

MATERIAL SAFETY DATA SHEET**PHENOL:CHLOROFORM**

PRODUCT CODE NUMBER(S): 7030-5

PRODUCT IDENTIFICATION**Chemical Name and Synonyms:** Phenol:Chloroform Mixture**Chemical Family:** NA**Chemical Formula:** $C_6H_5OH + CHCl_3 + C_5H_{12}O$ **Product Use:** Laboratory reagent**Manufacturer's Name and Address:**Caledon Laboratories Ltd.
40 Armstrong Avenue
Georgetown, Ontario L7G 4R9**Telephone No:** (905) 877-0101**Fax No:** (905) 877-6666**Emergency Telephone No:** CANUTEC (613) 996-6666**HAZARDOUS INGREDIENTS OF MATERIALS**

Ingredients	%	TLV Units	CAS No.
Phenol	52	5 ppm	108-95-2
Chloroform	46	10 ppm	67-66-3
IsoAmyl Alcohol	2	100 ppm	123-51-3

PHYSICAL DATA**Physical State:** Liquid**Odour and Appearance:** Clear, light yellow liquid**Odour Threshold (ppm):** Not available**Vapour Pressure (mm Hg):** Not available**Vapour Density (Air = 1):** Not available**Evaporation Rate:** Not available**Boiling Point (degrees C):** Not available**Melting Point (degrees C):** Not available**pH:** Not determined**Specific Gravity:** Not determined**Coefficient of Water/Oil distribution:** Not available**SHIPPING DESCRIPTION****UN:** 2810**T.D.G. Class:** 6.1**Pkg. Group:** II**REACTIVITY DATA****Chemical Stability:** Stable.**Incompatibility with other substances:** Phenol: Acetaldehyde: violent condensation reaction. 1,3-Butadiene, borontrifluoride diethyl ether complex, sodium nitrate or trifluoroacetic acid: intense exothermic reaction. Calcium hypochlorite: intense exothermic reaction with ignition; Formaldehyde: temperature and pressure increase in closed container. May react explosively with strong oxidizers,

peroxodisulfuric acid, peroxomonosulfuric acid, sodium nitrite when heated, aluminum chloride and nitrobenzene mixture under carbon monoxide. Attacks many plastics, rubbers, coatings. Emits flammable hydrogen gas in contact with reducing agents. Corrosive to aluminum, lead, zinc. Chloroform: Incompatible with strong bases, strong oxidizing agents, ketones, alkali metals, aluminum, acetone, disilane, magnesium. May react explosively with fluorine, reactive metals in powder form, sodium and sodium methoxide mixtures. May form detonatable mixtures with alkali metals or nitromethane.

Reactivity: Avoid heat, flame, other ignition sources and all incompatible materials; protect from light and air. Avoid generation of mist. Hazardous polymerization will not occur.**Hazardous Decomposition Products:** CO_x . At high temperatures, chloroform decomposes to give off hydrogen chloride gas, phosgene, chlorine.**FIRE AND EXPLOSION DATA****Flammability:** Combustible. May form explosive mixtures with air. Vapours may travel to distant source of ignition and flash back. Hot surfaces may be enough to ignite liquid in the absence of sparks or flame. Chloroform is not combustible and probably reduces the combustibility of phenol somewhat.**Extinguishing Media:** Water spray, carbon dioxide, dry chemical, "alcohol" or polymer foam. Water as spray or fog can be used to cool containers and disperse vapours or flush spills away from ignition sources. Fight fire from a distance, from upwind direction. Firefighters must wear NIOSH/OSHA approved full face-piece, positive-pressure self-contained breathing apparatus and encapsulating chemical splash suit (Bunker Gear is not adequate).**Flash Point (Method Used):** Not available**Autoignition Temperature:** Not available**Upper Flammable Limit (% by volume):** Not available**Lower Flammable Limit (% by volume):** Not available**Hazardous Combustion Products:** CO_x , hydrogen chloride gas, phosgene, chlorine, toxic gases.**Sensitivity to Impact:** None identified**Sensitivity to Static discharge:** Not available. Mixtures of phenol vapours with air may be ignited by static discharge under certain circumstances.**TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****Phenol****LD₅₀:** (oral, rat) 320 mg/kg, 530 mg/kg (2 and 5% solutions); (dermal, pig) 500 mg/kg (liquified, 45°C)**LC₅₀:** (mouse) 177 mg/m³/3h; (rat) 316 mg/m³/3h**Chloroform****LD₅₀:** (oral, rat) 908 mg/kg; (oral, young rat) 450 mg/kg; (oral, male mouse) 36 mg/kg; dermal, rabbit >29 g/kg

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LC₅₀: (rat) 2,265 / 4h**Iso-amyl alcohol****LD₅₀:** (oral, rat) 5.74 g/kg (oral, female rat) 4 g/kg (dermal, rabbit) 3.22g/kg**LC₅₀:** Not available**Effects of Acute Exposure to Product:**

Toxic by all routes of exposure; causes burns by all routes of exposure. May cause irreversible effects. Target organs: Central nervous system, kidneys, liver, pancreas, spleen.

Chloroform toxicity may be increased by exposure with alcohol, steroids, polybrominated biphenyls, acetone, or chlordecone. Women who are pregnant or expect to become pregnant are advised to avoid exposure to this product. Persons with a history of liver disease or alcoholism should not be exposed to this product.

Inhaled: PHENOL: VERY TOXIC. Vapour and mist are destructive to all tissue, causing severe burns of the nose and throat; absorption causes CNS effects (nausea, dizziness, headache), kidney and liver damage. Brief exposure can cause irreversible injury or death as a result of spasm of larynx and bronchi, chemical pneumonitis and pulmonary edema. Vapours are heavier than air and can collect in low-lying areas, displacing air.

CHLOROFORM: Concentrations around 1,000 ppm produce headache, dizziness, shortness of breath, and fatigue after a few minutes. Concentrations around 4,000 ppm may cause nausea and vomiting. 10,000 ppm causes loss of feeling; 14,000 to 16,000 causes severe narcosis with stupor and unconsciousness. Concentrations of 15,000 to 18,000 can be life-threatening, causing respiratory or heart failure. Moderate irritant of the respiratory tract. Delayed effects include damage to heart, liver and kidneys.

In contact with skin: PHENOL: CORROSIVE, VERY TOXIC. Liquid and dust are extremely corrosive; hazard increases with phenol concentration; aqueous solutions over 5% are corrosive and toxic. Vapour and liquid can be readily absorbed through the skin in toxic or lethal amounts; effects include shock, collapse, coma, convulsion, kidney and liver damage and death. Moisture on skin (perspiration) accelerates tissue destruction. Causes local anesthesia; severe chemical burns and poisoning can occur with little or no pain. Chloroform may also be absorbed with systemic effects as in "Inhaled".

In contact with eyes: CORROSIVE. Vapours and concentrated solutions are severely irritating to eyes. Can cause conjunctival swelling, permanent corneal damage and blindness.

Ingested: PHENOL: CORROSIVE, VERY TOXIC. Causes severe burns of the mouth and throat, systemic effects as in "In Contact with Skin"; lethal dose may be as little as 15 mL. Chloroform is also toxic.

Effects of Chronic Exposure to Product:

Long-term exposure to phenol may cause dermatitis, darkening of skin and urine, muscular pains, weight loss, anorexia, headache, nausea, vomiting, diarrhea, weakness, kidney and liver damage and skin sensitization. May be fatal. May aggravate cardiovascular, liver and kidney disease, existing respiratory conditions, such as asthma, bronchitis, inflammatory or fibrotic respiratory disease. Chronic overexposure to chloroform may cause headache, mental confusion, depression, fatigue, loss of appetite, loss of balance, visual disturbances, liver and kidney damage. Inges-

tion of alcohol or phenobarbital increases the toxic effects. Prolonged skin contact can cause dermatitis.

Carcinogenicity: Chloroform is a suspected human carcinogen; phenol is not classifiable as carcinogenic.

Teratogenicity: Phenol probably not teratogenic at levels not toxic to mother. Chloroform has caused fetal abnormalities or death at levels toxic to the mothers in animal studies.

Reproductive Effects: Phenol showed no significant effects on reproductive performance in a study on rats. Insufficient information for chloroform.

Mutagenicity: Chloroform is considered to be mutagenic, based on animal information. Results for phenol are inconclusive.

Synergistic Products: Alcohols may react synergistically with chlorinated solvents. Phenol can promote the development of skin cancer when applied with known carcinogens.

PREVENTIVE MEASURES

Engineering Controls: Corrosion-resistant, non-sparking, grounded ventilation system, separate from other ventilation systems.

Respiratory Protection: Use only in a fumehood. To 50 ppm: NIOSH/OSHA approved chemical cartridge respirator with organic vapour cartridge and dust and mist filter. To 125 ppm: supplied air respirator operated in a continuous flow mode or powered air-purifying respirator with organic vapour cartridge and dust and mist filter. To 250 ppm: full facepiece chemical cartridge respirator with organic vapour cartridge and high-efficiency particulate filter or powered, full face-piece, air-purifying respirator with organic vapour cartridge and high-efficiency particulate filter. For higher or unknown concentrations, as in fire or spill conditions, self-contained breathing apparatus with full facepiece operated in a positive pressure mode, or positive-pressure, full face-piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles and faceshield.

Skin Protection: Viton™, Viton™/butyl rubber, Trelcehm™HPS, Responder™, Barrier (PE/PA/PE), Tychem™BR/LV, Tychem™SL, Tychem™TK gauntlet gloves. Other impervious protective body-covering clothing, such as apron, sleeves, trousers, coveralls, boots, sufficient to prevent any contact.

Other Personal Protective Equipment: Safety shower and eye-wash fountain in work area.

Leak and Spill Procedure: Stop or reduce discharge if it can be done safely. Evacuate area. Ventilate area. Eliminate all sources of ignition. Ground and bond all equipment. Cleanup personnel must be thoroughly trained in the hazards of this material, and must wear protective equipment and clothing sufficient to prevent inhalation of vapours or mists (see "Respiratory Protection") and contact with skin, eyes or clothing. Contain material with inert non-combustible absorbent. Prevent entry into water or sewer systems. Collect contaminated absorbent and put in covered containers for collection by approved disposal agency. Contaminated absorbent poses the same hazards as the product; treat with extreme caution. Flush area of spill thoroughly with copious amounts of running water.

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

Handling Procedures and Equipment: CORROSIVE, VERY TOXIC. POSSIBLE CARCINOGEN, MUTAGEN. Personnel working with this chemical must be thoroughly trained in its hazards, and its safe use, must wear appropriate protective equipment and clothing, in an area with

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proper ventilation and engineering controls. **DO NOT WORK ALONE.** Use the smallest amount possible for the purpose, in designated areas with adequate ventilation. Keep away from heat, flame hot surfaces, all sources of ignition, and all incompatible materials. Ground and bond all equipment to prevent static charge accumulation. Use non-sparking tools. Post "No Smoking" signs. Avoid all inhalation and contact with skin, eyes, and clothing. Avoid procedures which generate dust or mist. Empty containers contain hazardous residues; treat with caution.

Storage Requirements: Store in glass containers in a cool, dry, well-ventilated area out of direct sunlight and away from heat, flame, all sources of ignition, and all incompatible materials. Keep containers tightly closed and when opening, use extreme caution. Keep separate from other materials. Protect from damage. Inspect frequently for signs of damage or leaking. Storage area should have raised sills or ramps and a trench which drains to a safe location, and sealed floors to prevent absorption. Empty containers may contain hazardous residues; treat with extreme care.

FIRST AID MEASURES

Specific Measures:

Eyes: Immediately flush eyes with warm running water for at least sixty (60) minutes, holding eyelids open while flushing. **DO NOT INTERRUPT FLUSHING.** Use neutral saline to flush as soon as it is available. Take care not to flush contaminated water into unaffected eye. Wear protective gloves to avoid contact during first aid procedures. **GET MEDICAL ATTENTION IMMEDIATELY.**

Skin: Immediately remove all contaminated clothing (including rings, watches, belts, and shoes) under running water. Wear gloves and other protective clothing sufficient to prevent ANY contact with chemical. Flush exposed area with large amounts of gently running, lukewarm water for at least sixty (60) minutes. If polyethylene glycol-300 is available, stop water flushing after the chemical is removed and immerse the affected part in PEG-300, or if immersion is not possible, spray or swab with it continuously until medical help arrives. **GET VICTIM TO MEDICAL FACILITY IMMEDIATELY.** If breathing has stopped give artificial respiration. If breathing and pulse are absent, give CPR. Use mouth guards to prevent contact. Keep contaminated clothing in closed, labelled containers until it can be safely discarded.

Inhalation: **IMMEDIATELY** remove to fresh air (caution must be used by rescuers to avoid exposure). Give oxygen for breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent, give CPR. Use mouth guards to prevent contact. **GET MEDICAL ATTENTION IMMEDIATELY.** Stay with casualty until medical assistance is reached.

Ingestion: **DO NOT INDUCE VOMITING. DANGER OF ASPIRATION WITH EMESIS.** If casualty is alert and not convulsing, rinse out mouth with water and give 15 to 30 cc of castor oil or vegetable oil. **GET MEDICAL ATTENTION IMMEDIATELY.** If spontaneous vomiting occurs have casualty lean forward with head down to avoid breathing in of

vomitus. If breathing has stopped give artificial respiration. If breathing and pulse are absent, give CPR. Use mouth guards to prevent contact.

Note to physician: After initial decontamination with copious amounts of water, polyethylene glycol/alcohol (2:1) may be used to remove phenol from skin (do not use in eyes). Determination of urinary phenols may help in establishing extent of exposure. If lavage is performed, suggest endotracheal and/or esophagoscopy control.

REFERENCES USED

CCINFO disc: Cheminfo
Online NIOSH Pocket Guide to Chemical Hazards
Budavari: The Merck Index, 12th ed., 1997
Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 4b, 1991
Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: August 2000

Revision: April 2011

MSDS: 7030-5

Proposed WHMIS Classification: Phenol: B3; D1A; D2B;
E. Chloroform: D1A; D2A: D2B

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