

School Material Safety Data Sheet

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GENIUM PUBLISHING CORP.

No. 42

TOLUENE

February 1987

SECTION 1. INTRODUCTORY INFORMATION

MATERIAL NAME AND FORMULA: TOLUENE; C_7H_8

SYNONYMS: Toluol, Methylbenzene, Phenylmethane, Methylbenzol, Methacide, $C_6H_5CH_3$

CAS NUMBER: 0108-88-3

INGREDIENTS: Toluene, ca 100%

DOT CLASSIFICATION: Flammable Liquid

OSHA CLASSIFICATION: Class 1B Flammable Liquid

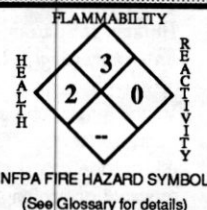
EPA CLASSIFICATION: Hazardous Substance, Hazardous Waste, Priority Toxic Pollutant

MANUFACTURERS: Always request Material Safety Data Sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The Manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.

DESCRIPTION: A water white liquid with a characteristic pungent, benzenelike, aromatic odor, whose recognition threshold (unfatigued) is 2 to 5 ppm (100% of test panel). Odor detection for safety is unsatisfactory due to fatigue.

PRELIMINARY INFORMATION: Toluene is a flammable liquid that can be a dangerous fire hazard and moderate explosion hazard.

Reported to have mutagenic properties (ref. #510, p. 13). May serve as a possible (safer) substitute for benzene (School MSDS #117). This material should not be used in schools if alternatives can be found to meet the necessary educational objectives. If its use is deemed necessary, keep amounts used to a minimum and use with great caution. Avoid body contact. Toluene is irritating and can cause serious health effects.



SECTION 2. USE AND STORAGE INFORMATION

-- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- Always provide for safe disposal of all chemical waste generated in the lab. Check applicable regulations prior to use.
- Not recommended for use or storage in schools without an absolute need being determined.
- Provide adequate ventilation or restrict use to fume hood. Whenever possible, substitute less hazardous solvents.
- Eliminate all possible sources of ignition. Nearby electrical service and equipment should be explosion proof (no spark-generation potential).
- Review sections 3, 5, and 6 to prepare for possible accidents or emergencies.
- Neoprene gloves are recommended when working with this material.

-- USAGE PRECAUTIONS AND PROCEDURES --

- For safety, contact lenses should not be worn in the laboratory; soft lenses may absorb irritants and all lenses may concentrate them.
- READ THE LABEL and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials.
- After working with this material, always wash hands and face before eating, drinking, or smoking. Keep off of clothes and belongings.
- Do not breathe vapors -- use only in a fume hood or very small ventilated area.
- Keep away from strong oxidizing agents and sources of heat or ignition.
- Use only nonsparking tools around toluene. Avoid generation of static sparks.
- Heavier-than-air vapors may collect in low areas, creating a fire or explosion hazard.

-- ADDITIONAL INFORMATION --

- Toluene does not polymerize. This material is stable at room temperature under normal conditions.
- Incompatible with oxidizers. Nitric acid and toluene, especially in combination with sulfuric acid, will produce nitrated compounds, which are dangerously explosive.
- Use (consumption) of alcohol can aggravate the narcotic effect and blood effects of toluene.

-- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Containers should be tightly closed. Toluene should be kept in an approved safety can.
- Do not store chemicals alphabetically by name; store by chemical family instead to keep compatibles together.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Smoking should not be permitted in areas where chemicals are stored.
- Purchase only amounts equivalent to one year's needs, if at all.
- Should be stored in approved FLAMMABLES cabinet, away from oxidizing agents, sources of heat or ignition, and H_2SO_4 .

SECTION 3. SPILLS AND DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:

- Evacuate unnecessary personnel. Ventilate area of spill. Provide maximum explosion-proof ventilation.
- Eliminate all possible sources of ignition. Nearby electrical service and equipment should be explosion proof (no spark-generation potential). Use nonsparking tools for cleanup.
- Cleanup personnel should wear personal protective equipment as necessary to prevent skin or eye contact and inhalation of vapors.
- Cover material with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into an appropriate container (with secure lid) for disposal in accordance with existing regulations. Dike with inert absorbent material to contain and limit spill area.
- Very small spills may be picked up on paper toweling (avoid skin contact).

DISPOSAL OF SMALL QUANTITIES:

- Contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.
- Evaporate small quantities absorbed on paper in a properly functioning hood, then burn paper.
- Do not flush down drains (explosion hazard)

DISPOSAL OF LARGER AMOUNTS: Contact a licensed disposal company.

*** FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL. ***

SECTION 4: HEALTH HAZARDS

Toluene has not been identified as a known or suspected carcinogen by the NTP, IARC, or OSHA.

Current OSHA PEL TLV: 8-hr. TWA: 200 ppm. (ceiling level is 300 ppm)*

* Acceptable maximum peak above the acceptance ceiling concentration for an 8-hr. shift = 500 ppm for 10 minutes.

- ACGIH TLV: TWA: 100 ppm (375 mg/m³). STEL = 150 ppm (560 mg/m³).

- Human, Inhalation, LCLo: 4000 ppm/4 hr.

- Rat, Oral, LD₅₀: 5000 mg/kg

- Vapor inhalation can produce headache and slight drowsiness at 100 ppm, fatigue, nausea, and itching skin at 100-200 ppm, anesthetic effects and respiratory tract and eye irritation above 200 ppm.

- Absorption can occur through the skin and liquid contact will cause defatting of the skin, with possible dermatitis from repeated or prolonged skin contact.

- Eye contact is irritating and can be damaging and can cause corneal burns.

- Ingestion irritates the digestive tract and results in systemic effects from absorption.

SECTION 5: FIRST AID PROCEDURES**Eye contact:**

- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get prompt medical attention.*

Skin contact:

- Wash exposed areas of skin with soap and water. Remove contaminated clothing promptly.
- Get medical help when area of skin exposure is large or if irritation persists.*

Inhalation:

- Remove victim to fresh air; restore and/or support breathing as necessary. Have a trained person administer oxygen as needed.
- Get medical help for coughing or breathing difficulty.*

Ingestion:

- Give USP mineral oil to drink if victim is conscious. Never give anything by mouth to a person who is unconscious or convulsing.
- Aspiration is a potential hazard if vomiting occurs!
- Get prompt medical attention.*

* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

SECTION 6: FIRE PROCEDURES AND DATA

- At room temperature toluene emits vapors that can form flammable mixtures in air.
- When exposed to heat and flame, it is a dangerous fire hazard and a moderate explosion hazard.
- Extinguishing media: carbon dioxide, dry chemical, alcohol type of foam, or water spray.
- For major fires, or if large quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.
- Use of a direct water stream may scatter fire.
- A water spray may be used to cool fire-exposed containers and disperse vapors.
- The heavier-than-air vapors may flow along surfaces to distant sources of ignition and flash back.

THERMAL OXIDATIVE DEGRADATION PRODUCTS INCLUDE: oxides of carbon and nitrogen.

FLASH POINT AND METHOD(S) ... 40°F (4.4°C) (CC)

AUTOIGNITION TEMPERATURE ... 997°F (536°C)

FLAMMABILITY LIMITS IN AIR (vol. %) :
Lower ... 1.2 Upper ... 7

SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm.) ... 231°F (110.6°C)

VAPOR PRESSURE (@ 25°C, mm Hg) ... 28

VAPOR DENSITY (air = 1) ... 3.2

SOLUBILITY IN WATER (%) ... 0.05

SPECIFIC GRAVITY (Water = 1) ... 0.866

FREEZING POINT ... -139°F (-95°C)

MOLECULAR WEIGHT ... 92.15

EVAPORATION RATE (n-BuAc = 1) ... 1.9

% VOLATILE ... 100

DATA SOURCES: Genium's Industrial MSDS #317 (8/79) and references 1-9, 12, 20, 21, 24, 26, 82, 501, 503, 504, 506, 509-11.
(see glossary for titles)

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