

SAFETY DATA SHEET



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TOLUENE

SDS No. M0192

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Toluene

Synonyms: Methacide, Methylbenzene, Methylbenzol, Phenylmethane, Toluol

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION



Classification:

Flammable Liquids: GHS Category 2

Skin Irritation: GHS Category 2

Reproductive Toxicity: GHS Category 2

Specific Target Organ Toxicity, Single Exposure: GHS Category 3

Specific Target Organ Toxicity, Repeated Exposure: GHS Category 2

Aspiration Hazard: GHS Category 2

Acute Aquatic Toxicity: GHS Category 2

Label Elements

Signal Word: **DANGER**

Hazard Statements:

- H225 – Highly flammable liquid and vapor.
- H304 – May be fatal if swallowed and enters airways.
- H315 – Causes skin irritation.
- H336 – May cause drowsiness or dizziness.
- H361 – Suspected of damaging fertility or the unborn child.
- H373 – May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements:

- P210 – Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P243 – Take precautionary measures against static discharge.
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P301+P310 – IF SWALLOWED: Immediately call a POISON CENTER or a doctor.

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P303+P361+P353 – IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340 – IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305+P351+P338 – IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.

P403+P233 – Store in a well-ventilated place. Keep container tightly closed.

P405 – Store locked up.

P501 – Dispose of contents/ container to an approved waste disposal plant.

Emergency Overview

Causes irritation to eyes, skin, and respiratory tract. Breathing vapors may cause drowsiness and dizziness. May be absorbed through intact skin. Aspiration hazard. May be harmful if swallowed. Can enter lungs and cause damage. May cause central nervous system effects. Possible risk to unborn children. May cause liver and kidney damage. Highly flammable liquid and vapor. Static electrical hazard. Target Organs: Kidneys, central nervous system, liver, respiratory system eyes, and skin.

HMIS Rating:

Health – 2* Flammability – 3 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Toluene	108-88-3	100%	Yes

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Ingestion: Potential aspiration hazard if swallowed. Get medical help immediately. Do not induce vomiting unless directed by medical personnel. If vomiting occurs naturally, have victim lean forward. Never give anything by mouth to an unconscious person.

Skin Contact: Remove any contaminated clothing. Wash skin with water for at least 15 minutes. Get medical attention if irritation persists.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.

Notes to Physician: Causes cardiac sensitization to endogenous catecholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine and pseudoepinephrine.

5. FIRE FIGHTING MEASURES

Flammability: Highly flammable liquid and vapor (GHS Category 2)

Auto-ignition Temperature: 480° C (896° F)

Flash Point: 4° C (39.2° F)

Flammable Limits: Lower Limit – 1.1 vol %, Upper Limit – 7.1 vol %

Products of Combustion: May decompose into irritating and highly toxic gases under fire conditions (carbon monoxide and carbon dioxide).

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. This liquid

floats on water and may travel to a source of ignition and spread the fire. Water run-off can cause environmental damage and should be collected and confined.

Fire Fighting Media: Use water spray, dry chemical, carbon dioxide, or appropriate foam. Solid streams of water may be ineffective and spread material.

National Fire Protective Association: Health - 2, Flammability - 3, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Use water spray to reduce vapors. Water spray may reduce vapors but still not prevent ignition in closed spaces. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Do not use sawdust or any combustible material. Use spark-proof tools. Provide ventilation to the affected area and remove all ignition sources. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist.

Storage: Keep in a flammables area away in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from sources of ignition. Separate from oxidizing materials. Keep locked up.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles or other appropriate eye protection. Use butyl rubber gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

ACGIH – 20 ppm TWA

NIOSH – 100 ppm TWA; 375 mg/m³; 500 ppm IDLH

OSHA Final PELs – 200 ppm; 300 ppm Ceiling

OSHA Vacated PELs: 100 ppm TWA; 375 mg/m³

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Sweetish, pleasant odor – benzene-like

Odor Threshold: 2.9 ppm

Molecular Formula: C₆H₅CH₃

Molecular Weight: 92.14

Auto-ignition Temperature: 480° C (896° F)

Flash Point: 4° C (39.2° F)

Flammable Limits: Lower Limit – 1.1 vol %, Upper Limit – 7.1 vol %

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pH: Not available.

Boiling Point: 110.6° C

Freezing/Melting Point: -95° C

Decomposition Temperature: Not available

Specific Gravity: 0.86g/cm³

Vapor Density (Air=1): 3.1

Vapor Pressure: 28.4 mm Hg @ 25° C.

Evaporation Rate (Butyl acetate = 1): 2.4

Viscosity: 0.59 cps 20° C

Solubility: Insoluble

Conductivity: Nonconductive; Conductivity = <1 pS/m; Dielectric Constant = 2.38; Relaxation Time Constant = 21 seconds

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperature and pressure.

Conditions to Avoid: Ignition sources, excess heat, confined spaces.

Incompatibility With Various Substances: Strong oxidizing agents.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: Causes respiratory tract irritation. Inhalation of high concentrations (>200 ppm) of toluene are clearly associated with central nervous system encephalopathy, headache depression, weakness, exhaustion, impaired coordination, transient memory loss, and impaired reaction time.

INGESTION HAZARD: May cause effects similar to those for inhalation. May cause central nervous system depression.

Aspiration into lungs may cause chemical pneumonitis, which may be fatal. May be harmful if swallowed.

SKIN CONTACT HAZARD: Causes skin irritation. May be absorbed through intact skin. Repeated or prolonged exposure may cause drying and cracking of skin.

EYE CONTACT HAZARD: Causes eye irritation. Vapors may cause eye irritation.

Chronic Exposure Hazards: Repeated or prolonged exposure may cause dermatitis and defatting of skin. Repeated exposure in combination with constant, loud noise can produce hearing loss and dizziness. Chronic hydrocarbon abuse, such as sniffing glue or light hydrocarbons as contained in this material, has been associated with irregular heart rhythms and potential cardiac arrest. Toluene abuse has been linked with kidney disease, as evidenced by blood, protein, and pus in the urine, accompanied by elevated serum creatinine, decreased urinary output, and metabolic and renal tubular acidosis. Although kidney toxicity is not common in cases of occupational toluene exposure, there has been at least one report of renal toxicity following a 40-year occupational exposure to toluene. Toluene does not cause severe bone marrow injury characteristic to benzene poisoning. Intentional abuse of toluene vapors has been linked to damage to the brain, liver, and kidneys, as well as to death. Repeated inhalation exposure to animals causes histological changes in the brain, degeneration of heart tissue, and possible immune system effects.

Animal Toxicity:

Draize test, rabbit, eye: 870 ug Mild;

Draize test, rabbit, eye: 2 mg/24H Severe;

Draize test, rabbit, skin: 435 mg Mild;

Draize test, rabbit, skin: 500 mg Moderate;

Draize test, rabbit, skin: 20 mg/24 hr Moderate;

Inhalation, mouse: LC50 = 400 ppm/42H;

Inhalation, mouse: LC50 = 30,000 mg/m³/2H;

Inhalation, mouse: LC50 = 19,900 mg/m³/7H;

Inhalation, mouse: LC50 = 10,000 mg/m³;

Inhalation, rat: LC50 = 49 mg/m³/4H;

Oral, rat: LD50 = 636 mg/kg;

Skin, rabbit: LD50 = 14,100 mg/kg;

Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Epidemiology: No information available.

Teratogenicity: In an epidemiological study of toluene and pregnancy, occupational exposures to toluene were said to be associated with an increased incidence of renal, urinary, gastrointestinal, and cardiac anomalies. Reduced fetal weight, effects on learning and memory, and hearing loss in males were observed in the offspring of rats exposed by inhalation at levels that did not cause toxic effects in the mother.

Reproductive Effects: Many reports of reproductive effects of toluene abuse or heavy occupational exposure are confounded by mixed solvent exposure or fetal alcohol syndrome. In women exposed to toluene in lab work, the risk of spontaneous abortion increased 4.7 times.

Mutagenicity: No information available.

Neurotoxicity: No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Bluegill: LC50 = 17 mg/L/24H;

Shrimp: LC50 = 4.3 ppm/96H;

Fathead minnow: LC50 = 36.2 mg/L/96H;

Sunfish (Fresh water): TLm = 1180 mg/L/96H

Environmental Fate: When released to soil, product is expected to evaporate and be microbially biodegraded. In water, product is expected to biodegrade and volatilize.

Physical: Photochemically produced hydroxyl radicals degrade this material.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is a "U" listed waste (U220).

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Toluene

Hazard Class: 3

UN Number: UN1294

Packing Group: II

IMDG

Proper Shipping Name: Toluene

Hazard Class: 3

UN Number: UN1294

Packing Group: II

IATA

Proper Shipping Name: Toluene

Hazard Class: 3

UN Number: UN1294

Packing Group: II

15. REGULATORY INFORMATION

US Federal Regulations:

CERCLA Hazardous Substances: CAS# 108-88-3; 1000 lbs/454 kg final RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 108-88-3— immediate, fire

Section 313: Toluene (CAS# 108-88-3) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: CAS# 108-88-3 is listed as a hazardous air pollutant (HAP).

Clean Water Act: CAS# 108-88-3 is listed as a Hazardous Substance. It is a Priority Pollutant. It is a Toxic Pollutant.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

CAS# 108-88-3 is on the following state right-to-know lists: New Jersey, Pennsylvania, and Massachusetts

California Prop 65: This product contains Toluene, a chemical known to the State of California to cause birth defects or other reproductive harm.

16. OTHER INFORMATION

Originally Prepared: 1/1/2006

Last Revised: 11/29/2022 – Updated composition in Section 3.

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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