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Responsible Care®
Our commitment to sustainability.



Responsible Distribution Canada
Leaders in Chemicals and Ingredients

1. PRODUCT IDENTIFICATION

Name: *Perchloroethylene*

Synonyms: *1,1,2,2-tetrachloroethylene; tetrachloroethylene; "perc"*

CAS# 127-18-4

Product Uses: *Solvent, parts cleaning prior to painting or plating.*

Supplier Identifier: *Megaloid Laboratories Limited
5515 North Service Road, Suite 306
Burlington, Ontario, Canada
L7L 6G4
Phone: 905-337-7411 / Fax: 905-337-1686*

EMERGENCY INFORMATION Call CHEMTREC - (800) 424-9300 (CNN # 693764)

2. HAZARDS

GHS Class <i>(category)</i>	Acute inhalation <i>(4)</i>	Skin irritation <i>(2)</i>	Carcinogen <i>(2)</i>	Aquatic toxic <i>(2)</i>
Signal Word	WARNING			
Hazard Statements	<i>Harmful if inhaled (H332)</i>	<i>Causes skin irritation (H315)</i>	<i>Suspected of causing cancer on inhalation (H351)</i>	<i>Toxic to aquatic life with long lasting effects (H411)</i>



Label Pictograms

GHS Precautionary Statements for Labelling

Prevention

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

P262 Do not get in eyes, on skin or on clothing.

P264 Wash thoroughly after handling.

P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273, P391	Avoid release to the environment. Collect spillage.
P280	Wear eye protection, protective gloves and clothing of butyl rubber
Response	
P301, P310	IF SWALLOWED, immediately call a doctor.
P304, P340	IF INHALED: remove person to fresh air and keep comfortable for breathing.
P305, P351, P338	IF IN EYES: rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P313, P333	If skin irritation or rash occurs, get medical advice/attention.
Storage	
P405	Store locked up.
Disposal	
P501	Dispose of contents and container in accordance with local, regional, national and international regulations.

3. COMPOSITION

Chemical Name:	CAS No.	%	Other Identifiers
Tetrachloroethylene (Perchloroethylene)	127-18-4	100	EC # 204-825-9

4. FIRST AID

Inhalation

Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself! If breathing stops, administer artificial respiration and seek medical aid promptly.**

Skin Contact

Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.

Eye Contact

Wash eyes with plenty of water, holding eyelids open. Seek medical assistance if there is any irritation.

Ingestion

Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

First-aid Comments

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

5. FIRE FIGHTING & FLAMMABILITY

Extinguishing Media

Suitable Extinguishing Media

Not combustible. Use extinguishing agent suitable for surrounding fire. Use water to keep non-leaking, fire-exposed containers cool. Alcohol-resistant foam, dry chemical, water fog or spray.

Combustion Products

Cannot accumulate a static charge on agitation or pumping.

Carbon monoxide, chlorine, phosgene, hydrogen chloride & other toxic and/or corrosive gases.
Special Protective Equipment and Precautions for Fire-fighters
Firefighters must wear SCBA. Fire-fighters may enter the area if positive pressure SCBA and full Bunker Gear is worn.

6. ACCIDENTAL RELEASE MEASURES

Serious Fire Potential:

blanket spill with foam as a precaution against accidental ignition. Take extreme care to avoid sparks – do not operate (turn on OR off) electrical appliances near spill, unless explosion proof.

Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Eliminate all ignition sources. Use grounded, explosion-proof equipment. Increase ventilation to area or move leaking container to a well-ventilated and secure area.

Environmental Precautions

If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

Methods and Materials for Containment and Cleaning Up

*Leak Precaution: dyke to control spillage and prevent environmental contamination
Handling Spill: Ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal.*

Other Information

*If spill is extensive & excellent ventilation is not possible, cleanup workers must wear respirators with fresh organic vapour cartridges.
Report spills to local health, safety and environmental authorities, as required.*

7. HANDLING & STORAGE

Precautions for Safe Handling

Do not smoke around this product. The heat of the cigarette converts tetrachloroethylene into toxic phosgene & hydrogen chloride! For the same reason, do not carry out welding operations in the area.

Empty containers may contain a flammable / explosive vapour. Always ensure that containers, whether empty or full, are tightly sealed unless in use.

Never cut, drill, weld or grind on or near this container. Avoid contact with skin & wash work clothes frequently. An eye bath must be available near the workplace.

Conditions for Safe Storage

Store away from open flame & substances listed in Part 10. Stable to 500C° / 930°F. Always ensure that containers, empty or full, are tightly sealed unless in use. Avoid breathing product vapour. This product should only be used in special equipment to keep vapour out of the workplace. If dealing with a spill, & excellent ventilation is not possible, wear a suitable respirator with a fresh cartridge. Discard the cartridge after one use*.*

** NOTE: A respirator cannot be relied on to protect a worker from this product! The odour threshold is ABOVE the TLV. Before you are aware of the substance, it is already harming you! Use respirators – always fitted with a fresh cartridge – for emergency only!*

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV 25 ppm / 170 mg/m³
ACGIH TLV 25 ppm / 170 mg/m³
OSHA PEL 100 ppm / 670 mg/m³

Ontario STEV 100 ppm / 685 mg/m³
ACGIH STEL 100 ppm / 685 mg/m³
OSHA STEL 200 ppm / 1340 mg/m³

Ventilation	<i>Mechanical ventilation may be required to control airborne titre to regulated limits; an “escape” respirator with “fresh” organic vapour cartridge should be available for workers in area should vapour containment fail. Store respirators & cartridges in airtight containers (“Tupperware”, “Zip Lock”) to maintain “freshness”.</i>
Hands	<i>Nitrile or “Viton” gloves recommended – other types may also protect; consult supplier to confirm suitability wear impermeable (above) apron, boots, & long sleeves if there is any danger of splashing.</i>
Eyes	<i>Safety glasses with side shields – always protect the eyes</i>
Clothing	<i>Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.</i>

Appropriate Engineering Controls

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Provide eyewash and safety shower if contact or splash hazard exists.

9. PHYSICAL PROPERTIES

Appearance	<i>Clear colourless liquid.</i>
Odour	<i>mild, pleasant ether odour</i>
Odour threshold	<i>~ 50 ppm (338.8 mg/m³)</i>
pH	<i>Neutral</i>
Melting Point/Freezing Point	<i>-22 °C (-8 °F) (freezing)</i>
Initial Boiling Point/Range	<i>121 °C (250 °F)</i>
Flash Point	<i>Not applicable</i>
Evaporation Rate	<i>1.5 (n-butyl acetate = 1)</i>
Flammability (Solid, Gas)	<i>Not Available</i>
Upper/Lower Flammability or Explosive Limit	<i>Not applicable</i>
Vapour Pressure	<i>14 mm Hg (2 kPa)</i>
Vapour Density (air = 1)	<i>5.8</i>
Relative Density (water = 1)	<i>1.62 at 20 °C (68 °F)</i>
Solubility	<i>-20 mg/L in water; Soluble in all proportions in common organic solvents.</i>
Partition Coefficient, n-Octanol/Water (Log Kow)	<i>3.4</i>
Auto-ignition Temperature	<i>Not applicable</i>

Conversion Factor	1ppm=6.77mg/m ³
Viscosity	2.4 centipoise (20°C / 68°F)
Physical State	Liquid
Specific Gravity	1.62 (20/20oC)
Molecular Weight	166 grams per mole
Molecular Formula	C ₂ Cl ₄

10. REACTIVITY

Dangerously Reactive with strong oxidizing agents; strong acids may cause explosions
Also Reactive with strong alkalis may cause explosion if trichloroethylene present; copper may react with any dichloroethylene present to form explosive substances; aluminum powder may react explosively.

Chemical Stability

Stable; will not polymerize

Hazardous Decomposition Products

None apart from Hazardous Combustion Products.

Conditions to Avoid

Temperatures above 500.0 °C (932.0 °F)

11. TOXICITY

Acute Toxicity	
LD₅₀ (oral)	2630mg/kg (rat), 6400 & 8100mg/kg (mouse), >4000mg/kg (dog & cat)
LD₅₀ (skin)	>3230mg/kg (rabbit)
LC₅₀ (inhalation)	3790, 4000 & 4620ppm (rat), 2610, 3645, 4860 & 5200ppm (mouse)

Skin Corrosion/Irritation

Severely irritating within minutes, redness, possible blistering (complete healing in days)

Serious Eye Damage/Irritation

Mildly irritating; vapour irritating above ~250ppm

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Over 100ppm causes dizziness, drowsiness, headache, nausea; irritating above 200ppm; over 600ppm causes incoordination, possible unconsciousness

Skin Absorption

Slight; no toxic effects likely by this route

Ingestion

Dizziness, drowsiness, intoxication, headache, nausea – not a route of industrial exposure

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Do not breathe vapours. If inhaled remove person to fresh air and keep comfortable for breathing.

Respiratory and/or Skin Sensitization

Not a sensitizer in humans or animals.

Carcinogenicity

IARC: Group 2A – Probably carcinogenic to humans. ACGIH®: A3 – Confirmed animal carcinogen.

Reproductive Toxicity

Sexual Function and Fertility

Does not cause effects on sexual function or fertility.

Germ Cell Mutagenicity

Not known to be a mutagen.

Interactive Effects

Synergistic not known - perchloroethylene appears to act synergistic with several organic solvents.

Other Information

Severe acute effect makes prolonged or repeated skin exposure unlikely; chronic exposure causes dry skin & dermatitis; mood changes, persistent nausea, fatigue & other neurological effects may occur; kidney damage in rats at 200ppm & mice at 50ppm (chronic); mice also had liver damage.

12. ECOLOGICAL INFORMATION

Bioaccumulation	<i>Not a bioaccumulator; biological 1/2 life is 6 days.</i>
Persistence and Degradability	Biodegradation - <i>biodegrades slowly with or without oxygen; aerobic ½-life is 180days; anaerobic – 98days; rapid biodegradation (87% in 28days) in acclimated sewage facilities</i> Abiotic Degradation - <i>reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 96 days; stratospheric photolysis (high UV intensity) is rapid – 6 days for 50-90% destruction</i>
Mobility in soil, water	<i>Sparingly water soluble; moves moderately readily in soil & water.</i>
Aquatic Toxicity	
LC50 (Fish, 96hr)	<i>5mg/litre (Limada limada, Oncorhynchus mykiss & Salmo gairdneri), 13.4, 18.4 & 23.8mg/litre (Pimephelas promelas), 130mg/litre (Leuciscus idus), 29-52mg/litre (Cyprinodon variegatus), 13mg/litre (Lepomis macrochirus)</i>
EC50 (Crustacea, 48hr)	<i>3.2, 9-18, 22 & 126-176mg/litre (Daphnia magna)</i>
EC50 (Algae)	<i>10.5mg/litre (Phaeodactylum tricornutum), 816mg/litre (Selenastrum capricornutum), 500mg/litre (Skeletonema costatum)</i>
EC50 (Bacteria)	<i>112mg/litre (Nitrosomas sp), 100mg/litre (Tetrahymena pyriformis), & others</i>
EC10 (Bacteria)	<i>68mg/litre (Photobacterium phosphoreum), >45mg/litre Pseudomonas putida)</i>
NOEC	<i>1.6mg/litre (Poecilia sphenops), 2.0mg/litre (Hordanella floridae)</i>

13. DISPOSAL

Water Disposal

Do not flush to sewer, recycle solvent if possible, local regulations may permit disposal in sanitary landfill, may be incinerated in approved facility after mixing with a suitable flammable waste


Containers

Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.

Pails must be vented and thoroughly dried prior to crushing and recycling.
IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs).
Steel containers must be inspected, pressure tested & recertified every 5 years.

***Never cut, drill, weld or grind on or near this container,
 even if empty***

14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN1897	
AND	Shipping Name	Tetrachloroethylene	
U.S.A. 49 CFR	Class & Packing Group	6.1, PG III	
Marine Pollutant ERAP Required Reportable Quantity E R G No.	Tetrachloroethylene NO 100 lbs (45kg) 160		

15. REGULATIONS

Canada DSL	On Inventory
U.S.A. TSCA	On Inventory
Europe EINECS	On Inventory

Canadian Regulations

CEPA - National Pollutant Release Inventory (NPRI)
 Part 1A

U.S.A. Regulations

Immediately Dangerous to Life or Health: NIOSH has recommended that tetrachloroethylene be treated as a potential occupational carcinogen.

Acceptable Daily Intakes: Suggested No-Adverse-Response Level (SNARL): In light of the lack of definitive information regarding the quantity of tetrachloroethylene that must be ingested to depress psychophysiological function, it seems appropriate that calculations for a SNARL be based upon quantities of the chemical that are required to produce tissue injury. ... the 0.3 ml/kg (0.49 g/kg) dose appears to be a reasonable "minimum toxic dose" from which to calculate a 24-hr SNARL for contamination of drinking water, assuming that the sole source of tetrachloroethylene during this period will be from 2 l/day of drinking water consumed by a 70 kg human. A safety factor of 100 is applied: 490 mg/kg times 70 kg/100 times 2 l = 172 mg/l. The above considerations ignore the possibility that tetrachloroethylene may be carcinogenic. ... a 7-day standard for drinking water contamination, which was obtained by dividing the 24-hr standard by 7 (172 mg/l/7 days = 24.5 mg/l), should protect against adverse effects by the chemical.

OSHA Standards: Permissible Exposure Limit: Table Z-2 8-hr Time Weighted Avg: 100 ppm. Permissible Exposure Limit: Table Z-2 Acceptable Ceiling Concentration: 200 ppm. Permissible Exposure Limit: Table Z-2 Acceptable maximum peak above the acceptable ceiling concentration for

an 8-hour shift. Concentration: 300 ppm. Maximum Duration: 5 minutes in any 3 hours. Vacated 1989 OSHA PEL TWA 25 ppm (170 mg/cu m) is still enforced in some states.

NIOSH Recommendations: NIOSH recommends that tetrachloroethylene be regulated as a potential occupational carcinogen. NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concentration. Minimize workplace exposure concentration.

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 25 ppm; 15 min Short Term Exposure Limit (STEL): 100 ppm A3: Confirmed animal carcinogen with unknown relevance to humans.

Biological Exposure Index (BEI): Determinant: Tetrachloroethylene in end-exhaled air; Sampling Time: Prior to shift; BEI: 3 ppm. Biological Exposure

Index (BEI): Determinant: Tetrachloroethylene in blood; Sampling Time: Prior to shift; BEI: 0.5 mg/L.

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non-air quality health and environmental impact and energy requirements. Tetrachloroethylene is produced, as an intermediate or a final product, by process units covered under this subpart. Listed as a hazardous air pollutant generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all emission sources that emit one or more of the listed pollutants. Tetrachloroethylene is included on this list.

Federal Drinking Water Standards: Maximum contaminant levels (MCL) for organic contaminants apply to community and non-transient, non-community water systems: Tetrachloroethylene, MCL 0.005 mg/L. EPA 5 ug/L

State Drinking Water Standards: Florida 3 ug/L, New Jersey 1 ug/L

State Drinking Water Guidelines: Arizona 0.67 ug/L, Connecticut 5 ug/L, Maine 7 ug/L, Minnesota 5 ug/L

Clean Water Act Requirements: Toxic pollutant designated pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations.

CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Centre (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 100 lb or 45.4 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV.D.3.b).

TSCA Requirements: Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Tetrachloroethylene is included on this list. Effective date 6/1/87; Sunset date: 6/1/97.

RCRA Requirements: A solid waste containing tetrachloroethylene may or may not become characterized as a hazardous waste when subjected to the Toxicity Characteristic Leaching Procedure listed in 40 CFR 261.24, and if so characterized, must be managed as a hazardous waste. As stipulated in 40 CFR 261.33, when tetrachloroethylene, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). When trichloroethylene is a spent halogenated solvent, it is classified as a hazardous waste from a nonspecific source, as stated in 40 CFR 261.31, and must be managed according to state and/or federal hazardous waste regulations.

FIFRA Requirements: As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their continued use. Under this pesticide reregistration program, EPA examines newer health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether the use of the pesticide does not

pose unreasonable risk in accordance to newer safety standards, such as those described in the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA '88 were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern than those on List C, and with List C containing pesticides of greater concern than those on List D. Tetrachloroethylene is found on List C. Case No: 3109; Case Status: No products containing the pesticide are actively registered. Therefore, we are characterizing the case as "cancelled." Under FIFRA, pesticide producers may voluntarily cancel their registered products. EPA also may cancel pesticide registrations if registrants fail to pay required fees or make/meet certain reregistration commitments, or if EPA reaches findings of unreasonable adverse effects.; Active ingredient (AI): tetrachloroethylene; AI Status: The active ingredient is no longer contained in any registered products ... "cancelled."

16. OTHER INFORMATION

NFPA RATING	Health 2	Flammability 0	Instability 0
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Prepared for Megaloid Laboratories Limited **by** Richard Koscher
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Revision Dates: May 2007, May 2010, May 2013, May 2015, Oct 2017, Feb 2019

Key to Abbreviations	ACGIH® = American Conference of Governmental Industrial Hygienists AIHA® = AIHA® Guideline Foundation HSDB® = Hazardous Substances Data Bank IARC = International Agency for Research on Cancer NFPA = National Fire Protection Association NIOSH = National Institute for Occupational Safety and Health NTP = National Toxicology Program OSHA = US Occupational Safety and Health Administration RTECS® = Registry of Toxic Effects of Chemical Substances
References	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). HSDB® database. US National Library of Medicine. Available from Canadian Centre for Occupational Health and Safety (CCOHS). NIOSH Pocket Guide database. National Institute for Occupational Safety and Health. Available from Canadian Centre for Occupational Health and Safety (CCOHS). Registry of Toxic Effects of Chemical Substances (RTECS®) database. Dassault Systèmes/BIOVIA ("BIOVIA"). Available from Canadian Centre for Occupational Health and Safety (CCOHS).
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