

MATERIAL SAFETY DATA SHEET**TRIBUTYL PHOSPHATE**

PRODUCT CODE NUMBER(S): 8970-1

PRODUCT IDENTIFICATION**Chemical Name and Synonyms:** Tributyl phosphate;
Phosphoric acid, tri-n-butyl ester; TBP**Chemical Family:** Phosphoric acid ester;
organo-phosphate**Chemical Formula:** $C_{12}H_{27}O_4P$ **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.
Tributyl phosphate	~98	0.2 ppm	126-73-8

PHYSICAL DATA**Physical State:** Liquid**Odour and Appearance:** Clear, colourless, odourless liquid**Odour Threshold (ppm):** Not applicable**Vapour Pressure (mm Hg):** 127 mm Hg at 177°C**Vapour Density (Air = 1):** 9.20**Evaporation Rate:** >1 (ether=1)**Boiling Point (degrees C):** 289°C**Freezing Point (degrees C):** <-80°C**pH:** Not available**Specific Gravity:** 0.978 @ 20°C**Coefficient of Water/Oil distribution:** $\log P=3.99-4.01$ **SHIPPING DESCRIPTION****UN:** Not regulated**T.D.G. Class:** Not regulated**Pkg. Group:** Not regulated**REACTIVITY DATA****Chemical Stability:** Stable at normal temperatures. Decomposes above 289°C forming phosphoric acid, butene. On contact with warm water, forms phosphoric acid, butanol**Incompatibility with other substances:** Reacts violently with strong oxidizing agents, with risk of fire and explosion. Strong bases decompose tributyl phosphate forming phosphoric acid and butanol. Not corrosive to cast iron, steel, probably not to stainless steel.**Reactivity:** Avoid temperatures >149°C, contact with water and all other incompatible materials. Prevent generation of mist or vapour.**Hazardous Decomposition Products:** CO_x , toxic fumes of phosphoric acid, phosphorus oxides and/or phosphine.**FIRE AND EXPLOSION DATA****Flammability:** Combustible liquid. Can burn if strongly heated.**Extinguishing Media:** Alcohol or polymer foam, dry chemical powder, carbon dioxide, water spray or fog. Water may cause violent frothing that could endanger personnel close to fire, but water spray or fog carefully applied to the surface will cause frothing that will blanket and extinguish the fire. Use water as spray or fog to cool containers, disperse vapours and dust, flush spill away from ignition source. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment and clothing (NIOSH/MSHA approved positive-pressure self-contained breathing apparatus, and chemical splash suit) sufficient to prevent onhalation of mist or fumes, and contact with skin and eyes. (Bunker Gear is not sufficient).**Flash Point (Method Used):** 146°C (CC)**Autoignition Temperature:** >482°C**Upper Flammable Limit (% by volume):** Not available**Lower Flammable Limit (% by volume):** Not available**Hazardous Combustion Products:** CO_x , toxic fumes of phosphoric acid, phosphorus oxides, phosphine.**Sensitivity to Impact:** None identified**Sensitivity to Static discharge:** Not likely to accumulate static charge; electrical conductivity of phosphoric acid esters is probably high.**TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****LD₅₀:** (oral, male rat) 1,390 mg/kg; (dermal, rabbit) >3,100 mg/kg**LC₅₀:** (rat) 7 g/m³/4h**Effects of Acute Exposure to Product:****Inhaled:** Does not easily form vapour at room temperature. Inhalation exposures likely only if substance is heated or misted. May cause irritation of respiratory tract, central nervous system depression with headache, nausea, dizziness and incoordination. Liver and lung injury occurred in rats exposed to lethal aerosol concentrations.**In contact with skin:** May cause mild irritation, redness, itching. May be absorbed through skin, but not expected to have harmful effects through skin absorption.**In contact with eyes:** May cause moderate irritation (based on animal information; no human information available).**Ingested:** Animal evidence indicates low oral toxicity. Ingestion of very large doses may cause CNS depression (see

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"Inhaled"). May be aspirated into the lungs following ingestion or vomiting. Aspiration of even a small amount can cause lung damage, with chemical pneumonitis, and pulmonary edema, which can be life-threatening.

Effects of Chronic Exposure to Product:

Prolonged or repeated skin exposure may cause dermatitis. Long-term oral exposure in rats has been shown to produce decreased body weight, effects on spleen, testicles, and nervous system, liver and kidney and bladder damage.

Carcinogenicity: No human or animal information available

Teratogenicity: No human information available. No effects observed, even at maternally toxic doses.

Reproductive Effects: No human information available. No effects observed in a two-generation study on rats, despite significant toxicity in the exposed animals.

Mutagenicity: No human or animal information available. Positive results in one short-term bacterial test. Negative results in most other tests.

Synergistic Products: None known

PREVENTIVE MEASURES

Engineering Controls: Local corrosion resistant exhaust ventilation required.

Respiratory Protection: Up to 2 ppm: NIOSH/OSHA approved supplied-air respirator. Up to 5 ppm: supplied-air respirator operated in continuous-flow mode. Up to 10 ppm: full face-piece self-contained breathing apparatus, or full face-piece supplied-air respirator. Up to 30 ppm: positive-pressure full face-piece supplied-air respirator. Higher or unknown concentrations, as in fire or spill conditions: positive-pressure full face-piece self-contained breathing apparatus, or positive-pressure full face-piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection: Chemical safety goggles and/or face shield.

Skin Protection: Chemical resistant, impermeable gloves (4H™ is recommended). Other impervious protective clothing, sleeves, coveralls, boots, sufficient to prevent contact.

Other Personal Protective Equipment: Safety shower and eye bath in area.

Leak and Spill Procedure: Evacuate area. Cleanup personnel must be thoroughly trained in the hazards of this substance and in its safe use, and must wear protective equipment and clothing sufficient to prevent inhalation of mists or fumes, and contact with skin and eyes. Do not touch spilled material. Contain and absorb spill with inert absorbent. Keep away from water (causes frothing) until most material is collected up. Prevent from entering sewers or waterways. Transfer carefully into suitable, labelled container(s) and arrange removal by disposal company. Contaminated absorbent may pose the same hazards as the chemical; treat with caution. Wash site of spillage thoroughly with copious amounts of running water and detergent.

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

Handling Procedures and Equipment: TOXIC. Workers must be thoroughly trained in the handling of hazardous materials and in the hazards of this material and its safe use, and must wear appropriate protective equipment and clothing. Eliminate all ignition sources. Avoid generating mists. Use the smallest amount possible for the purpose, in

designated areas with adequate ventilation. Follow routine safe handling and good housekeeping procedures. Keep away from sources of heat and ignition, and from all incompatible materials. Avoid all contact and inhalation.

CAUTION: empty containers contain hazardous residues; treat with caution. Wash thoroughly after working with this substance.

Storage Requirements: Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight. Keep containers tightly closed when not in use and when empty. Protect from damage, and inspect frequently for signs of damage. Store away from incompatible materials. Use corrosion resistant structural materials, lighting and ventilation systems in the storage areas. Storage facilities should be made of fire-resistant materials. Provide raised sills and trenches to drain to a safe area.

FIRST AID MEASURES**Specific Measures:**

Eyes: Immediately flush eyes with gently running water for at least twenty (20) minutes, holding eyelids open during flushing. Take care not to flush contaminated water into unaffected eye. Obtain medical attention IMMEDIATELY.

Skin: Remove contaminated clothing, including watches, rings, belts, and shoes. Flush skin with plenty of running water and soap for five (5) minutes, or until no evidence of chemical remains. If irritation develops get medical attention. Decontaminate clothing, shoes and leather goods before reuse, or discard.

Inhalation: Move victim to fresh air. Give oxygen and get medical attention for any breathing difficulty.

Ingestion: If victim is alert and not convulsing, give 1 to 2 glasses of water to drink to dilute material. DO NOT INDUCE VOMITING. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.

REFERENCES USED

CCINFO disc: Cheminf

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: November 25, 1991

Revision: November 2009

MSDS: 8970-1

Proposed WHMIS Designation: D2B (chronic effects, irritation)

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