

SAFETY DATA SHEET

1. Identification

Product identifier: Toluene

Other means of identification

Synonyms: Methylbenzene
Product No.: 4483, 8604, 8608, 9336, 9351, 9364, 9456, 9460, 9466, 9476, V560, RM9165D, RMB9457

Recommended use and restriction on use

Recommended use: For Laboratory, Research or Manufacturing Use.
Restrictions on use: Not determined.

Details of the supplier of the safety data sheet

Avantor Performance Materials, LLC
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 Radnor, PA 19087

Telephone: Customer Service: 855-282-6867

Fax: Product Information Compliance
 Contact Person: info@avantormaterials.com
 E-mail:

Emergency telephone number:

CHEMTREC: 1-800-424-9300 within US and Canada (24 hrs/day, 7 days/week)

2. Hazard identification

Hazard Classification

Physical Hazards

Flammable liquids	Category 2
Static-accumulating flammable liquid	Category 1

Health Hazards

Acute toxicity (Oral)	Category 4
Acute toxicity (Inhalation - vapor)	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2A
Toxic to reproduction	Category 2
Specific Target Organ Toxicity - Single Exposure	Category 3 ¹
Specific Target Organ Toxicity - Repeated Exposure	Category 2 ²
Aspiration Hazard	Category 1

Target Organs

- 1.Narcotic effect., Respiratory tract irritation.
- 2.Central nervous system, Peripheral nervous system, auditory system, Kidney

Unknown toxicity - Health

Acute toxicity, inhalation, vapor 100 %

Environmental Hazards

Acute hazards to the aquatic environment Category 2

Unknown toxicity - Environment

Acute hazards to the aquatic environment 0 %

Chronic hazards to the aquatic environment 100 %

Label Elements

Hazard Symbol:



Signal Word: Danger

Hazard Statement: Highly flammable liquid and vapor.
Harmful if swallowed or if inhaled.
Causes skin irritation.
Causes serious eye irritation.
Suspected of damaging fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
May cause damage to organs through prolonged or repeated exposure.
Toxic to aquatic life.

Precautionary Statements

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof [electrical/ventilating/lighting] equipment. Use non-sparking tools. Take action to prevent static discharges. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response: In case of fire: Use water spray, foam, dry powder or carbon dioxide for extinction. IF exposed or concerned: Get medical advice/attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF SWALLOWED: Immediately call a POISON CENTER/doctor. Do NOT induce vomiting.

Storage: Store locked up. Store in a well-ventilated place. Keep cool. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in GHS classification: Static accumulating flammable liquid can become electrostatically charged even in bonded and grounded equipment.

3. Composition/information on ingredients

Substances

Chemical name	Common name and synonyms	CAS number	Content in percent (%)*
Toluene	Methylbenzene	108-88-3	99,50 - 100,00%

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First-aid measures

General information: Get medical advice/attention if you feel unwell. Show this safety data sheet to the doctor in attendance.

Ingestion: Call a physician or poison control center immediately. Do NOT induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Inhalation: Move to fresh air. Get medical attention immediately.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Eye contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention.

Most important symptoms/effects, acute and delayed

Symptoms: Harmful if swallowed. May be fatal if swallowed. Harmful if inhaled. Irritating to eyes, respiratory system and skin.

Hazards: None known.

Indication of immediate medical attention and special treatment needed

Treatment: Treat symptomatically. Symptoms may be delayed.

5. Fire-fighting measures

General Fire Hazards: Vapors may travel considerable distance to a source of ignition and flash back. Vapors may cause a flash fire or ignite explosively.

Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray, foam, dry powder or carbon dioxide.

Unsuitable extinguishing media: Avoid water in straight hose stream; will scatter and spread fire.

Specific hazards arising from the chemical: Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.

Special protective equipment and precautions for firefighters

Special fire fighting procedures: Use water spray to keep fire-exposed containers cool. Cool containers exposed to flames with water until well after the fire is out. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk.

Special protective equipment for fire-fighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures: ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the SDS for Personal Protective Equipment.

Methods and material for containment and cleaning up: In case of leakage, eliminate all ignition sources. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

Environmental Precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

7. Handling and storage

Precautions for safe handling: DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Ground and bond container and receiving equipment. Use explosion-proof [electrical/ventilating/lighting] equipment. Use non-sparking tools. Wear protective gloves/protective clothing/eye protection/face protection. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash hands thoroughly after handling.

Conditions for safe storage, including any incompatibilities:

Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

8. Exposure controls/personal protection
Control Parameters
Occupational Exposure Limits

Chemical Identity	Type	Exposure Limit Values	Source
Toluene	TWA	50 ppm 188 mg/m ³	Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2) (07 2009)
Toluene	TWA	20 ppm	Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended) (07 2007)
Toluene	TWA	20 ppm	Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act) (03 2011)
Toluene	TWA	20 ppm	Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents) (11 2010)
Toluene	8 HR ACL	50 ppm	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
	15 MIN ACL	60 ppm	Canada. Saskatchewan OELs (Occupational Health and Safety Regulations, 1996, Table 21) (05 2009)
Toluene	TWA	50 ppm 188 mg/m ³	Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment) (09 2017)
Toluene	TWA	20 ppm	US. ACGIH Threshold Limit Values (2011)

Biological Limit Values

Chemical Identity	Exposure Limit Values	Source
Toluene (o-Cresol, with hydrolysis: Sampling time: End of shift.)	0,3 mg/g (Creatinine in urine)	ACGIH BEI (03 2013)
Toluene (toluene: Sampling time: Prior to last shift of work week.)	0,02 mg/l (Blood)	ACGIH BEI (03 2013)
Toluene (toluene: Sampling time: End of shift.)	0,03 mg/l (Urine)	ACGIH BEI (03 2013)

Appropriate Engineering Controls

No data available.

Individual protection measures, such as personal protective equipment

General information: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment.

Eye/face protection: Wear safety glasses with side shields (or goggles) and a face shield.

Skin Protection

Hand Protection: Chemical resistant gloves

Other: Wear suitable protective clothing.

Respiratory Protection:	In case of inadequate ventilation use suitable respirator.
Hygiene measures:	Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

9. Physical and chemical properties

Appearance

Physical state:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	Sweet, Aromatic
Odor threshold:	No data available.
pH:	No data available.
Melting point/freezing point:	-95 - -94,9 °C
Initial boiling point and boiling range:	110,6 °C
Flash Point:	4 - 4,4 °C (Closed Cup)
Evaporation rate:	2,24 (butyl acetate=1)
Flammability (solid, gas):	Class IB Flammable Liquid
Upper/lower limit on flammability or explosive limits	
Flammability limit - upper (%):	7 - 7,1 %(V)
Flammability limit - lower (%):	1,1 - 1,27 %(V)
Explosive limit - upper (%):	No data available.
Explosive limit - lower (%):	No data available.
Vapor pressure:	2,93 - 3,0 kPa (20 °C) 3,786 kPa (25 °C)
Vapor density:	3,1 (Air=1)
Density:	0,86 g/ml (20 °C)
Relative density:	0,8636 (20 °C)
Solubility(ies)	
Solubility in water:	0,526 g/l (25 °C)
Solubility (other):	chloroform: Miscible ether: Miscible acetone: Soluble benzene: Soluble ethanol: Soluble
Partition coefficient (n-octanol/water):	2,73
Auto-ignition temperature:	480 °C
Decomposition temperature:	No data available.
Viscosity:	No data available.
Other information	
Minimum ignition energy:	0,24 mJ
Molecular weight:	92,14 g/mol (C7H8)

10. Stability and reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical Stability:	Material is stable under normal conditions.

Possibility of hazardous reactions:	Hazardous polymerization does not occur.
Conditions to avoid:	Heat, sparks, flames. Contact with incompatible materials.
Incompatible Materials:	Strong oxidizing agents. Chlorine.
Hazardous Decomposition Products:	Thermal decomposition may release oxides of carbon.

11. Toxicological information

Information on likely routes of exposure

Inhalation:	Harmful if inhaled. May cause irritation to the mucous membranes and upper respiratory tract.
Skin Contact:	Causes skin irritation.
Eye contact:	Causes serious eye irritation.
Ingestion:	Harmful if swallowed.

Information on toxicological effects

Acute toxicity (list all possible routes of exposure)

Oral	
Product:	LD 50 (Rat): 2,6 g/kg LD 50 (Rat): > 5.000 mg/kg
Dermal	
Product:	LD 50 (Rabbit): 12.124 mg/kg
Inhalation	
Product:	LC 50 (Rat): 12,5 - 30 mg/l

Repeated dose toxicity

Product:	No data available.
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Skin Corrosion/Irritation

Product:	Causes skin irritation.
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Serious Eye Damage/Eye Irritation

Product:	Causes serious eye irritation.
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Respiratory or Skin Sensitization

Product:	Not a skin nor a respiratory sensitizer.
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Carcinogenicity

Product:	This substance has no evidence of carcinogenic properties.
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IARC Monographs on the Evaluation of Carcinogenic Risks to Humans:

No carcinogenic components identified

US. National Toxicology Program (NTP) Report on Carcinogens:

No carcinogenic components identified

ACGIH Carcinogen List:

SDS_CA - SDS000000860

No carcinogenic components identified

Germ Cell Mutagenicity

In vitro

Product: No mutagenic components identified

In vivo

Product: No mutagenic components identified

Reproductive toxicity

Product: May damage fertility or the unborn child.

Specific Target Organ Toxicity - Single Exposure

Product: Narcotic effect. Respiratory tract irritation.

Specific Target Organ Toxicity - Repeated Exposure

Product: Peripheral nervous system Central nervous system. Kidneys. auditory organs

Aspiration Hazard

Product: May be fatal if swallowed and enters airways.

Other effects: No data available.

12. Ecological information

Ecotoxicity:

Acute hazards to the aquatic environment:

Fish

Product: No data available.

Specified substance(s):

Toluene
LC 50 (Fathead Minnow, 96 h): 12,6 - 66 mg/l
LC 50 (Bluegill, 96 h): 74 - 340 mg/l
LC 50 (Rainbow Trout, 96 h): 24 mg/l

Aquatic Invertebrates

Product: No data available.

Specified substance(s):

Toluene
EC 50 (Water flea (Daphnia magna), 48 h): 5,46 - 11,5 mg/l
LC 50 (Water flea (Daphnia magna), 48 h): 54,6 - 174,7 mg/l
LC 50 (Ceriodaphnia dubia, 48 h): 3,78 mg/l

Chronic hazards to the aquatic environment:

Fish

Product: No data available.

Aquatic Invertebrates

Product: No data available.

Toxicity to Aquatic Plants

Product: No data available.

Persistence and Degradability

Biodegradation
Product: Expected to be readily biodegradable.

BOD/COD Ratio
Product: No data available.

Bioaccumulative potential
Bioconcentration Factor (BCF)
Product: Bioaccumulation is unlikely to be significant because of the low water solubility of this product.

Partition Coefficient n-octanol / water (log Kow)
Product: Log Kow: 2,73

Mobility in soil: The product is insoluble in water and will spread on the water surface.

Other adverse effects: Toxic to aquatic organisms.

13. Disposal considerations

Disposal instructions: Discharge, treatment, or disposal may be subject to national, state, or local laws. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near this container.

Contaminated Packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transport information

TDG

UN Number: UN 1294
UN Proper Shipping Name: TOLUENE
Transport Hazard Class(es)
Class: 3
Label(s): 3
Packing Group: II
Marine Pollutant: No
Special precautions for user: Not determined.

IMDG

UN Number: UN 1294
UN Proper Shipping Name: TOLUENE
Transport Hazard Class(es)
Class: 3
Label(s): 3
EmS No.: F-E, S-D
Packing Group: II
Marine Pollutant: No
Special precautions for user: Not determined.

IATA

UN Number: UN 1294
UN Proper Shipping Name: Toluene
Transport Hazard Class(es)
Class: 3
Label(s): 3
Packing Group: II
Marine Pollutant: No

Special precautions for user: Not determined.
Cargo aircraft only: Allowed.

Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable

15. Regulatory information

Canada Federal Regulations

List of Toxic Substances (CEPA, Schedule 1)

Not Regulated

Export Control List (CEPA 1999, Schedule 3)

Not Regulated

National Pollutant Release Inventory (NPRI)

Canada. National Pollutant Release Inventory (NPRI) Substances, Part 5, VOCs with Additional Reporting Requirements

NPRI PT5 Toluene

Canada. National Pollutant Release Inventory (NPRI) (Schedule 1, Parts 1-4)

NPRI Toluene

Greenhouse Gases

Not Regulated

Controlled Drugs and Substances Act

CA CDSI Not Regulated

CA CDSII Not Regulated

CA CDSIII Not Regulated

CA CDSIV Not Regulated

CA CDSV Not Regulated

CA CDSVII Not Regulated

CA CDSVIII Not Regulated

Precursor Control Regulations

Chemical Identity

Toluene

International regulations

Montreal protocol

Not applicable

Stockholm convention

Not applicable

Rotterdam convention

Not applicable

Kyoto protocol

Not applicable

Inventory Status:

Australia AICS:	On or in compliance with the inventory
Canada DSL Inventory List:	On or in compliance with the inventory
China Inv. Existing Chemical Substances:	On or in compliance with the inventory
Japan (ENCS) List:	On or in compliance with the inventory
Japan ISHL Listing:	On or in compliance with the inventory
Korea Existing Chemicals Inv. (KECI):	On or in compliance with the inventory
Mexico INSQ:	On or in compliance with the inventory
New Zealand Inventory of Chemicals:	On or in compliance with the inventory
Philippines PICCS:	On or in compliance with the inventory
Taiwan Chemical Substance Inventory:	On or in compliance with the inventory
US TSCA Inventory:	On or in compliance with the inventory
EINECS, ELINCS or NLP:	On or in compliance with the inventory

16. Other information

Revision Date: 30.09.2020

Version #: 1.3

Source of information: Sources of information used in preparing this SDS included one or more of the following: results from in house or supplier toxicology studies, information from the Toxicology Data Network (TOXNET), European Chemical Agency (ECHA) substance dossiers, IARC Monographs, US National Toxicology Program data, the Agency for Toxic Substances and Disease Registry, other manufacturer's SDSs and other sources, as appropriate.

Further Information: No data available.

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