

Chemical Profiles

Toluene

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What are other names or identifying information for toluene?

CAS Registry No.: 108-88-3

Other Names: Methylbenzene, Toluol

Main Uses: Manufacture of other chemicals, solvent.

Appearance: Clear colourless liquid.

Odour: Aromatic, sweet, pungent

Canadian TDG: UN1294

What is the WHMIS classification?

According to the Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST), [toluene](#) can be classified as:

Flammable liquids - Category 2



Acute toxicity - inhalation - Category 4



Skin corrosion/irritation - Category 2



Reproductive toxicity - Category 2



Specific target organ toxicity - single exposure (narcotic effects) - Category 3 - Narcotic effect



Specific target organ toxicity - repeated exposure - Category 1



Aspiration hazard - Category 1



The signal word is danger.

The hazard statements are:

- Highly flammable liquid and vapour
- Harmful if inhaled
- Causes skin irritation
- Suspected of damaging fertility or the unborn child
- May cause drowsiness or dizziness
- Causes damage to organs through prolonged or repeated exposure
- May be fatal if swallowed and enters airways

Please note that this classification was retrieved from the [CNESST](#) site on April 4, 2023 and was established by CNESST personnel to the best of their knowledge based on data obtained from scientific literature and it incorporates the criteria contained in the *Hazardous Products Regulations* (SOR/2015-17). It does not replace the supplier's classification which can be found on its Safety Data Sheet.

What are the most important things to know about toluene in an emergency?

Emergency Overview: Clear colourless liquid. Aromatic odour. HIGHLY FLAMMABLE LIQUID AND VAPOUR. Distant ignition and flashback are possible. Can accumulate static charge. Can float on water and spread the fire. CONFINED SPACE HAZARD. Can accumulate in hazardous amounts in low-lying areas especially inside confined spaces. May cause drowsiness and dizziness. IRRITANT. Causes moderate or severe skin irritation. ASPIRATION hazard. May be fatal if swallowed and enters the airways. TERATOGEN/EMBRYOTOXIN. May damage the unborn child.

What are the potential health effects of toluene?

Main Routes of Exposure: Inhalation. Skin contact. Eye contact.

- **Inhalation:** Can irritate the nose and throat. Can harm the nervous system. Symptoms may include headache, nausea, dizziness, drowsiness, and confusion. A severe exposure can cause unconsciousness.
- **Skin Contact:** SKIN IRRITANT. Causes moderate to severe irritation. Symptoms include pain, redness, and swelling. Can be absorbed through the skin. Can cause effects as described for inhalation.
- **Eye Contact:** May cause mild irritation.
- **Ingestion:** Can cause effects as described for inhalation. Aspiration hazard. May be drawn into the lungs if swallowed or vomited, causing severe lung damage. Death can result.
- **Effects of Long-Term (Chronic) Exposure:** Can cause dry, red, cracked skin (dermatitis) following skin contact. Exposure to this chemical and loud noise may cause greater hearing loss than expected from noise exposure alone. Effects on colour vision have been reported, but the evidence is inconclusive. May harm the nervous system. Conclusions cannot be drawn from the limited studies available. At high concentrations: May harm the kidneys.
- **Carcinogenicity:** Not known to cause cancer.
 - International Agency for Research on Cancer (IARC): Group 3 - Not classifiable as to its carcinogenicity to humans.
 - American Conference for Governmental Industrial Hygienists (ACGIH): A4 - Not classifiable as a human carcinogen.
- **Teratogenicity / Embryotoxicity:** DEVELOPMENTAL HAZARD. May harm the unborn child based on animal information. Has been associated with: low birth weight or size, learning disabilities, and hearing loss.
- **Reproductive Toxicity:** Not known to be a reproductive hazard.
- **Mutagenicity:** Not known to be a mutagen.

What are first aid measures for toluene?

Inhalation: Take precautions to prevent a fire (e.g. remove sources of ignition). Move victim to fresh air. If breathing has stopped, trained personnel should begin artificial respiration (AR). Get medical attention as soon as possible.

Skin Contact: Avoid direct contact. Wear chemical protective clothing if necessary. Quickly take off contaminated clothing, shoes and leather goods (e.g., watchbands, belts). Quickly and gently blot or brush away excess chemical. Immediately wash gently and thoroughly with gently flowing water and non-abrasive soap for 15-20 minutes. Get medical attention promptly. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact: Avoid direct contact. Wear chemical protective gloves if necessary. Quickly and gently blot or brush chemical off the face. Immediately flush the contaminated eye(s) with gently flowing water, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Ingestion: Have victim rinse mouth with water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Get medical attention immediately.

First Aid Comments: Some of the first aid procedures recommended here require advanced first aid training. All first aid procedures should be periodically reviewed by a medical professional familiar with the chemical and its conditions of use in the workplace.

What are fire hazards and extinguishing media for toluene?

Flammable Properties: HIGHLY FLAMMABLE LIQUID. Can ignite at room temperature. Releases vapour that can form explosive mixture with air. Can be ignited by static discharge.

Suitable Extinguishing Media: Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog. Foam manufacturers should be consulted for recommendations regarding types of foams and application rates. Use water to keep non-leaking, fire-exposed containers cool.

Specific Hazards Arising from the Chemical: Liquid can float on water and may travel to distant locations and/or spread fire. Liquid can accumulate static charge by flow, splashing or agitation. Vapour may travel a considerable distance to a source of ignition and flash back to a leak or open container. Vapour may accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a toxicity hazard. Closed containers may rupture violently when heated releasing contents. In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide; reactive chemicals; toxic, flammable aldehydes; and other chemicals.

What are the stability and reactivity hazards of toluene?

- **Chemical Stability:** Normally stable.
 - **Conditions to Avoid:** Open flames, sparks, static discharge, heat and other ignition sources.
 - **Incompatible Materials:** Reacts violently with: nitric acid. Increased risk of fire and explosion on contact with: oxidizing agents (e.g., peroxides). Not corrosive to: aluminum alloys, carbon steel.
 - **Hazardous Decomposition Products:** None known.
 - **Possibility of Hazardous Reactions:** None known.
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What are unintentional release measures for toluene?

Personal Precautions: Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Eliminate all ignition sources. Use grounded, explosion-proof equipment.

Methods for Containment and Clean-up: Stop or reduce leak if safe to do so. Small spills or leaks: contain and soak up spill with absorbent that does not react with spilled product. Large spills or leaks: contact emergency services and manufacturer/supplier for advice.

Other Information: Report spills to local health, safety and environmental authorities, as required.

What handling and storage practices should be used when working with toluene?

Handling: In the event of a spill or leak, exit the area immediately. Eliminate heat and ignition sources such as sparks, open flames, hot surfaces and static discharge. Post "No Smoking" signs. Avoid generating vapours or mists. Electrically bond and ground equipment. Ground clips must contact bare metal. Avoid repeated or prolonged skin contact with product or with contaminated equipment/surfaces.

Storage: Store in an area that is: cool, well-ventilated, out of direct sunlight and away from heat and ignition sources, clear of combustible and flammable materials (e.g., old rags, cardboard), separate from incompatible materials. Keep amount in storage to a minimum. Electrically bond and ground containers. Ground clips must contact bare metal. Avoid bulk storage indoors.

What is the American Conference of Governmental Industrial Hygienists (ACGIH®) recommended exposure limit for toluene?

ACGIH® TLV® - TWA: 20 ppm OTO A4 BEI®

Exposure Guideline Comments: TLV® = Threshold Limit Value. TWA = Time-Weighted Average. OTO = Ototoxicant (chemical has the potential to cause hearing impairment alone or in combination with noise, even below 85dBA). A4 = Not classifiable as a human carcinogen. BEI® = Biological Exposure Index.

Adapted from: 2022 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH)

NOTE: In many (but not all) Canadian jurisdictions, the exposure limits are similar to the ACGIH® TLVs®. Since legislation varies by jurisdiction, contact your local jurisdiction for exact details. A list is available in the OSH Answers on [Canadian Governmental Occupational Health & Safety Departments](#).

A list of which acts and regulations that cover [exposure limits to chemical and biological agents](#) is available on our website. Please note that while you can see the list of legislation for free, you will need a subscription to view the actual documentation.

What are the engineering controls for toluene?

Engineering Controls: Use a local exhaust ventilation and enclosure, if necessary, to control amount in the air. For large scale use of this product: use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. Control static electricity discharges which includes bonding of equipment to ground.

What Personal Protective Equipment (PPE) is needed when working with toluene?

Eye/Face Protection: Wear chemical safety goggles and face shield when contact is possible.

Skin Protection: Wear chemical protective clothing e.g. gloves, aprons, boots. [Suitable materials](#) include: Viton®, Vitron®/Butyl rubber, Silver Shield® - PE/EVAL/PE, ChemMAX® (3, 4 Plus), Frontline® 500, AlphaTec® (4000, EVO, VPS), Tychem® (5000, 6000, 6000 FR, 9000, Responder® CSM, 10000, 10000 FR), Zytron® (300, 500).

Not recommended: butyl rubber, natural rubber, neoprene rubber, polyvinylchloride – PVC, Saranex®.

Respiratory Protection:

Up to 500 ppm:

(APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*; or Any supplied-air respirator*.

(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*.

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister; or Any self-contained breathing apparatus with a full facepiece.

*Reported to cause eye irritation or damage; may require eye protection.

APF = Assigned Protection Factor

Recommendations apply only to National Institute for Occupational Safety and Health (NIOSH) approved respirators. Refer to the [NIOSH Pocket Guide to Chemical Hazards](#) for more information.

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