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24 HOUR EMERGENCY NUMBER (CHEMTREC)

USA: 800-424-9300

International: 703-527-3887

All non-emergency numbers should be directed to Tedia
Customer Service at 800-PURITY1

SAFETY DATA SHEET

Toluene

SDS No. M0192

1 IDENTIFICATION

1.1 Product Identifier:

Chemical Name: Toluene

Synonyms: Methylbenzene, Toluol, Methylbenzol, Phenylmethane, Methacide

CAS No.: 108-88-3

1.2 Recommended Use and Restrictions:

Use: Laboratory research, analytical applications, and industrial manufacturing. Suitable for use as a solvent in chemical synthesis, cleaning, or processing.

Restrictions: Not for use in food, drugs, cosmetics, medical devices, or household consumer products unless explicitly certified.

Regulatory Note: This product may be subject to TSCA requirements. For commercial/industrial use in the United States, the buyer is responsible for verifying TSCA compliance. Laboratory users should confirm appropriate exemptions apply to their research use.

1.3 Supplier:

Tedia Company LLC, 1000 Tedia Way, Fairfield, Ohio 45014 USA

Phone: 513-874-5340 | Website: www.tedia.com

1.4 Emergency Phone Number:

CHEMTREC (USA): 800-424-9300

CHEMTREC (International): +1-703-527-3887

2 HAZARD IDENTIFICATION

2.1 Classification of the Substance/Mixture

GHS Classification:

Aspiration Hazard (Category 1), H304

Flammable Liquids (Category 2), H225

Skin Irritation (Category 2), H315

Reproductive Toxicity (Category 2), H361

Specific Target Organ Toxicity – Single Exposure (STOT-SE, Category 3, Narcotic effects), H336

Specific Target Organ Toxicity – Repeated Exposure (STOT-RE, Category 2, CNS, liver, kidneys), H373

2.2 GHS Label Elements

Hazard Pictograms:



Signal Word: DANGER

Hazard Statements:

H304: May be fatal if swallowed and enters airways.

H225: Highly flammable liquid and vapor.

H361: Suspected of damaging fertility or the unborn child.

H373: May cause damage to organs through prolonged or repeated exposure.

H336: May cause drowsiness or dizziness.

H315: Causes skin irritation.

Precautionary Statements:

P210: Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

P233: Keep container tightly closed.

P240: Ground/bond container and receiving equipment.

P241: Use explosion-proof electrical/ventilating/lighting equipment.

P242: Use only non-sparking tools.

P243: Take precautionary measures against static discharge.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

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

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

P301+P310: IF SWALLOWED: Immediately call a poison center or doctor/physician.

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

P331: Do NOT induce vomiting (for aspiration hazard H304).

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.

2.3 Other Hazards

No additional information available

2.4 Emergency Overview

Highly flammable liquid and vapor! Vapor may cause a flash fire. Causes serious eye irritation. High vapor concentrations may cause drowsiness and irritation of the respiratory tract. Prolonged or repeated skin contact may cause drying, cracking, and irritation.

Target Organs: Central nervous system (CNS), liver, kidneys, respiratory system, skin, eyes

2.5 HMIS Rating:

Health – 3 Flammability – 3 Physical Hazard – 0 PPE – F (Gloves, goggles, respirator)

NOTE: HMIS ratings (0–4) reflect hazard severity under normal use. Higher values indicate greater risk. PPE recommendations are minimal; users must assess specific conditions.

3 COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance Identification



Chemical Name: Toluene

Hazardous	Ingredient	CAS No.	EC No.	Concentration	Molecular Formula
Yes	Toluene	108-88-3	203-625-9	100%	C ₇ H ₈

4 FIRST AID MEASURES

4.1 Description of First Aid Measures

Inhalation: Remove victim to fresh air immediately. Keep at rest in a position comfortable for breathing. If breathing is difficult, administer oxygen if available and you are trained to do so. If unconscious or not breathing, provide artificial respiration using a pocket mask or bag-valve device to avoid rescuer exposure and seek immediate medical attention.

Skin Contact: Remove contaminated clothing promptly. Wash skin thoroughly with soap and water for at least 15 minutes. If irritation develops or persists, obtain medical advice. Discard contaminated clothing as hazardous waste.

Eye Contact: Immediately flush eyes with gently flowing water for at least 15 minutes, holding eyelids open to ensure complete rinsing. Remove contact lenses if present and easy to do. Seek medical attention if irritation persists. Use an eye wash station if available.

Ingestion: Rinse mouth with water. Do NOT induce vomiting due to risk of aspiration. Never give anything by mouth to an unconscious person. Seek immediate medical attention. If vomiting occurs naturally, position victim in a left lateral decubitus position (recovery position) to minimize aspiration risk.

4.2 Most Important Symptoms and Effects

Acute Effects:

Inhalation: Dizziness, headache, nausea, central nervous system depression, respiratory tract irritation.

Skin/Eye Contact: Redness, irritation, pain, possible dermatitis with prolonged exposure.

Ingestion: Aspiration hazard, chemical pneumonitis, cardiac sensitization, gastrointestinal irritation.

Chronic Effects: Prolonged exposure may cause liver/kidney damage, neurological effects, hearing loss, or color vision impairment (per ACGIH).

4.3 Indication of Immediate Medical Attention and Special Treatment

Immediate medical attention is required for ingestion or if symptoms persist. Provide SDS to medical personnel.

Notes for Physicians:

Toluene may cause cardiac sensitization to catecholamines (e.g., epinephrine). Avoid adrenergic agents due to risk of arrhythmias. Consider beta-blockers if arrhythmias occur.

Monitor for hypoxia, pulmonary edema, or metabolic acidosis if aspiration is suspected.

Blood toluene levels may correlate with exposure severity.

5 FIRE-FIGHTING MEASURES

5.1 Suitable Extinguishing Media

Use alcohol-resistant foam, dry chemical powder, or carbon dioxide (CO₂).

Do NOT use water jets (may spread burning material).

5.2 Specific Hazards Arising from the Chemical:

Forms explosive vapor-air mixtures (LEL: 1.1%, UEL: 7.1%).

Hazardous combustion products: Carbon monoxide (CO), carbon dioxide (CO₂), and irritating smoke.

Vapors are heavier than air and may travel to ignition sources, causing flashback fires.

Floats on water; runoff may spread fire or contaminate the environment.

5.3 Protective Equipment:

Wear self-contained breathing apparatus (SCBA, NIOSH-approved) and full firefighting turnout gear (including flame-resistant



clothing and face shield).

Use water spray to cool exposed containers but avoid direct streams.

5.4 Additional Firefighting Guidance

Auto-ignition temperature: 480°C (896°F).

Flash point: 4°C (39°F) – highly flammable at room temperature.

Approach fires upwind to avoid toxic vapors.

Prevent runoff from entering drains or waterways (environmental hazard).

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

Note: NFPA ratings are for emergency response only and reflect acute exposure risks.

6 ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions

Immediately evacuate non-essential personnel upwind.

Eliminate all ignition sources within 50 feet (15 meters).

Wear NIOSH-approved SCBA (for vapors >500 ppm) and chemical-resistant PPE (Viton® gloves + Tychem® suit).

6.2 Environmental Precautions

Prevent entry into sewers/waterways using absorbent booms or dikes.

EPA Reportable Quantity (RQ): 1,000 lbs (454 kg) per 40 CFR 302.4.

CERCLA Hazardous Substance: RQ = 1,000 lbs (immediate reporting to NRC: 1-800-424-8802).

6.3 Containment and Cleanup Methods

For releases <1,000 lbs:

Contain with inert absorbents (clay, polypropylene pads).

Collect in DOT-approved containers (UN1A1/X).

For releases ≥1,000 lbs (or any quantity entering waterways):

Implement emergency containment per SPCC Plan (40 CFR 112).

Notify NRC and state/local authorities immediately.

6.4 Reporting Requirements

EPA:

≥1,000 lbs (454 kg): Report to NRC within 15 minutes (40 CFR 302.6).

Any release to waterways: Immediate notification (Clean Water Act).

7 HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Use only in well-ventilated areas (e.g., fume hood, local exhaust ventilation).

Ground and bond containers during transfer to prevent static discharge.

Avoid contact with strong oxidizers (e.g., peroxides, nitric acid, halogens).

Use non-sparking tools and explosion-proof equipment in handling areas.

Do not breathe vapors/mists; use respiratory protection if ventilation is inadequate (see Section 8).

Avoid contact with eyes, skin, and clothing. Wash thoroughly with soap and water after handling.

Remove contaminated clothing immediately; wash skin and clothing before reuse.

Empty containers may retain hazardous residues (liquid/vapor). Do not puncture, weld, grind, or expose to heat, sparks, or open flames.

7.2 Storage Conditions

Store in a flammable liquids cabinet or approved safety can.

Keep containers tightly closed and clearly labeled when not in use.



Store in a cool, dry, well-ventilated area away from:
Ignition sources (heat, sparks, open flames, static electricity).
Incompatible materials (oxidizers, strong acids/bases, halogens).
Segregate from oxidizing agents and other incompatible substances.
Keep locked to prevent unauthorized access.

Additional Notes:

Never pressurize, cut, weld, drill, or grind containers, even when empty.
Monitor vapor concentrations to ensure levels remain below occupational exposure limits (see Section 8).

8 EXPOSURE CONTROLS/PPE

8.1 Exposure Limits

OSHA PEL (TWA): 200 ppm (750 mg/m³)
ACGIH TLV (TWA): 20 ppm (75 mg/m³) [skin notation]
NIOSH REL (TWA): 100 ppm (375 mg/m³) [skin notation]
NIOSH STEL: 150 ppm (560 mg/m³)
NIOSH IDLH: 500 ppm (immediately dangerous concentration; requires SCBA)

8.2 Engineering Controls

Use local exhaust ventilation (LEV) or process enclosure
Ensure adequate general ventilation (minimum 6 air changes/hour)
Ground and bond all equipment to prevent static discharge
Explosion-proof electrical systems required in handling areas

8.3 Personal Protective Equipment (PPE)

Respiratory Protection:

<100 ppm (OSHA AL): None required if below AL and adequate ventilation.
100–200 ppm (OSHA AL to PEL): Half-face APR with organic vapor cartridges*.
200–500 ppm (Above PEL): Full-face APR or powered air-purifying respirator (PAPR).
≥500 ppm (IDLH) or unknown: SCBA or supplied-air respirator (SAR) with escape bottle.

Eye/Face Protection:

Chemical splash goggles
Face shield (when splashing risk exists)

Skin Protection:

Impermeable gloves (nitrile, neoprene, or butyl rubber ≥0.4 mm thickness)
Chemical-resistant apron or suit (when splash risk exists)
Closed-toe shoes with chemical-resistant uppers

Other Protection:

Static-dissipative footwear in flammable areas
Safety showers and eye wash stations must be accessible

8.4 General Hygiene Measures

Prohibit eating/drinking/smoking in work areas.
Wash hands/face thoroughly after handling.
Launder contaminated clothing before reuse.

9 PHYSICAL AND CHEMICAL PROPERTIES

9.1 General Information

a) Appearance: Clear, colorless liquid



- b) Odor: Sweet, pungent (aromatic)
- c) Odor threshold: 0.16-30 ppm
- d) pH: Not applicable
- e) Melting point/freezing point: -95°C (-139°F)
- f) Initial boiling point and boiling range: 111°C (232°F)
- g) Flash point: 4°C (40°F) (Tag closed cup)
- h) Evaporation rate: 1.2 (butyl acetate=1.0)
- i) Flammability (solid, gas): Highly flammable liquid (GHS Cat 2)
- j) Upper/lower flammability or explosive limits:
 - Upper explosive limit (UEL): 7.1%
 - Lower explosive limit (LEL): 1.1%
- k) Vapor pressure: 28.4 mmHg at 25°C
- l) Vapor density: 3.1 (air=1)
- m) Relative density: 0.87 at 20°C (water=1)
- n) Solubility(ies): 0.5 g/L in water at 20°C
- o) Partition coefficient (n-octanol/water): log Kow 2.73
- p) Autoignition temperature: 480°C (896°F)
- q) Decomposition temperature: No data available
- r) Viscosity: 0.59 mPa·s at 20°C
- s) Explosive properties: No data available
- t) Oxidizing properties: No data available

9.1 Other safety characteristics:

Refractive index: 1.496 at 20°C

Dielectric constant: 2.38 at 20°C

10 STABILITY AND REACTIVITY

10.1 Stability

Stable under normal conditions (temperature, pressure).

Conditions to avoid:

Open flames, sparks, static discharge (flammability risk).

Temperatures >40°C (accelerates vapor formation).

Confined spaces (vapor accumulation hazard).

10.2 Reactive Hazards

Hazardous polymerization: Will not occur (monomer stable).

Incompatible materials:

Strong oxidizers (e.g., nitric acid, peroxides – risk of fire/explosion).

Strong acids/bases (e.g., sulfuric acid – may generate heat).

10.3 Hazardous Decomposition Products

Thermal decomposition: Carbon monoxide (CO), carbon dioxide (CO₂).

Combustion products: Soot (polycyclic aromatics), trace benzene.

11 TOXICOLOGICAL INFORMATION

11.1 Acute Toxicity

Oral Toxicity (LD₅₀): 636 mg/kg (rat)

Dermal Toxicity (LD₅₀): 14,100 mg/kg (rabbit)

Inhalation Toxicity (LC₅₀): 49,000 mg/m³/4h (rat)

Skin Corrosion/Irritation: Causes mild irritation (rabbit)

Eye Damage/Irritation: Causes severe eye irritation (rabbit)

11.2 Chronic Toxicity

Carcinogenicity:

IARC: Group 3 (Not classifiable as carcinogenic to humans)

NTP: Not listed

ACGIH: Not classified

Reproductive Toxicity: Suspected of damaging fertility (based on animal studies)

Specific Target Organ Toxicity (Repeated Exposure):

Central nervous system (CNS) depression

Liver and kidney effects at high exposure levels

11.3 Other Toxicological Effects

Skin Sensitization: Not classified

Mutagenicity: Negative (Ames test)

Aspiration Hazard: Not classified

11.4 Exposure Routes and Symptoms

Inhalation: Dizziness, headache, fatigue, nausea

Skin Contact: Dryness, irritation, dermatitis

Eye Contact: Redness, pain, blurred vision

Ingestion: Abdominal pain, vomiting

12 ECOLOGICAL INFORMATION

12.1 Ecotoxicity

Aquatic Toxicity:

Fish (LC₅₀, 96h): 8.9-21 mg/L (Pimephales promelas)

Daphnia (EC₅₀, 48h): 9.6 mg/L (Daphnia magna)

Algae (EC₅₀, 72h): 5.3 mg/L (Pseudokirchneriella subcapitata)

Terrestrial Toxicity:

Earthworm (LC₅₀, 14d): 120 mg/kg soil (Eisenia fetida)

Avian (LD₅₀, oral): 1,500 mg/kg (Colinus virginianus)

12.2 Persistence and Degradability

Biodegradation:

Ready biodegradability: 72% (28d, OECD 301F)

Inherent biodegradability: Not persistent

Abiotic Degradation:

Hydrolysis: Not significant (stable at pH 5-9)

Photodegradation: Half-life = 3.5 days (air)

12.3 Bioaccumulation

Log Kow: 2.73

BCF (Bioaccumulation Factor): 28 (measured)

Potential to bioaccumulate: Low

12.4 Mobility in Soil

Koc (Organic Carbon Partition Coefficient): 160

Potential to leach: Moderate

Volatilization: Half-life = 4.6 hours (from water)



12.5 Other Adverse Effects

Ozone Depletion Potential (ODP): 0

Global Warming Potential (GWP): 4 (100-yr)

Endocrine Disruption: No data available

13 DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods

Product Disposal:

Dispose as hazardous waste (D001 ignitable characteristic)

Incineration in approved hazardous waste facility at $\geq 1,100^{\circ}\text{C}$ ($2,012^{\circ}\text{F}$) with scrubbers

Contaminated Packaging:

Triple-rinse with solvent (e.g., acetone)

Puncture/crush to prevent reuse (OSHA 1910.1200(f)(9))

13.2 Regulatory Information

US EPA Waste Codes: D001 (Ignitable)

RCRA Classification: Hazardous Waste (40 CFR 261)

EU Waste Code: 14 06 01* (halogen-free solvents)

13.3 Special Precautions

Never pour down drains or into waterways

Avoid landfilling of liquid waste

Use closed-system transfer for disposal operations

13.4 Recommended Disposal Agencies

Contact licensed waste handlers (e.g., Clean Harbors, Veolia)

Consult local hazardous waste regulations (state/provincial requirements may vary)

13.5 Contaminated Soil Treatment

Soil vapor extraction for small spills

Ex-situ bioremediation for large-scale contamination

14 TRANSPORT INFORMATION

14.1 DOT (U.S. Department of Transportation)

Proper Shipping Name: Toluene

Hazard Class: 3 (Flammable Liquid)

UN Number: UN1294

Packing Group: II

14.2 IMDG (International Maritime Dangerous Goods)

Proper Shipping Name: Toluene

Hazard Class: 3 (Flammable Liquid)

UN Number: UN1294

Packing Group: II

Marine Pollutant: No

EMS: F-E, S-D

14.3 IATA (International Air Transport Association)

Proper Shipping Name: Toluene

Hazard Class: 3 (Flammable Liquid)

UN Number: UN1294



Packing Group: II
Marine Pollutant: No
Passenger Aircraft Max Net Qty: 5 L
Cargo Aircraft Only Max Net Qty: 60 L

15 REGULATORY INFORMATION

15.1 U.S. Regulations

EPA (Environmental Protection Agency)

TSCA (Toxic Substances Control Act): Listed (40 CFR 710.3)

CERCLA (Superfund) Reportable Quantity (RQ): 1,000 lbs (454 kg) (40 CFR 302.4)

SARA Title III (EPCRA):

Section 302/304: Extremely Hazardous Substance (EHS) - TPQ: 10,000 lbs (40 CFR 355)

Sections 311/312: Fire Hazard, Acute Health Hazard

RCRA:

Hazardous Waste Number: D001 (Ignitable Waste)

Regulatory Level: 10% minimum concentration for ignitability characteristic (40 CFR 261.21)

U-220: Listed waste when discarded commercial chemical product (40 CFR 261.33)

15.2 US State Regulations

New Jersey: Listed on RTK Hazardous Substance List (N.J.A.C. 7:1G)

Pennsylvania: Reportable under Worker & Community Right-to-Know Act (35 P.S. § 7302)

Massachusetts: Listed on RTK Hazardous Substance List (454 CMR 21.00)

California:

Proposition 65: Listed as developmental toxicant (Safe Harbor Level = 7,000 µg/day)

Warning Requirement: "WARNING: This product contains toluene, a chemical known to the State of California to cause birth defects or other reproductive harm."

16 OTHER INFO:

16.1 Document Control

Original Preparation Date: January 1, 2006

Latest Revision Date: April 2, 2025

Revision Summary: Updated to align with GHS Revision 7 standards and current regulatory requirements.

16.2 Disclaimer:

The information contained herein is accurate to the best of TEDIA COMPANY LLC's knowledge and complies with applicable regulations as of the revision date. However, no warranty, express or implied, is made regarding its accuracy, completeness, or fitness for a particular purpose.

16.3 User Responsibility:

It is the responsibility of the user to: Verify compliance with local, state, federal, and international regulations before use. Conduct independent assessments to ensure suitability for intended applications. Implement appropriate safety, health, and environmental controls.