

MATERIAL SAFETY DATA SHEET**1-BUTANOL**

PRODUCT CODE NUMBER(S): 1800-1, 1801-2

PRODUCT IDENTIFICATION**Chemical Name and Synonyms:** 1-Butanol; n-Butyl alcohol; Propyl carbinol; Butyric alcohol**Chemical Family:** Primary aliphatic alcohols**Chemical Formula:** C₄H₉OH**Product Use:** Laboratory solvent**Manufacturer's Name and Address:**

Caledon Laboratories Ltd.

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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.
Butyl alcohol	99+	50 ppm	71-36-3
(reduction to 25 ppm is proposed)			
(contact with skin and eyes contributes to overall exposure)			

PHYSICAL DATA**Physical State:** Liquid**Odour and Appearance:** Clear, colourless, sweet, rancid odour.**Odour Threshold (ppm):** Reports vary widely, 0.12-11 ppm (detection); 1-20 ppm (recognition). All values are below TLV, so good warning properties, despite variance.**Vapour Pressure (mm Hg):** 4.0-5.5 mm Hg @ 20°C**Vapour Density (Air = 1):** 2.55**Evaporation Rate (bu ac=1):** 0.47**Boiling Point (degrees C):** 117.7°C**Freezing Point (degrees C):** -89.3°C**pH:** Not available**Specific Gravity:** 0.810 @ 20°C**Coefficient of Water/Oil distribution:** LogP (oct)=0.88**SHIPPING DESCRIPTION****UN:** 1120**T.D.G. Class:** 3**Pkg. Group:** III**REACTIVITY DATA****Chemical Stability:** Stable**Incompatibility with other substances:** Increased risk of fire or explosion with oxidizing materials, strong mineral acids, alkali metals, aluminum, lithium aluminum hydride, isocyanates, acetaldehyde, dialkylmagnesiums, N-haloimides, ethylene oxide, hydrogen peroxide, hypochlorous acid. Will react vigorously with chromium trioxide causing ignition. Can form shock-sensitive or explosive compounds with perchloric acid or perchlorates. Not corrosive to most metals. Can attack some plastics and coatings.**Reactivity:** Avoid excessive heat, open flames, all ignition sources, all incompatible or combustible materials, generation of mist.**Hazardous Decomposition Products:** CO_x**FIRE AND EXPLOSION DATA****Flammability:** Flammable liquid and vapour. More ignitable than other butyl alcohols. Can release vapours that form explosive mixtures with air at or above 17°C. Vapour is heavier than air and may travel considerable distance to source of ignition and flash back. Liquid can float on water to ignition source and flash back and/or spread fire. Can accumulate in confined spaces and cause flammability hazard. Closed containers may rupture violently when heated.**Extinguishing Media:** Water fog; CO₂; alcohol-resistant foam; dry chemical. Water may be used to cool containers and disperse vapours but will be ineffective for extinguishing fire because it may not cool liquid below flash point. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment and clothing sufficient to prevent inhalation of mists and vapours and contact with skin and eyes. Closed containers may explode in heat of fire; withdraw immediately in case of rising sound from venting device, or discolouration in container.**Flash Point (Method Used):** 37°C (TCC)**Autoignition Temperature:** 343°C**Upper Flammable Limit (% by volume):** 11.2**Lower Flammable Limit (% by volume):** 1.4**Hazardous Combustion Products:** CO_x, toxic and irritating gases.**Sensitivity to Impact:** None identified**Sensitivity to Static discharge:** Liquid will not accumulate static charge because of high conductivity. Vapours in the flammable range may be ignited by static discharge of sufficient energy.**TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****LD₅₀:** (oral, rat) 2,510 mg/kg; (oral, young male rat) 750 mg/kg; (dermal, rabbit) 4,200 mg/kg**LC₅₀:** (rat) >8,000 ppm/4 hr.**Effects of Acute Exposure to Product:****Inhaled:** Vapours are irritating to the eyes, nose, throat, and respiratory tract. High concentrations may cause central nervous system depression with nausea, dizziness, incoordination and confusion. In volunteers, 25 ppm produced mild irritation, 50 ppm, pronounced irritation and mild headaches; men inhaling 200 ppm for 30 minutes, while doing heavy physical exercise, showed no effects. Extreme overexposures may cause coma and death.**In contact with skin:** No human information available. Animal information indicates probably mild to moderate irritant. May cause defatting, drying and cracking of the skin. May be absorbed through skin; if in very large amounts, could cause central nervous system depression.**In contact with eyes:** Animal information indicates liquid is severe eye irritant. In humans, vapour concentrations >50 ppm cause irritation, >100 ppm, tearing, redness, blurred vision, sensitivity to light. Liquid may cause irritation, corneal burns, conjunctivitis and possible corneal damage.

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Ingested: May cause irritation and burning of the mouth and throat, abdominal pain, and alcoholic intoxication with headache, dizziness and central nervous system depression. In severe cases, breathing difficulty, unconsciousness, liver damage may occur. Aspiration into the lungs may cause severe lung damage, respiratory and cardiac arrest and possibly death.

Effects of Chronic Exposure to Product:

A ten-year study of workers found no hazard associated with concentrations up to 100 ppm. Long term exposure may cause auditory nerve damage, liver and kidney damage, and effects on lungs and blood. Prolonged and repeated contact can cause, defatting and drying of the skin resulting in skin irritation and dermatitis.

Carcinogenicity: No human or animal information available. Not considered to be a carcinogen by NTP, IARC, or OSHA

Teratogenicity: No human information available. In animal studies, malformations observed at doses toxic to mother.

Reproductive Effects: No information available

Mutagenicity: Not mutagenic in short-term tests with bacteria, chick embryos, or cultured mammalian cells.

Synergistic Products: Alcohols may react synergistically with chlorinated solvents, aromatic hydrocarbons, or dithiocarbamates.

PREVENTIVE MEASURES

Engineering Controls: Non-sparking, grounded ventilation system, separate from other ventilation systems, and electrical equipment that does not provide a source of ignition.

Respiratory Protection: Up to 1,250 ppm: supplied air respirator in continuous-flow mode, or powered air-purifying respirator with organic vapour cartridge. To 1,400 ppm: full facepiece chemical cartridge respirator with organic vapour cartridge, or gas masks with organic vapour cannister, or powered air-purifying respirator with tight-fitting facepiece and organic vapour cartridge, or full facepiece self-contained breathing apparatus, or full facepiece supplied air respirator. Higher, unknown concentrations, as in fire or spill conditions: positive pressure full facepiece self-contained breathing apparatus or positive pressure full facepiece supplied air respirator with an auxiliary positive pressure self-contained breathing apparatus.

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

Skin Protection: Impervious gloves (butyl rubber, Teflon™, Viton™, Barricade™, Responder™, CPF3™, 4H™ have best resistance. Neoprene for shorter periods of use). Other protective clothing (coveralls, boots) as required to prevent contact with liquid or vapour.

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

Leak and Spill Procedure: Evacuate area. Eliminate all sources of ignition. Cleanup personnel must be thoroughly trained in the handling of hazardous substances and must wear protective equipment and clothing sufficient to prevent inhalation and contact with skin and eyes. Stop and contain discharge by constructing barriers or applying inert absorbent. Do not touch spilled material. Prevent from entering sewers, waterways or confined spaces. Collect product and contaminated soil and water and place in covered containers for recovery or disposal. Contaminated adsorbent may pose the same hazards as the spilled product; treat with caution. Flush area of spill thoroughly with running water.

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

Handling Procedures and Equipment: FLAMMABLE; TOXIC. Personnel working with this chemical must be thoroughly trained regarding its hazards, and its safe use. The user is responsible for wearing appropriate protective equipment and clothing depending on the application. Avoid **all contact** with skin and eyes and **any inhalation** of vapours. Keep away from heat and ignition sources. Avoid generating mists or vapours. Ground and bond all equipment to prevent static charge accumulation. Post "No Smoking" signs. Use non-sparking tools and avoid "splash filling" of containers. Keep storage and work areas free of combustible or incompatible materials. Use the smallest amount possible for the purpose, in a designated area with adequate ventilation. Keep containers closed when not in use. Empty containers may contain hazardous residues; treat with caution.

Storage Requirements: Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight, and away from heat and ignition sources, and all incompatible materials. Protect from damage and inspect regularly for signs of leaking. Post "No Smoking" signs. Keep containers tightly closed when not in use. Inspect regularly for leaks or damage. Storage facilities should be made of fire-resistant materials, and have raised sills or ramps, with trenching 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 while flushing. Take care not to flush contaminated water into the unaffected eye. Get medical advice immediately.

Skin: Remove contaminated clothing (including shoes, watches, belts, and rings). Wash affected areas with large amounts of running water and non-abrasive soap, for five to ten (5-10) minutes, or until no trace of chemical remains. If irritation persists, get medical attention. Decontaminate clothing before reuse, or discard.

Inhalation: Remove to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Give oxygen and get medical attention for any breathing difficulty.

Ingestion: DO NOT INDUCE VOMITING (danger of severe lung damage if aspiration occurs). If casualty is alert and NOT convulsing, rinse out mouth with water and give 1 to 2 glasses of water to drink to dilute material. Immediately get medical attention. If spontaneous vomiting occurs have casualty lean forward with head down to avoid breathing in of vomitus.

REFERENCES USED:

CCINFO disc: Cheminfo, MSDS's

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

Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 1, 1989

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

Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued: November 1, 1988

Revision: November 2010

MSDS: 1800-1, 1801-2

Proposed WHMIS Designation: B2; D2B (eye irritation)

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