MATERIAL SAFETY DATA SHEET

HEXANES

PRODUCT IDENTIFICATION

Chemical Name and Synonyms: Hexane; Normal hexane; Hexanes

Chemical Family: Saturated aliphatic hydrocarbon

Chemical Formula: $CH_3(CH_2)_4CH_3$

Product Use: Laboratory solvent

Manufacturers Name and Address: Caledon Laboratories Ltd. 40 Armstrong Avenue Georgetown, Ontario, L7G 4R9

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients, %, TLV Units, CAS No: n-Hexane, 62-95, 50 ppm, 110-54-3 Hexane isomers of methylpentanes, <21, 500 ppm, 107-83-5 (2-methylpentane, <7, , 3-methylpentane, <14), , Methylcyclopentane, <17, Not established, 96-37-7

PHYSICAL DATA

Physical State: Liquid

Odour and Appearance: Clear, colourless volatile liquid, gasoline-like odour

Odour Threshold (ppm): 64-244 ppm; poor warning properties, odour threshold exceeds TLV.

Vapour Pressure (mm Hg): 124 mm Hg at 20C

Vapour Density (Air = 1): 2.97

Evaporation Rate (Diethyl Ether = 1): 1.4

Boiling Point (degrees C): 67-69C

Freezing Point (degrees C): -95C

pH: Not applicable.

Specific Gravity: 0.659 at 20C

Coefficient of Water/Oil distribution: LogP(oct)= 3.6

SHIPPING DESCRIPTION

UN: 1208

T.D.G. Class: 3

Pkg. Group: II

REACTIVITY DATA

Chemical Stability: Normally stable.

Incompatibility with other substances: Reacts vigorously with chlorine, oxygen and strong oxidizing agents (peroxides, nitrates, perchlorates), increasing risk of fire and explosion. Explodes violently in contact with fluorine. May explode with nitrogen tetroxide. Not corrosive to most metals. May attack some forms of plastics, rubbers and coatings.

Reactivity: Avoid heat, sparks, open flame, all ignition sources, and incompatible or combustible materials. Avoid generation of mist. Confined materials may explode upon heating.

FIRE AND EXPLOSION DATA

Flammability: Extremely flammable liquid and vapour. Vapours form flammable/explosive mixtures with air at or above -21C. Vapour is heavier than air and may travel considerable distance to source of ignition and flash back. Liquid can float on water and may spread fire. Can accumulate in confined spaces and cause flammability or toxicity hazard. Closed containers may rupture violently when heated.

Extinguishing Media: CO2, dry chemical, foam. Water may be ineffective for extinguishing, but as spray or fog may be used to cool containers and disperse vapours. Fight fire from a safe distance and from upwind. Firefighters must wear protective equipment (NIOSH/MSHA approved self-contained breathing apparatus) and clothing (Bunker Gear) sufficient to prevent inhalation of mists or vapours, and contact with skin and eyes. Closed containers may rupture violently during fire; withdraw immediately in case of rising sound from vent or discoloration of tank.

Flash Point (Method Used): -21C (TCC)

Autoignition Temperature: 225C

Upper Flammable Limit (% by volume): 7.5

Lower Flammable Limit (% by volume): 1.1

Hazardous Combustion Products: COx

Sensitivity to Impact: Probably not sensitive.

Sensitivity to Static discharge: Vapour is readily ignited by static discharge. Liquid can accumulate static charge by flow or agitation.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:

LD50: (oral, adult rat) 28,710 mg/kg; (oral, 14-day old rat) 15,840 mg/kg; (dermal, rabbit) >2g/kg

LC50: (rat) 48,000 ppm/4h

Effects of Acute Exposure to Product:

Inhaled: Limited information specific to hexane available; most information relates to mixtures of solvents. Available information suggests low toxicity. Exposure to high vapour concentrations may cause CNS depression with nausea, and headache, dizziness, unconsciousness. In studies with human volunteers, 10 minute exposure at 2000 ppm produced no symptoms, 10 minutes at 5000 ppm caused dizziness and giddiness. If atmospheric oxygen is displaced by hexane, where vapour concentrations are high, life-threatening asphyxiation can occur. Symptoms are drowsiness, loss of coordination, loss of judgement, sometimes masked by a state of euphoria, eventual loss of consciousness and death.

In contact with skin: May cause irritation, burning sensation, reddening. May be absorbed through skin, but not likely in harmful amounts.

In contact with eyes: Vapour and liquid may cause mild irritation, with tearing, redness, and pain. No human or animal information available.

Ingested: No specific human information available. May cause burning sensation in the mouth and throat, nausea, and vomiting. Animal testing indicates low oral toxicity. However, may be aspirated into the lungs during ingestion or vomiting, which can cause pulmonary edema, chemical pneumonitis, and death.

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Effects of Chronic Exposure to Product: Causes harm to the nervous system producing numbness or tingling in the extremities, spasms in the legs, tiredness, muscle weakness and more severe nerve damage. Peripheral neuropathy developed within 7 months in mice at 250 ppm. Methyl pentanes have produced kidney damage in male rats only, but no comparable health hazard for kidney disease is known to occur in humans. Prolonged skin contact can cause dermatitis. Abnormal colour perception and pigment changes in the eyes have been reported in workers exposed to 423 to 1,280 ppm for five years or more. Mild forms of anemia have been associated with exposure - reversible on termination of exposure.

Carcinogenicity: Insufficient information available.

Teratogenicity: Has shown fetotoxic effects in animal testing at maternally toxic levels only (RTECS No. MN 9275000).

Reproductive Effects: No human information available. Testicular damage in male rats at concentrations that produced other toxicity.

Mutagenicity: Negative results in animal testing, and in cultured human cells with or without metabolic activation.

Synergistic Products: Neurotoxic and respiratory effects enhanced by both methyl ethyl ketone and lead acetate, but decreased by toluene.

PREVENTIVE MEASURES

Engineering Controls: Non-sparking, grounded, separate, exhaust ventilation required.

Respiratory Protection: Dust/mist mask. Fumehood. To 500 ppm - NIOSH/MSHA approved supplied-air respirator or self-contained breathing apparatus. To 1,100 ppm - continuous flow supplied-air respirator, or full face-piece supplied-air respirator or self-contained breathing apparatus. Higher or unknown concentrations, as in fire or spill conditions, full face-piece positive-pressure self-contained breathing apparatus or positive pressure, full face-piece air-supplied respirator with an auxiliary positive pressure self-contained breathing apparatus.

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

Skin Protection: Nitrile rubber, polyvinyl alcohol, Viton, Viton/Butyl rubber, Teflon, Barrier (PE/PA/PE), Silver Shield/4H(polyethylene/ethylene vinyl alcohol), Responder, TrellchemHPS, Tychem BR/LV, Tychem TK gloves. Other impervious or resistant protective clothing sufficient to prevent contact.

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

Leak and Spill Procedure: Evacuate and ventilate area. Eliminate all sources of ignition. 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, and contact with skin, eyes or clothing. Contain spill and collect using inert absorbent material. Prevent from entering sewers or waterways. Do not touch spilled material or contaminated absorbent. Contaminated absorbent may pose the same hazards as the chemical; treat with caution. Flush area of spill with copious amounts of running water.

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

Handling Procedures and Equipment: EXTREMELY FLAMMABLE, TOXIC. Personnel working with this substance must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing suitable for the application. Keep away from heat, sparks, flame, and all sources of ignition. Post No Smoking signs. Ground and bond drums, transfer vessels, hoses and piping, during liquid transfer. Ground clips must contact bare metal. Use non-sparking tools. Use inert gas in containers or storage vessels to reduce fire/explosion hazard Keep work area free of other materials that can burn. Keep aisles and exits clear of obstruction. 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. Do not return contaminated material to the original container. Have absorbents readily available for leaks or spills. Have appropriate fire extinguishers available.

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. Keep containers tightly closed when not in use. Inpsect 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, holding eyelids open while flushing, for five to ten (5 to 10) minutes, or until no trace of chemical remains. Take care not to flush contaminated water into the unaffected eye. If irritation persists, get medical attention.

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

Inhalation: IMMEDIATELY remove casualty from contaminated area to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Remove any sources of ignition. Give oxygen and get medical attention for any breathing difficulty. If breathing has stopped give artificial respiration. If breathing and pulse are absent give CPR. Immediately obtain medical attention. 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 mouth with water and give 1 to 2 cups 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. Rinse mouth and give more water to drink.

REFERENCES USED

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

CCINFO disc: MSDSs, January 2007

Royal Society of Chemistry: Material Safety Data Sheets, Vol. 1, 1992

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

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Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: January 31, 1989

Revision: Jan 2013

Proposed WHMIS Designation: B2; D2B

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