can cause the generation of dichloroacetylene and after subsequent fractional distillation, explode. It should be noted that the maximum amount of trichloroethylene in this product as purchased is 10 ppm (0.001%). Mixtures of dinitrogen tetroxide with tetrachloroethylene are explosive when subjected to shock of 25 g TNT equivalent or less.

Extinguishing Media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific Hazards: Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes. Containers may explode when heated. Vapors are heavier than air and will collect in low areas.

Unusual Hazards: Decomposes slowly on contact with moisture. This produces trichloroacetic acid and hydrochloric acid.

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

Hazardous Combustion Products: Not combustible, but if involved in a fire decomposes to produce hydrogen chloride and phosgene

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Products Formed During Combustion and Thermal Degradation: 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

SECTION 6. ACCIDENTAL RELEASE MEASURES

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.

Personal Protective Equipment: See Section 8 for information on personal protective equipment. Cleanup personnel must wear proper protective equipment. Wear protective gloves, protective clothing, eye, and face protection. Use respiratory protection as required. For Unknown Concentrations or exposures above IDLH (Immediately Dangerous to Life or Health) - Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

Emergency Procedures: For other than minor leaks, immediately implement the facility's predetermined emergency response plan. Evacuate unnecessary personnel and eliminate all sources of ignition. Stop leak, if possible, without personal risk. Shut off ventilation systems to occupied areas where they can be impacted by vapors picked up by the intake systems.

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.

Methods and Materials for Containment, Confinement, and/or Abatement: 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.

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SECTION 7. HANDLING AND STORAGE

Handling:

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.

Technical measures/precautions: Galvanized steel, aluminum or plastic piping should not be used. Chlorinated organics handling equipment must not be constructed of any reactive metals such as aluminum, zinc, brass, or magnesium alloys. Neoprene and natural rubber parts cannot be used for chlorinated organic service. Gaskets used in the service of chlorinated organics may be constructed of PTFE or Teflon® envelope gasket material or graphite with stainless steel metal inserts. Rubber-based products such as neoprene or Buna N gasketing should not be used. If a composition differing from those mentioned above is to be used, it must first be tested with the specific chlorinated organic product to ensure compatibility.

Prevention of contact: See Section 8, Exposure Controls and Personal Protection, for additional information.

Storage:

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).

Technical measures: Bulk storage containers should be constructed of either carbon or stainless steel. Aluminum or fiberglass reinforced plastic storage tanks are prohibited for chlorinated organic service. Storage tanks should not be constructed of, nor contain, any non-compatible plastic components. All storage facilities should be designed to protect the environment from contamination through the use of secondary containment. Typical secondary containment systems employ impermeable surfaces such as double-walled tanks, sumps, dikes (non-earth). All storage tanks should be diked to contain the tank contents in the event of a spill or tank rupture. Containment should be large enough to contain the tank's volume and an additional appropriate volume as a safety factor. Containment volumes and diking requirements are often defined and mandated by individual states and localities. Regulations must be reviewed prior to construction.

Incompatible Substances: Acids, bases, Strong oxidizing agents, Oxygen, Peroxides, Reactive metals, aluminum

Additional Information:

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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REGULATORY EXPOSURE LIMIT(S):

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

Component	OSHA Final PEL TWA	OSHA Final PEL STEL	OSHA Final PEL Ceiling
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	100 ppm	-----	200 ppm
Carbon Tetrachloride 56-23-5 (<0.005 %)	10 ppm	-----	25 ppm

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

Component	Canada - TWAs	Canada - STELs	Canada - Ceilings
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	Ontario - 25 ppm (TWA) Alberta - 25 ppm (TWA) Alberta - 170 mg/m ³ (TWA) British Columbia - 25 ppm (TWA)	Ontario - 100 ppm (STEL)	-----
Carbon Tetrachloride 56-23-5 (<0.005 %)	Ontario - 2 ppm (TWA) Alberta - 5 ppm (TWA) Alberta - 31 mg/m ³ (TWA) British Columbia - 2 ppm (TWA)	Ontario - 3 ppm (STEL)	-----

NON-REGULATORY EXPOSURE LIMIT(S):

Listed below for the product components that have non-regulatory occupational exposure limits (OELs).

Component	ACGIH TWA	ACGIH STEL	ACGIH Ceiling	Skin Absorption - ACGIH	OSHA TWA (Vacated)	OSHA STEL (Vacated)	OSHA Ceiling (Vacated)
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	25 ppm	100 ppm	-----	-----	25 ppm 170 mg/m ³	-----	-----
Carbon Tetrachloride 56-23-5 (<0.005 %)	5 ppm	10 ppm	-----	Listed	2 ppm 12.6 mg/m ³	-----	-----

- 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.

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Additional Advice: United States Environmental Protection Agency (US EPA), in the risk evaluation process conducted under the Toxic Substances Control Act ("TSCA"), determined unreasonable risks from commercial uses of this chemical to workers in direct contact from all but two occupational uses of perchloroethylene: distribution in commerce and industrial and commercial use in lubricants and greases for penetrating lubricants and cutting tool coolants. Additionally, EPA found unreasonable risks from most commercial uses of this chemical to workers nearby but not in direct contact with this chemical (known as occupational non-users). This includes an unreasonable risk to workers and occupational non-users when domestic manufacturing or importing the chemical; processing as a reactant and intermediate; incorporation into cleaning and degreasing products; uses in a variety of industrial and commercial applications such as degreasing, dry cleaning, in adhesives and sealants, and in paints and coatings; and disposal. Unreasonable risk determinations were based upon workers and occupational non-user's potential exposure from long-term inhalation, without respiratory protection, or dermal (through the skin) exposures for workers not wearing appropriate personal protective equipment (PPE). US EPA is preparing a draft risk mitigation rule for uses that were determined to have unreasonable risks. The information below addresses engineering controls and PPE to reduce exposure.

ENGINEERING CONTROLS: Use closed systems when possible. Provide local exhaust ventilation where vapor or mist may be generated. Handle product only in closed system or provide appropriate exhaust ventilation at machinery. In case of insufficient ventilation, wear suitable respiratory equipment. All process sampling must be performed using a closed loop sampling system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Eye Protection: Wear chemical safety goggles with a face-shield to protect against skin and eye contact when appropriate. Provide an emergency eyewash 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: This material may be absorbed across the skin causing systemic effects. 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 (99.0 - 100.0 %)	150 ppm IDLH

Other Protective Equipment: Provide an emergency eyewash fountain and quick drench shower in the immediate work area.

HYGIENE MEASURES: Obtain proper training prior to use. Contaminated work clothing should not be allowed out of

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the workplace. For environmental protection remove and wash all contaminated protective equipment before re-use. Good hygiene practices include but are not limited to: wearing suitable gloves and/or eye protection; washing hands and affected skin immediately after handling, before breaks, and at the end of the workday; regularly cleaning work area and clothing; etc.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Colorless
Odor:	Chloroform-like odor
Molecular Weight:	165.8
Molecular Formula:	C ₂ -Cl ₄
Chemical Family:	Aliphatic halogenated solvent
pH:	No data available
Melting Point/Range:	-22.3°C
Freezing Point/Range:	-2 °F (-19 °C)
Flash point:	Not flammable
Vapor Pressure:	13 mmHg @ 20 °C 18.5 mm Hg @ 25 °C (77 °F)
Vapor Density (air=1):	5.7
Relative Density/Specific Gravity (water=1):	1.62 @ 25°C
Water Solubility:	0.015%
Partition Coefficient (n-octanol/water):	log Kow = 3.4 @ 20°C
Auto-ignition Temperature:	Not applicable
Odor Threshold [ppm]:	27 ppm (causes olfactory fatigue)
Evaporation Rate (ether=1):	0.1 (ether=1)
Volatility:	100%
Flammability (solid, gas):	Not flammable
Lower Flammability Level (air):	Not flammable
Upper Flammability Level (air):	Not flammable
Viscosity (Liquid):	0.932cP @ 15°C; 0.839cP @ 25°C; 0.657cP @ 50 °C; 0.534cP @ 75°C
Viscosity (Vapor):	9900 cP @ 60 °C

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability: Stable at normal temperatures and pressures.

Reactivity: Not reactive under 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.

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Conditions to Avoid (e.g., static discharge, shock, or vibration): None known.

Incompatible Substances: 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.

SECTION 11. TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS:

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.

ACUTE TOXICITY:

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.

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 TOXICITY:

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.

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SIGNS AND SYMPTOMS OF EXPOSURE:

Inhalation (Breathing): The initial effects of exposure to vapor are transient, slight eye irritation and possibly lightheadedness. 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: The distinctive odor of perchloroethylene does not necessarily provide adequate warning. Because perchloroethylene quickly desensitizes olfactory responses, persons can suffer exposure to vapor concentrations in excess of occupational exposure levels without smelling it. 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.

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.

GHS HEALTH HAZARDS:

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

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

GHS: ACUTE TOXICITY - ORAL: Category 5 - May be harmful if swallowed

GHS: TARGET ORGAN TOXICITY (SINGLE EXPOSURE):

Category 1 - Causes damage to nervous system including visual effects

Category 3 - May cause drowsiness or dizziness

GHS: TARGET ORGAN TOXICITY (REPEATED EXPOSURE):

Category 2 - May cause damage to liver, kidney, immune and hematologic systems through prolonged or repeated exposure

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

GHS: CARCINOGENICITY: Category 1B - May cause cancer

TOXICITY DATA:

PRODUCT TOXICITY DATA:

LD50 Oral: 2629 mg/kg oral-rat LD50	LD50 Dermal: >2000 mg/kg skin-rabbit LD50	LC50 Inhalation: 5200 ppm (4 hr. - Rat)
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COMPONENT TOXICITY DATA:

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

Component	Oral LD50	Dermal LD50	Inhalation LC50
Tetrachloroethylene [Perc]	2629 mg/kg (Rat)	No data available	27.8 mg/L (4-h Rat)
Tripropylene	2100 mg/kg (Rat)	5000 mg/kg (Rabbit)	
Diallylamine	No data available	562 mg/kg (Rabbit)	795 ppm (8-h Rat)
Carbon Tetrachloride	2350 mg/kg (Rat)	5070 mg/kg (Rat)	8000 ppm (4-h Rat)
Phenol, 4-(1,1-dimethylpropyl)-	1830 mg/kg (Rat)	2000 mg/kg (Rabbit)	

Standard Draize (Eye): Draize (rabbit/ dose 500 mg/24hr) "Mild"; Draize (rabbit/ dose 162 mg) "Mild".

Eye Irritation/Corrosion: High concentrations of perchloroethylene vapor or direct contact with the liquid can cause intense conjunctival and scleral irritation, pain, swelling, lacrimation, and photophobia. This product is classified as causing serious eye irritation (Category 2) per GHS criteria.

Standard Draize (Skin): Draize (rabbit/810mg/24hr); Draize (rabbit/500mg/24hr)

Skin Irritation/Corrosion: Direct contact with the liquid can cause skin irritation and burns. The product is classified as cutaneous irritant (Category 2), according to GHS classification criteria.

Skin Absorbent / Dermal Route: Yes

The volatility of Perchloroethylene significantly decreases the expected dermal absorption under non-occluded conditions.

RESPIRATORY OR SKIN SENSITIZATION: This material is classified as a skin sensitizer according to Korean REACH regulation's harmonized classification scheme; however, manufacturer GHS self-classification does not indicate this grade of Perchloroethylene is a skin sensitizer. Perchloroethylene is unlikely to be a skin sensitizer based on the mode of action for small molecules, which would include covalent binding to biomolecules (proteins); however, the stabilizer n-Butyl glycidyl ether (BGE) used only in the degreasing grades of perchloroethylene is a skin sensitizer. See SDS for perchloroethylene degreasing grades for additional information. Perchloroethylene has not been widely reported to be a respiratory sensitizer; however, high level exposure might give rise to Reactive Airways Dysfunction Syndrome (RADS).

CARCINOGENICITY: Studies of dry-cleaning workers exposed to perchloroethylene have shown associations between exposure to perchloroethylene and several types of cancer, specifically bladder cancer, non-Hodgkin lymphoma and multiple myeloma. There is also limited evidence suggestive of associations with esophageal, kidney, cervical and breast cancer. Animal studies have reported an increased incidence of liver tumors in mice, from inhalation and oral exposure, and kidney and mononuclear cell leukemias in rats, via inhalation exposure. EPA has classified perchloroethylene as likely to be carcinogenic to humans by all routes of exposure based on suggestive evidence in epidemiological studies and conclusive evidence in rats (mononuclear cell leukemia) and mice (increased incidence of liver tumors). The International Agency for Research on Cancer (IARC) has classified perchloroethylene as probably carcinogenic to humans (Group 2A). Classified as Category 1B (May cause cancer) under GHS.

SPECIFIC TARGET ORGAN TOXICITY (Single Exposure): Data from acute exposure studies in animals and human incidents indicate that short term exposure to perchloroethylene may cause neurotoxicity which can impair cognitive function and evoke prolonged visual disturbances. In addition, the neurotoxicity effects can include central nervous system depression, including loss of consciousness which can result in death.

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SPECIFIC TARGET ORGAN TOXICITY (Repeated or Prolonged Exposure): Exposure to concentrations greater than 200 ppm may be associated with neurotoxicity and liver damage. The NOAEL was 800 ppm the NOEL was 200 ppm. 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 major effects from chronic inhalation exposure to perchloroethylene noted in humans, generally at higher exposure levels, include liver damage, kidney effects, immune and hematologic effects.

GERM CELL/IN-VITRO MUTAGENICITY: Perchloroethylene shows little to no genotoxic activity in the absence of metabolic activation. Several metabolites resulting from both the oxidative and conjugation pathways have shown some indication of mutagenic activity in vitro. However, the primary metabolite in the liver, trichloroacetic acid (TCA), has shown little to no genotoxic activity in vitro, but testing of this compound is confounded by the pH changes it induces. In vivo studies examining genotoxicity have shown negative or modest genotoxic effects. Not classified as a mutagen per GHS criteria.

REPRODUCTIVE TOXICITY: Some adverse reproductive effects, such as menstrual disorders, altered sperm structure, and reduced fertility, have been reported in studies of workers occupationally exposed to perchloroethylene. However, the evidence is inconclusive. Some studies of residents exposed to drinking water contaminated with perchloroethylene and other solvents during pregnancy suggest an association of perchloroethylene exposure with birth defects, however firm conclusions cannot be drawn due to several limitations of these studies. 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.

DEVELOPMENTAL TOXICITY: Not classified as a developmental or reproductive toxin per GHS criteria.

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

TOXICOKINETICS: Not available.

METABOLISM: Available information suggests that cytochrome P450-dependent oxidation is likely the dominant metabolic pathway for perchloroethylene (PCE) in rodents and humans, with the glutathione conjugation pathway contributing to PCE metabolism at a much lower extent. Metabolic flux through the oxidative pathway was ~30-fold higher than through the conjugation pathway in male mice of three different strains following single oral doses of 1,000 mg/kg PCE. The primary oxidative metabolite of PCE is trichloroacetic acid (TCA), which is thought to be formed from spontaneous decomposition of trichloroacetyl chloride (TCAC). Dechlorination of TCA could yield dichloroacetic acid (DCA); however, most of the DCA excreted after exposure to PCE is believed to be produced in the kidney as an end product of β -lyase metabolism.

ENDOCRINE DISRUPTOR: Tetrachloroethylene and Carbon tetrachloride are both listed on The Endocrine Disruptors Exchange's (TEDX) List of Potential Endocrine Disruptors database of chemicals with the potential to affect the endocrine system. Every chemical on the TEDX List has one or more verified citations published, accessible, primary scientific research demonstrating effects on the endocrine system.

NEUROTOXICITY: Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness, or unconsciousness.

IMMUNOTOXICITY: Animal studies have evaluated the association between perchloroethylene (PCE) exposure and autoimmunity, hypersensitivity, immunosuppression and general immune measures and have identified associations with PCE for each type of measure in some (but not all) studies.

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Hazard Not Otherwise Classified (HNOC)-Health

- Potential endocrine disruptor
- The transfer of tetrachloroethylene in milk was reported in laboratory animals and women

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICITY (EC, IC, and LC):

Component:	Freshwater Fish:	Invertebrate Toxicity:	Algae Toxicity:	Other Toxicity:
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	*LC50 Lepomis macrochirus: 11.0 - 15.0 mg/L 96h static *LC50 Pimephales promelas: 12.4 - 14.4 mg/L 96h flow-through *LC50 Oncorhynchus mykiss: 4.73 - 5.27 mg/L 96h flow-through *LC50 Pimephales promelas: 8.6 - 13.5 mg/L 96h static	*EC50 Daphnia magna: 6.1 - 9.0 mg/L 48h	*EC50 Pseudokirchneriella subcapitata (96 h) >500 mg/L	*LC50 Eisenia foetida (14 Days soil wet weight) 100 - 320 mg/kg *NOEC Eisenia foetida (14 Days soil wet weight) 32 - 100 mg/kg
Carbon Tetrachloride 56-23-5 (<0.005 %)	*LC50 Lepomis macrochirus: 23 - 33 mg/L 96h static *LC50 Pimephales promelas: 36.3 - 47.3 mg/L 96h flow-through *LC50 Pimephales promelas: 9.68 - 11.3 mg/L 96h static	*1500 ug/L 7 hour(s) EC50 (Regeneration) Flatworm (Dugesia japonica)	No data available	No data available
Phenol, 4-(1,1-dimethylpropyl)- 80-46-6 (<0.001 %)	*LC50 Pimephales promelas: 1.87 - 3.34 mg/L 96h flow-through *LC50 Cyprinus carpio: 1.6 mg/L 96h	-----	No data available	No data available

Aquatic Toxicity:

Chlamydomonas reinhardtii 72 hr EC50 = 3.64 mg/l
reinhardtii EC50-3.64 mg/l.

Fish Toxicity:

Salmo gairdneria 96 hr LC50 = 5 mg/l
floridae 96 hr LC50 = 8.4 mg/l
promelas 96 hr LC50 = 18.4 - 21.4 mg/l
floridae 10 day NOEC = 1.99 mg/l; LOEC = 4.85 mg/l (larvae)
floridae 28 day NOEC = 2.34 mg/l; LOEC = 5.82 mg/l (fry)

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Invertebrate Toxicity:

LC50 (Static) Mysid shrimp (96 hr.) = 10.2 ppm

LC50 Daphnia magna (48 hr.) = 18 mg/L

Daphnia magna 48 hr EC50 = 8.5 mg/lmagna 28 d NOEC = 0.51 mg/l; LOEC = 1.1 mg/l

FATE AND TRANSPORT:

PERSISTENCE: AIR: In the environment, PCE is expected to largely volatilize to the atmosphere where it may undergo long-range transport and slowly degrade via indirect photolysis, with a half-life ≤ 6 months. SOIL: PCE has low potential to partition to or accumulate in soil and is primarily expected to volatilize to air or migrate through soil into groundwater based on its physical-chemical properties. WATER: Based on its Henry's Law constant (0.0177 atm-m³/mole) and vapor pressure (18.5 mmHg at 25°C), PCE can be expected to volatilize from surface water to air and from soil to air. Predicted volatilization from surface water to be 1.4 hours for rivers and 123 hours for lakes.

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

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

BIOACCUMULATIVE POTENTIAL: With measured bioconcentration factors of 312 or lower and estimated bioaccumulation factor of 46, perchloroethylene has limited bioaccumulation potential.

MOBILITY IN 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.

ADDITIONAL ECOLOGICAL INFORMATION: Perchloroethylene has a negligible tropospheric ozone creation potential in the atmosphere.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste from material:

Reuse or reprocess, if possible. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Keep out of water supplies, sewers, and soil. Recovered liquids may be sent to a licensed reclaimer or incineration facility. Wastewater from contaminant suppression, cleaning of protective clothing/equipment, or contaminated sites should be contained and evaluated for subject chemical or decomposition product concentrations. Concentrations shall be lower than applicable environmental discharge or disposal criteria. Alternatively, pretreatment and/or discharge to a permitted wastewater treatment facility is acceptable only after review by the governing authority and assurance that "pass through" violations will not occur. Due consideration shall be given to remediation worker exposure (inhalation, dermal and ingestion) as well as fate during treatment, transfer, and disposal. If it is not practicable to manage the chemical in this fashion, it must be evaluated in accordance with United States Environmental Protection Agency (US EPA) 40 CFR Part 261, specifically Subpart B, in order to determine the appropriate local, state, and federal requirements for disposal.

Container Management:

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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.

Contaminated Material:

Contaminated packaging must be disposed of as unused product by a licensed / permitted waste disposal service.

SECTION 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
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

AIR TRANSPORT (ICAO / IATA)

Special Instructions CAO: IATA Certificate for shipping personnel is required

SECTION 15. REGULATORY INFORMATION

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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	U.S. DOT Hazardous Substances/ RQs	CERCLA Hazardous Substances / RQs	CERCLA Section 302 EHS EPCRA RQs	Section 302 Threshold Planning Quantity (TPQ)
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0)	100 lbs(RQ)	100 lb	Not listed	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005)	10 lbs(RQ)	10 lb	Not listed	Not Listed

SARA EHS Chemical (40 CFR 355.30)

Not regulated.

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

Acute Health Hazard, Chronic Health Hazard

SARA HAZARD CATEGORIES ALIGNED WITH GHS (2018):

Health Hazard - Carcinogen
 Health Hazard - Acute Toxin (any route of exposure)
 Health Hazard - Skin Corrosion or Irritation
 Health Hazard - Serious eye damage or eye irritation
 Health Hazard - Specific Target Organ Toxicity (STOT) Single Exposure (SE)
 Health Hazard - Specific Target Organ Toxicity (STOT) Repeat Exposure (RE)
 Health Hazard - Aspiration Hazard
 Health Hazard - HNOC

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	SARA 313 - Emission Reporting	SARA 313 PBT
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0)	0.1% (de minimis concentration)	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005)	0.1% (de minimis concentration)	Not Listed

DEPARTMENT OF HOMELAND SECURITY (DHS)- Chemical Facility Anti-Terrorism Standards (6 CFR 27):

No components in this material are regulated under DHS

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

Not regulated.

Component	EPA RMP Toxic or Flammable TPQ	PSM - Highly Hazardous Substances, Toxics and Reactives	Flash Point
Tripropylene 27215-95-8 (<0.08)	Not Listed	Not Listed	26°Copen cup

EPA'S CLEAN WATER AND CLEAN AIR ACTS:

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This substance contains the ozone-depleting substance (ODS) Carbon Tetrachloride which is regulated as a Class I controlled substance by the U.S. Environmental Protection Agency. Class I substances have been completely phased out in the U.S., except for exemptions allowed under 40 CFR Part 82 (ODS regulations) and the Montreal Protocol. Those exemptions include feedstock (transformation) uses, destruction, certain process agent uses, and specific essential uses.

Component	Clean Water Act - Priority Pollutants	CAA - ODS CLASS 1 AND CLASS 2	CAA - Volatile Organic Compounds (VOCs) in SOCM1	CAA - HON Rule - Organic HAPs	CAA - Hazard Air Pollutants	CAA - Urban HAPs List (Integrated Urban Strategy)	SNAP - Substitutes for ODS	EPA RMP Toxic or Flammable TPQ
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	Present	Not Listed	Present	Present	Present	Present	Not Listed	Not Listed
Tripropylene 27215-95-8 (<0.08 %)	Not Listed	Not Listed	Present	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005 %)	Present	Class I ODS	Present	Present	Present	Not Listed	Not Listed	Not Listed

NATIONAL INVENTORY STATUS

U.S. INVENTORY STATUS: Toxic Substance Control Act (TSCA):

Component	TSCA Inventory	TSCA ACTIVE LIST	TSCA 12(b)	TSCA/Section 4	TSCA/Section 5	TSCA/Section 6	TSCA/Section 8
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Chemicals subject to Risk Evaluation	Listed
Tripropylene 27215-95-8 (<0.08 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Not listed	Not listed
Diallylamine 124-02-7 (<0.02 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Not listed	Not listed
Carbon Tetrachloride 56-23-5 (<0.005 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Chemicals subject to Risk Evaluation	Not listed
Phenol, 4-(1,1-dimethylpropyl)- 80-46-6 (<0.001 %)	Listed	ACTIVE	Not Listed	Not listed	Not Listed	Not listed	Listed

CANADIAN CHEMICAL INVENTORY: All components of this product are listed on either the DSL or the NDSL.

Component	DSL	NDSL
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0)	Listed	Not Listed
Tripropylene 27215-95-8 (<0.08)	Listed	Not Listed
Diallylamine 124-02-7 (<0.02)	Listed	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005)	Listed	Not Listed
Phenol, 4-(1,1-dimethylpropyl)- 80-46-6 (<0.001)	Listed	Not Listed

STATE REGULATIONS

California Proposition 65:

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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	Rhode Island Right to Know Hazardous Substance List
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0 %)	Listed	Not Listed	Not Listed	Listed	Listed
Tripropylene 27215-95-8 (<0.08 %)	Not Listed	Not Listed	Not Listed	Listed	Not Listed
Diallylamine 124-02-7 (<0.02 %)	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005 %)	Listed	Not Listed	Not Listed	Listed	Listed
Phenol, 4-(1,1-dimethylpropyl)- 80-46-6 (<0.001 %)	Not Listed	Not Listed	Not Listed	Listed	Not Listed

Component	New Jersey Right to Know Hazardous Substance List	New Jersey Special Health Hazards Substance List	New Jersey - Environmental Hazardous Substance List	Pennsylvania Right to Know Hazardous Substance List	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Special Hazardous Substances	Pennsylvania Right to Know Environmental Hazard List
Tetrachloroethylene [Perc]	1810	carcinogen	Listed	Listed	Present	Present	Present
Tripropylene	Not Listed	Not Listed	Not Listed	Listed	Not Listed	Not Listed	Not Listed
Diallylamine	0609	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed	Not Listed
Carbon Tetrachloride	0347	carcinogen	Listed	Listed	Present	Present	Present
Phenol, 4-(1,1-dimethylpropyl)-	Not Listed	Not Listed	Not Listed	Listed	Not Listed	Not Listed	Not 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.

Component	Canada - CEPA - Schedule I - List of Toxic Substances	Canada - NPRI	Canada - CEPA - 2010 Greenhouse Gases (GHG) Subject to Mandatory Reporting	CANADIAN CHEMICAL INVENTORY:	NDSL:
Tetrachloroethylene [Perc] 127-18-4 (99.0 - 100.0)	Present (044) Present (065)	Part 1, Group 1 Substance Part 4 Substance	Not Listed	Listed	Not Listed
Tripropylene 27215-95-8 (<0.08)	Present (065)	Part 4 Substance	Not Listed	Listed	Not Listed
Diallylamine 124-02-7 (<0.02)	Not listed	Not Listed	Not Listed	Listed	Not Listed
Carbon Tetrachloride 56-23-5 (<0.005)	Present (018) Present (065)	Part 1, Group 1 Substance Part 4 Substance	Not Listed	Listed	Not Listed
Phenol, 4-(1,1-dimethylpropyl)- 80-46-6 (<0.001)	Not listed	Not Listed	Not Listed	Listed	Not Listed

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SECTION 16. OTHER INFORMATION

Prepared by: Occidental Chemical Corporation - HES&S Product Stewardship Department

Rev. Date: 28-Jun-2021

Reason for Revision:

- Change of company physical address: SEE SECTION 1
- Updated 24 Hour Emergency Telephone Number: SEE SECTION 1
- Split original SDS into multiple SDSs to account for GHS hazard classification differences
- Added restrictions on use: See SECTION 1
- Modified the Emergency Overview information: SEE SECTION 2
- Revised GHS Information: SEE SECTION 2
- Modified GHS Hazard and Precautionary Statements: SEE SECTION 2
- Added Hazards Not Otherwise Classified (HNOC): SEE SECTION 2
- GHS Symbol(s) added or changed: SEE SECTION 2
- Modified Composition/Information on Ingredients: SEE SECTION 3
- FIRST AID MEASURES (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
- Removed an exposure level that was not applicable (i.e. foreign country). SEE SECTION 8
- Added Canadian exposure levels: SEE SECTION 8
- Additional advice added to discuss EPA risk assessment process under TSCA: SEE SECTION 8
- Revised Exposure Controls/Personal Protection information: SEE SECTION 8
- Added Hygiene Measures SEE SECTION 8
- Requirements for emergency eyewash and shower added: SEE SECTION 8
- Updated Physical and Chemical Properties. SEE SECTION 9
- SDS format change / enhancement to Section 11: Toxicological Information
- Ecological Information has been modified: SEE SECTION 12
- Updated Disposal Considerations. SEE SECTION 13
- Added air transport certificate requirements for shipping personnel: SEE SECTION 14
- Regulatory Information Changes: SEE SECTION 15
- Added Department of Homeland Security Anti-Terrorism Information: SEE SECTION 15
- Modified SARA Hazard Categories Aligned with GHS (2018): SEE SECTION 15
- Updated SECTIONS 1 and 15 based on finalization of EPA's Risk Assessment Evaluation under TSCA Section 6(a)

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, EXPRESSED 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 Occidental Chemical Corporation 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

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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