

TOLUENE**PRODUCT IDENTIFICATION****Chemical Name and Synonyms:**

Toluene; Toluol; Methyl benzene

Chemical Family:

Aromatic hydrocarbons

Chemical Formula:

C₆H₅CH₃

Product Use:

Laboratory solvent

Manufacturer's Name and Address:

Caledon Laboratories Ltd.

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HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
<i>Toluene</i>	<i>~99</i>	<i>100 ppm(TWA)</i>	<i>108-88-3</i>

PHYSICAL DATA**Physical State:**

Liquid

Odour and Appearance:

Clear, colourless, mobile liquid, with a benzene-like odour.

Odour Threshold (ppm):

0.16-0.37 ppm (detection); recognition varies widely from 1.9 to 69 ppm. Odour not a reliable indicator

Vapour Pressure (mm Hg):

22 mm Hg at 20°C

Vapour Density (Air = 1):

3.1

Evaporation Rate:

2.01 (n-Butyl acetate = 1)

Boiling Point (degrees C):

110.6°C

Freezing Point (degrees C):

-95°C

pH:

Not applicable

Specific Gravity:

0.86 @ 20°C

Coefficient of Water/Oil distribution:

LogP(oct)=2.11 to 2.80

SHIPPING DESCRIPTION**UN:**

1294

T.D.G. Class:

3

Pkg. Group:

II

REACTIVITY DATA**Chemical Stability:**

Stable

Incompatibility with other substances:

Increased risk of fire and explosion with strong oxidizers, BrF₃; reaction with nitric acid is extremely violent. Forms explosive mixtures with nitrogen tetroxide, silver perchlorate, tetranitromethane. Iron or ferric chloride catalyses a vigorous

exothermic reaction between toluene and sulphur dichloride. Not corrosive to metals.

Reactivity:

Avoid high temperatures, sparks, open flames, all other sources of ignition, all incompatible materials, generation of mist or vapour.

Hazardous Decomposition Products:

CO_x, irritating, toxic gases

FIRE AND EXPLOSION DATA**Flammability:**

Flammable liquid and vapour. Vapour may travel to a distant source of ignition and flash back. Vapour is heavier than air and may spread over long distance. Liquid can accumulate static charge by flow or agitation. Liquid can float on water and may spread to distant locations and spread fire. Vapour can accumulate in confined spaces, causing toxicity and flammability hazard.

Extinguishing Media:

Alcohol-type or all-purpose type foam for large fires. Carbon dioxide or dry chemical for small fires. Use water spray or fog to cool containers, disperse vapours, dilute chemical, or flush it away from fire, it may be ineffective for extinguishing fire. Fight fire from safe distance, from upwind direction. Firefighters must wear protective equipment (NIOSH/OSHA approved positive-pressure, full face-piece self-contained breathing apparatus) and encapsulating chemical splash suit to prevent any inhalation or contact with this chemical. Closed containers may rupture violently during fire; withdraw immediately in case of rising sound from vent or discoloration of tank.

Flash Point (Method Used):

4.4°C (CC)

Autoignition Temperature:

480°C

Upper Flammable Limit (% by volume):

7.1

Lower Flammable Limit (% by volume):

1.2

Hazardous Combustion Products:

CO_x, toxic gases, reactive hydrocarbons, aldehydes

Sensitivity to Impact:

None identified

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, rat) 636 mg/kg; (dermal, rabbit) 12,225 mg/kg

LC₅₀:

(rat) 8,800/4h; 6,000/6h

Effects of Acute Exposure to Product:**Inhaled:**

Causes CNS effects. 50 ppm can cause slight drowsiness and headache. 50 to 100 ppm causes irritation of eyes, nose, throat, and respiratory tract, with chest pain and edema. Over 100 ppm, headache, fatigue and dizziness; over 200 ppm, giddiness, numbness, nausea, >500 ppm, mental confusion and incoordination. Higher concentrations can cause

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unconsciousness, and death.

In contact with skin:

Based on animal evidence, moderate irritant. Direct contact with vapour, mist or liquid may cause defatting, drying and cracking of the skin. Absorbed slowly through skin, not expected to cause systemic toxic effects by skin exposure.

In contact with eyes:

Based on animal evidence, mild irritant. 300 ppm for 3-5 minutes caused mild irritation, longer exposures to >100 ppm also caused mild irritation.

Ingested:

May cause irritation and burning of the mouth and throat. Readily absorbed through gastrointestinal tract causing systemic poisoning as in "Inhaled". Aspiration into the lungs during ingestion or subsequent vomiting may cause severe damage to lung tissue. In one case ingestion of 60 mL of toluene was fatal within 30 minutes; death was caused either by CNS depression or by lung damage due to aspiration. Consumption of alcohol or tobacco products may increase toxic effects.

Effects of Chronic Exposure to Product:

Prolonged or repeated contact may cause dermatitis. Studies are inconclusive; some show nervous system disturbances, such as memory loss, sleep disturbances, loss of ability to concentrate, incoordination. Some evidence suggests that long-term exposure may affect hearing. Reduced visual acuity and suppressed colour vision have occurred in workers exposed to mixed solvents, but these effects are not attributable to toluene directly. Workers exposed long-term to exposures up to 200 ppm showed no clear evidence of kidney damage. It is generally accepted that toluene does not cause significant blood disorders. Exposure up to 500 ppm has not caused liver damage.

Carcinogenicity:

A4; not considered carcinogenic by NTP, IARC, ACGIH.

Teratogenicity:

Developmental toxicity hazard, based on animal studies. Fetotoxicity, behavioural effects, and hearing loss observed in offspring of rats exposed to 1200 -1800 ppm (inhalation) without maternal toxicity. Extreme exposures (associated with solvent abuse, e.g. glue-sniffing) have caused kidney effects. Other studies that have shown increased birth defects or spontaneous abortion have involved exposure to organic solvents, including, but not exclusively, toluene.

Reproductive Effects:

Insufficient human information available. No effects in animal testing.

Mutagenicity:

Insufficient information available

Synergistic Products:

Other solvents, such as benzene, xylene, and alcohols slow the rate of clearance of toluene from the body, therefore increasing its toxic effects.

PREVENTIVE MEASURES

Engineering Controls:

Non-sparking, grounded, separate, exhaust ventilation required.

Respiratory Protection:

NIOSH/OSHA approved organic vapour cartridge respirator, or powered air-purifying respirator with organic vapour cartridge, for concentrations up to 500 ppm. Higher or unknown concentrations, as in fire or spill conditions: positive pressure, full facepiece 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 goggles and/or face shield.

Skin Protection:

Polyvinyl alcohol, Viton™, Barrier (PE/PA/PE), Silver Shield/4H™ (polyethylene/ethylene vinyl alcohol), Responder™, Trelchem™ HPS, Tychem™ BR/LV, Tychem™ TK gloves. Other protective clothing, apron, sleeves, coveralls, boots, as required to prevent contact.

Other Personal Protective Equipment:

Safety shower and eye bath located close to chemical exposure 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. Stop or reduce discharge if safe to do so. Contain spill and collect using inert absorbent material. Do not touch spilled material or contaminated absorbent. Prevent from entering sewers or waterways. 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:

FLAMMABLE, POSSIBLE REPRODUCTIVE HAZARD, SKIN IRRITANT. Workers must be thoroughly trained in the hazards of this material and its safe use, and must wear appropriate protective equipment and clothing. Post "No Smoking" signs. Ground and bond equipment to prevent static charge accumulation. Use non-sparking tools. Avoid splash filling. 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. Avoid all contact and inhalation. Avoid generating vapours or mists. Empty containers may contain hazardous residues; treat with extreme caution.

Storage Requirements:

Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight and away from all sources of heat and ignition, and incompatible materials. Keep tightly closed when not in use. Protect from damage. Inspect regularly for signs of leaking or damage. Keep storage area clear of combustible materials. Post "NO SMOKING" signs. Have appropriate fire extinguishers and spill cleanup equipment near the storage area. Ground and bond equipment and containers to prevent a static charge buildup. 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 warm running water for five to ten (5-10) minutes, holding eyelids open during flushing. Take care not to flush contaminated water into unaffected eye. Get medical attention immediately.

Skin:

Remove contaminated clothing (including rings, watches, belts, and shoes), under running water. IMMEDIATELY flush

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exposed area with large amounts of warm running water for about twenty (20) minutes. Get medical attention .

Decontaminate clothing, shoes, before reuse, or discard.

Inhalation:

IMMEDIATELY remove to fresh air (rescuers must use caution to avoid exposure to contaminating fumes). Eliminate ignition sources. Give oxygen for breathing difficulty. If breathing has stopped begin artificial respiration and get medical attention *MMEDIATELY*. Stay with casualty until medical help is obtained.

Ingestion:

DO NOT INDUCE VOMITING. Danger of aspiration if vomiting occurs. If the casualty is alert and not convulsing, have them drink 2 to 4 glasses of water to dilute the material. If spontaneous vomiting occurs, have casualty lean forward to avoid breathing in of emesis. Rinse mouth and administer more water.

REFERENCES USED

CCINFO disc: Cheminfo

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

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

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

Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued:

November 1, 1988

Revision:

March 2012

MSDS:

9200-1, 9200-30, 9200-3, 9200-4, 9201-2, 9201-7, 9203-2, 9209-1, CAL 1348

Proposed WHMIS Designation:

B2, D2A; D2B (irritation)

Prepared by: Caledon Laboratories Ltd. (905)

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