

MATERIAL SAFETY DATA SHEET

TOLUENE

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1. SUBSTANCE IDENTIFICATION

SUBSTANCE: **TOLUENE**

CATALOG NUMBER: 9711, 9715

TRADE NAMES/SYNONYMS: MethylBenzene; 1-Methylbenzene; Methylbenzol; Phenylmethane; Toluol.

CHEMICAL FAMILY: Hydrocarbon, aromatic

MOLECULAR FORMULA: C₆ H₅ CH₃ MOLECULAR WEIGHT: 92.14

2. COMPOSITION AND INGREDIENTS INFORMATION

Toluene	CAS# 108-88-3	99.5% min.
Water	CAS# 7732-18-5	0.03% max.

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4):	Health=2	Fire=3	Reactivity=0
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Danger: Flammable Liquid

Warning: Vapor harmful

Toluene is a colorless liquid with pungent, aromatic, benzene like odor. It is a flammable liquid that is harmful if ingested and narcotic in high concentrations. It is a potential human carcinogen (IARC). Toluene is photochemically reactive. Inhalation of vapor is harmful. May affect central nervous system, liver and kidneys.

Primary Routes of Exposure: Inhalation, Ingestion, Skin and Eye contact.

Acute Effects: Fatigue, confusion, headache, dizziness, drowsiness, peculiar skin sensations (pins and needles) or numbness may be produced. Very high concentrations via inhalation can cause unconsciousness and death. After effects of acute inhalation include muscular fatigue, insomnia, and possible hepatic and renal damage. Skin contact causes irritation and drying. Absorption through the skin is possible. Contact with the eyes cause irritation and corneal burns. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

Chronic Effects: Prolonged or repeated exposure via inhalation may cause headache, loss of appetite, drowsiness, pallor, mucous membrane irritation, vomiting, insomnia, nosebleeds, chest pains, and various motor difficulties. Bone marrow hypoplasia and leukopenia have been reported. Neuropsychiatric effects are varied. Muscle weakness leading to limb paralysis and abdominal pain is noted. Continued repeated inhalation of

toluene to the point of euphoria has caused irreversible encephalopathy with ataxia, tremulousness, emotional lability, and diffuse cerebral atrophy. Chromosome changes were observed in some workers. Prolonged or repeated exposure to the skin may cause defatting and dryness. Repeated ingestion may cause damage to kidney, liver, central nervous system, and lead to cancer.

Potential Health Effects:

- Inhalation may cause dizziness, headache, nausea or vomiting.
- Eye contact may cause severe eye irritation.
- Skin contact may cause skin irritation.
- Ingestion harmful may be fatal if swallowed. May cause nausea or vomiting.

4. FIRST-AID PROCEDURES

Inhalation: Remove from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen. Keep affected person warm and at rest. Get medical attention immediately.

Eye Contact: Wash eyes immediately with large amounts of water, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention immediately.

Skin Contact: Remove contaminated clothing and shoes immediately. Wash affected area with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention if irritation persists.

Ingestion: If swallowed, **do not induce vomiting**. If vomiting does occur, insure victim's head is lower than hips in order to prevent aspiration. Call a physician immediately.

ANTIDOTE: No specific antidote. Treat symptomatically and supportively.

5. FIREFIGHTING PROCEDURES

FIRE AND EXPLOSION HAZARD: DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK. VAPOR-AIR MIXTURES ARE EXPLOSIVE. DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

FLASH POINT: 40°F (4°C) (CC)

UPPER EXPLOSIVE LIMIT: 7.1%

LOWER EXPLOSIVE LIMIT: 1.2%
FLAMMABILITY CLASS (OSHA): IB

AUTOIGNITION TEMP.: 996°F (536°C)

FIRE FIGHTING MEDIA: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1993 Emergency Response Guidebook, DOT P 5800.5). FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1993 Emergency Response Guidebook, DOT P 5800.5).

FIRE RESPONSE PROCEDURES: Move container from fire area if you can do it without risk. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing toxic vapors. Keep upwind. Apply cooling water to sides of containers that are exposed to flames until well after fire is out.

Water may be ineffective (NFPA 325M, Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, 1991)

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors mix readily with air, forming explosive mixtures. Flow, agitation etc., can cause build-up of electrostatic charge due to liquid's low conductivity. Reacts violently with strong oxidants, with risk of fire and explosion.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: Remove all ignition sources. Wear protective equipment, appropriate gloves, safety glasses and apron. Stop leak if you can do it without risk. Absorb Liquids in vermiculite, dry sand or similar material and deposit in sealed container.

LARGE SPILL: Wear an approved respirator. No smoking, flames or flares in hazard area. Follow the above procedure and dike far ahead of spill for later disposal. Keep unnecessary people away; isolate hazard area and restrict entry. If spill is very large call fire department immediately. Use water spray to reduce vapors

REPORTABLE QUANTITY (RQ): 1000 POUNDS

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state Emergency Response Commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103, the National Response Center must be notified immediately at 800-424-8802 or 202-426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

7. HANDLING AND STORAGE

General Handling: FLAMMABLE: Store in a cool, dry place away from heat, sparks and open flames. Vapors may be explosive. Do not get into eyes. Avoid contact with skin and clothing. Avoid breathing vapor. Keep containers tightly closed and in an upright position to prevent leakage. Wash hands thoroughly after handling. Containers of this material may be hazardous when empty. Since emptied containers retain product residues, assume emptied containers to have the same hazard qualities as full containers.

Observe all federal, state and local regulations when storing or disposing of this substance. For assistance, contact the district director of the Environmental Protection Agency.

Store in accordance with 29 CFR 1910.106. Toluene is a class IB flammable liquid (NFPA). Follow maximum allowed pile heights specified in the BOCA code or in the NFPA manual. Local fire authorities should be notified for the storage of this material in any quantity. Local permits are required for storage in warehouse quantities.

Protect against physical damage. Outside or detached storage is preferable. Inside storage should be in a standard flammable liquid storage room or cabinet. Separate from oxidizing materials (NFPA 49, Hazardous Chemicals Data, 1975). Store away from incompatible substances.

8. EXPOSURE CONTROL (PERSONAL PROTECTION)

VENTILATION: Provide local exhaust or general dilution ventilation to meet published exposure limits. Ventilation equipment must be explosion-proof.

RESPIRATOR: The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards; NIOSH criteria documents or by the U.S. Department of Labor, 29 CFR 1910 Subpart Z. The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

FOR FIRE FIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

CLOTHING: Laboratory Coat

GLOVES: Employee must wear appropriate protective gloves to prevent contact with this substance.

EYE PROTECTION: Employee must wear splash-proof or dust-resistant safety goggles to prevent eye contact with this substance.

EMERGENCY EYEWASH: Where there is any possibility that an employee's eyes may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.

EXPOSURE LIMITS:

TOLUENE:

200 ppm OSHA TWA; 150 ppm OSHA STEL

Ceiling 300 ppm (500 ppm max. peak)

50 ppm ACGIH TWA;

100 ppm (377 mg/m³) NIOSH RECOMMENDED TWA;

150 ppm (565 mg/m³) NIOSH RECOMMENDED STEL

50 ppm (190 mg/m³) DFG MAK TWA;

500 ppm (1885 mg/m³) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 2 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE; CARBON DISULFIDE; GAS CHROMATOLOGY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III #1500, HYDROCARBONS).

9. PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: Clear, colorless liquid with an aromatic odor.

BOILING POINT: 231°F (111°C)

SPECIFIC GRAVITY: 0.8669

VAPOR PRESSURE: 36.7 mmHg @ 30°C

EVAPORATION RATE: (butyl acetate-1): 2.24

VAPOR DENSITY: 3.14

SOLVENT SOLUBILITY: Soluble in alcohol, ether, benzene, chloroform, ligroin, glacial acetic acid, carbon disulfide, acetone.

MELTING POINT: -139°F (-95°C)

VOLATILITY: 100%

SOLUBILITY IN WATER: insoluble

FLASH POINT: 4°C (40°F) (CC)

10. STABILITY AND REACTIVITY INFORMATION

REACTIVITY: Stable under normal temperatures and pressures.

INCOMPATIBILITIES:

TOLUENE

ALLYL CHLORIDE + DICHLOROETHYL ALUMINUM OR ETHYLALUMINUM SESQUICHLORIDE: Possible explosion.

BROMINE TRIFLUORIDE (SOLID): Violent reaction.

1,3-DICHLORO-5,5-DIMETHYL-2,4-IMIDAZOLIDINEDIONE: Explosive reaction.

DINITROGEN TETROFLUORIDE: Forms explosive mixture.

NITRIC ACID: Vigorous reaction.

NITRIC ACID + SULFURIC ACID: Violent decomposition possible.

NITROGEN TETROXIDE: Explosive reaction.

OXIDIZERS (STRONG): Fire and explosion hazard.

PLASTICS, RUBBER, AND COATINGS: May be attacked.

SILVER PERCHLORATE: Forms shock-sensitive mixture.

SULFUR DICHLORIDE: Violent reaction, greatly accelerated in the presence of iron or ferric chloride.

SULFURIC ACID: Exothermic reaction.

TETRANITROMETHANE: Forms explosive mixture.

URANIUM HEXAFLUORIDE: Violent reaction.

DECOMPOSITION: Thermal decomposition may release acrid smoke and irritating fumes.

POLYMERIZATION: Hazardous polymerization has not been reported to occur under normal temperatures and pressures.

11. TOXICOLOGICAL INFORMATION

TOLUENE:

IRRITATION DATA: 300 ppm eye-human; 870 µg eye-rabbit mild; 2 mg/24 hours eye-rabbit severe; 100 mg/30 seconds rinsed eye-rabbit mild; 435 mg skin-rabbit mild; 500 mg skin-rabbit moderate; 20 mg/24 hours skin-rabbit moderate.

TOXICITY DATA: 200 ppm inhalation-human TCLO; 100 ppm inhalation-man TCLO; 26,700 ppm/1 hour inhalation-rat LC50; 400 ppm/24 hours inhalation-mouse LC50; 55,000 ppm/40 minutes inhalation-rabbit LCLO; 1600 ppm inhalation-guinea pig LCLO; 12,124 mg/Kg skin-rabbit LD50; 50 mg/Kg oral-human LDLO; 636 mg/Kg oral-rat LD50; 2250 mg/Kg subcutaneous-mouse LD50; 1960 mg/Kg intravenous-rat LD50; 130 mg/Kg intravenous-rabbit LDLO; 500 mg/Kg intraperitoneal-guinea pig LD50; 1332 mg/Kg intraperitoneal-rat LD50; 59 mg/Kg intraperitoneal-mouse LD50; 1750 mg/Kg intraperitoneal-mammal LDLO; 6900 mg/Kg unreported-rat LD50; 2000 mg/Kg unreported-mouse LD50; mutagenic data (RTECS); reproductive effects data (RTECS).

CARCINOGEN STATUS: Human inadequate evidence, animal inadequate evidence (IARC group-3).

12. ECOLOGICAL INFORMATION

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance. Toluene has moderate acute toxicity to aquatic life. Toluene has caused leaf membrane damage in plants. Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility and changes in appearance or behavior. Chronic effects can be seen long after exposure(s) to a toxic chemical. Toluene has moderate chronic toxicity to aquatic life. (AQUIRE Database, ERL-Duluth, U.S. EPA., Phytotox).

13. DISPOSAL GUIDELINES

RCRA: The unused product is a RCRA hazardous waste if discarded. The RCRA ID number is U220/D001. If the waste is a spent solvent, the appropriate spent solvent code should be used.

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262

OTHER DISPOSAL CONSIDERATIONS: The waste material should be treated and/or disposed of at site authorized to handle hazardous chemical waste. Appropriate Federal, State and Local Regulatory Authorities should be contacted before discharge, treatment or disposal of waste material. The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

Proper shipping name: Toluene

Hazard class or Division: 3

Identification Numbers: UN1294

Packing Group: II

Label(s) required (if not excepted): Flammable Liquid.

Packaging authorizations: Exceptions: 173.150; for small quantities of flammable liquids

Non-bulk packaging: 173.202; for liquid hazardous material in packing group II

Bulk-packaging: 173.242; for liquid hazardous material

Quantity Limitations: Passenger aircraft or railcar: 5 L

Cargo aircraft only: 60 L

15. REGULATORY INFORMATION

SARA TITLE III (Superfund Amendment and Reauthorization Act)

SECTION 302 AND 304: Extremely Hazardous Substance List (40 CFR 355)- Not Listed

SECTION 311: Hazard Categorization (40 CFR 370)- Acute, Chronic, and Fire

SECTION 313: Toxic Chemicals Listing (40 CFR 372.65)- Listed as a toxic chemical

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)

SECTION 102(A) Hazardous Substances (40 CFR 302.4)- Listed Reportable Quantity - 1,000 pounds.

SECTION 101(14) Reportable Quantity: 1,000 lbs

RCRA (Resource Conservation and Recovery Act.)

40 CFR 261.33 Hazardous Waste Number: U220

NJ-RTK (New Jersey- State Right To Know)

Environmental Hazardous Substance List: Listed, Substance # 1866

TSCA (Toxic Substance Control Act)

Toluene is listed on the TSCA Inventory.

CALIFORNIA PROPOSITION 65

Toluene is listed substance.

Warning: Toluene is a chemical known to the State of California to cause birth defects or other reproductive harm.

16. OTHER INFORMATION:

Toluene, as manufactured by Richard-Allan Scientific, is intended for legal use in laboratories and manufacturing environments.