

MATERIAL SAFETY DATA SHEET**PERCHLORIC ACID**

PRODUCT CODE NUMBER(S): 7925-1, 8025-1, 8026-2, 8027-2

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: *Perchloric acid*
Chemical Family: *Inorganic acid*
Chemical Formula: $HClO_4$
Product Use: *Laboratory chemical*
Manufacturer's Name and Address:
Caledon Laboratories Ltd.
40 Armstrong Avenue
Georgetown, Ontario L7G 4R9
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HAZARDOUS INGREDIENTS OF MATERIALS

<i>Ingredients</i>	<i>%</i>	<i>TLV Units</i>	<i>CAS No.</i>
<i>Perchloric acid</i>	<i>60-72</i>	<i>Not established</i>	<i>7601-90-3</i>

PHYSICAL DATA

Physical State: *Liquid*
Odour and Appearance: *Clear, colourless liquid with a pungent odour*
Odour Threshold (ppm): *Not available*
Vapour Pressure (mm Hg): *6.8 mm Hg @ 25°C*
Vapour Density (Air = 1): *3.5*
Evaporation Rate: *Not available*
Boiling Point (°C): *203°C (72.4% solution)*
Freezing Point (°C): *-112°C*
pH: *<1*
Specific Gravity: *1.6642*
Coefficient of Water/Oil distribution: *Not available*

SHIPPING DESCRIPTION

UN: *1873*
T.D.G. Class: *5.1, (8)*
Pkg. Group: *I*

REACTIVITY DATA

Chemical Stability: *Stable at concentrations below 73%. Above 73% and anhydrous, unstable.*
Incompatibility with other substances: *Contact with organic materials, strong reducing agents, strong bases, strong acids, amines, antimony compounds, phosphorous halides, acid anhydrides, or alcohols may produce violent or explosive reactions and/or explosive compounds. Ignites spontaneously with hydriotic acid. Decomposes violently with hydrochloric acid. Reacts violently with water. Non-oxidizing when cold, but >160°C or when anhydrous becomes an extreme oxidant and powerful dehydrator. Corrosive to metals.*
Reactivity: *Will explode in contact with heat, or organic materials. Avoid excessive heat, shock, moisture, all ignition sources and incompatible materials, generation of mist.*
Hazardous Decomposition Products: *Hydrogen chloride gas, chlorine, chlorine dioxide*

FIRE AND EXPLOSION DATA

Flammability: *Does not burn, but supports combustion. Can explode in contact with organic matter. Above 160°C reacts with combustible material to increase intensity of fire. Closed containers may rupture violently when heated.*
Extinguishing Media: *Use extreme caution. Containers may explode in heat of fire; withdraw immediately in case of rising sound from vent or discoloration of tank. Use flooding amounts of water as a spray or fog, cautiously, to extinguish fire and to cool closed containers and reduce vapours. Fight fire from upwind, from a safe distance. Firefighters must use protective equipment (positive-pressure, full face-piece self-contained breathing apparatus) and clothing (chemical splash suit) sufficient to prevent inhalation of dust, fumes, or vapours, and contact with skin, eyes, and clothing*
Flash Point (Method Used): *>109°C*
Autoignition Temperature: *Not applicable*
Upper Flammable Limit (% by volume): *Not applicable*
Lower Flammable Limit (% by volume): *Not applicable*
Hazardous Combustion Products: *Hydrogen chloride gas, chlorine, chlorine dioxide*
Sensitivity to Impact: *None identified*
Sensitivity to Static discharge: *Does not burn and will not be ignited by static discharge.*

TOXICOLOGICAL PROPERTIES AND HEALTH DATA**Toxicological Data:**

LD₅₀: *(oral, rat) 1,100 mg/kg; (oral, dog) 400 mg/kg*
LC₅₀: *Not available*

Effects of Acute Exposure to Product:

Inhaled: *Corrosive. Does not readily form vapour, but mists may cause severe irritation, with coughing, choking, shortness of breath. Will burn mucous membranes. Inhalation may be fatal as a result of spasm, inflammation and edema of larynx and bronchi. Symptoms (shortness of breath, cyanosis, weak, rapid pulse, frothy sputum, hypotension, hemoconcentration, and moist rales) may appear several hours after exposure.*
In contact with skin: *Corrosive. Concentrated solutions may cause pain, brownish or yellow stains, and severe burns, and possible permanent scarring. Prolonged exposure to dilute solutions may cause irritation, redness, pain and drying of skin.*
In contact with eyes: *Corrosive. Causes immediate pain, severe burns and permanent corneal damage which may result in blindness. Extent of damage depends on concentration and duration of exposure.*
Ingested: *Corrosive. Can cause severe irritation and burns to the digestive tract, nausea, vomiting, possible perforation esophagus and stomach, with severe abdominal pain. Can cause severe shock and may be fatal. Non-fatal exposures can cause permanent damage and strictures of gastrointestinal tract.*

Effects of Chronic Exposure to Product:

No reports of chronic health effects from absorption of perchloric acid.
Carcinogenicity: *No evidence of carcinogenicity*
Teratogenicity: *No information available*
Reproductive Effects: *No information available*

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Mutagenicity: No information available

Synergistic Products: None known

PREVENTIVE MEASURES

Engineering Controls: Non-sparking, grounded, corrosion-resistant ventilation system. Ventilation systems must be specifically designed and maintained for perchloric acid and must be clearly identified as such.

Respiratory Protection: Dust/mist mask. Use in fumehood only. NIOSH approved supplied-air respirator suitable for acid mist. For high or unknown concentrations, as in fire or spill conditions, full face-piece, positive-pressure self-contained breathing apparatus or supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles and face shield

Skin Protection: Natural, neoprene, or nitrile rubber, polyvinyl chloride, or Tychem TK gauntlet gloves. Impermeable apron, sleeves, boots and other protective clothing sufficient to prevent any contact with skin.

Other Personal Protective Equipment: Safety shower and eye bath located close to chemical exposure area.

Leak and Spill Procedure: Evacuate area. Shut off all sources of ignition and remove all combustible materials. Cleanup personnel must be trained in the handling of perchloric acid and must wear protective equipment and clothing sufficient to prevent inhalation and contact with skin, eyes, and clothing. Do not touch spilled material. Do not breathe mist. Stop and contain discharge by constructing barriers or applying inert absorbent. Cover spill with weak reducing agents such as hypochlorite, bisulphite or ferrous salts. Shovel sludge into large containers of water and add soda ash to neutralize. Keep mixture wet to prevent combustion upon drying. Wash site of spillage thoroughly with copious amounts of water. Arrange for removal by licenced disposal company.

Waste Disposal: Follow all federal, provincial, and local regulations for disposal.

Handling Procedures and Equipment: OXIDIZER, TOXIC, CORROSIVE. Persons working with this substance must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Keep away from heat, sparks, flame, and all sources of ignition. Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools. Add acid to water slowly, stirring constantly, to avoid boiling and splattering. Use the smallest amount possible for the purpose, in a designated area with adequate ventilation. Avoid all contact with this substance. Wash hands thoroughly after working with this chemical. Empty containers may contain hazardous residues; treat with caution.

Storage Requirements: Store in clearly labelled, glass, ceramic or polyethylene containers in a cool, dry well-ventilated place, out of direct sunlight. Store in second container or tray to contain acid if primary container is broken. Protect against damage, and inspect regularly for damage or signs of leaking. Discard if discolouration occurs. Evidence of crystals in storage containers indicate SEVERE explosion hazard; do not move; immediate contact supervisor. Keep containers tightly closed. Keep well away from combustible and incompatible materials. Treat empty containers with caution - they may contain hazardous residues.

FIRST AID MEASURES

Specific Measures:

Eyes: IMMEDIATELY flush eyes with running water for at least thirty (30) minutes, holding eyelids open while flushing. Take care not to flush contaminated water into the unaffected eye. Wear protective gloves and other clothing to avoid contact during first aid measures. Get MEDICAL ATTENTION IMMEDIATELY. Flushing may be continued while casualty is transported to medical facility.

Skin: Under running water, remove contaminated clothing (including shoes, watches, belts, and rings). IMMEDIATELY flush the exposed area with large amounts of running water for at least thirty (30) minutes. Wear protective gloves and other clothing to avoid contact. Transport to medical facility IMMEDIATELY after flushing is complete.

Inhalation: IMMEDIATELY remove to fresh air (caution must be used by rescuers to avoid exposure to the contaminating fumes). Get medical attention and give oxygen for any breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent, give CPR. IMMEDIATELY CONTACT A PHYSICIAN. Stay with casualty until medical help arrives. Second rescuer should obtain oxygen equipment and ambulance. Onset of pulmonary edema may be delayed; if victim feels unwell during the next 48 hours, get medical attention immediately.

Ingestion: DO NOT INDUCE VOMITING. If casualty is alert and not convulsing; rinse mouth with water and give 1 to 2 cups of water or milk to dilute material. IMMEDIATELY get medical attention. If spontaneous vomiting occurs; have casualty lean forward with head down to avoid breathing in of vomitus. Avoid contact with emesis. Rinse mouth and give 1/2 cup of water or milk.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979

Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: March 10, 1989

Revision: July 2010

MSDS: 7925-1, 8025-1, 8026-2, 8027-2

Proposed WHMIS Designation: C; E

Prepared by: Caledon Laboratories Ltd. (905) 877-0101
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