Safety Data Sheet(SDS)

Revision date : 01-06-2026

1. Identification

1) Product identifier : TOL_TOLUENE

2) Relevant identified uses of the substance or mixture and uses advised against

○ Relevant identified uses

1.Raw materials and intermediates, Solvent and extraction agents

○ Restrictions on use

Use for recommended use only
Do not use it for weapons manufacturing and related purposes.

3) Supplier information

○ Seller

Company name : Lotte Daesan Petrochem Corporation
Address : 82 Dokgot 1-ro, Daesan-eup, Seosan-si, Chungcheongnam-do
Telephone number : +82-41-689-5114
Emergency phone number : (Control Room) +82-41-689-5119
Fax number : +82-41-689-5985

2. Hazards identification

1) Hazard classification

- Flammable liquids Category 2
- Skin corrosion/irritation Category 2
- Reproductive toxicity Category 2
- Specific target organ toxicity single exposure Category 3(Narcotic effects)
- Specific target organ toxicity repeated exposure Category 2
- Aspiration hazard Category 1

2) Allocation label elements

Hazard pictograms

Signal word

- DANGER

Hazard statements

H225 Highly flammable liquid and vapour
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

- Prevention

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use only explosion-proof electrical, ventilating, lighting and equipment.
P242 Use nonsparking tools.
P243 Take action to prevent static discharges.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Avoid contact during pregnancy/ while nursing.
P271 Use only outdoors or in a wellventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

- Response

P301+P310 IF SWALLOWED: Call a POISON CENTER / toxins center / physician.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313 If exposed or concerned: Get medical advice/attention.
P312 Discomfort call a POISON CENTER / toxins center / physician if you feel unwell.
P314 Get medical advice/attention if you feel unwell.
P321 Specific treatment (see supplemental instructions on the administration of antidotes on this label).
P331 Do NOT induce vomiting.
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362+P364 Take off contaminated clothing and wash it before reuse.
P370+P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

- Storage

P403+P233 Store in a wellventilated place. Keep container tightly closed.
P403+P235 Store in a wellventilated place. Keep cool.
P405 Store locked up.

- Disposal

P501 Discard the contents/containers in accordance with the laws and laws related to waste.

3) Other hazards:

According to experience and information provided, this product does not affect harmful effects when using and handling it as a regulation.

3. Composition/Information on ingredients

Chemical name	Common name	CAS No.	Content(wt%)
Toluene	Methylbenzene	108-88-3	100

4. First-aid measures

1) Following eye contact
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Seek immediate medical assistance.

2) Following skin contact
- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Seek immediate medical assistance.
- Wash skin with soap and water.

3) Following inhalation
- Administer oxygen if breathing is difficult.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Give artificial respiration if victim is not breathing.
- If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.
- Keep victim warm and quiet.
- Move to fresh air.
- Seek immediate medical assistance.

4) Following ingestion
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Seek immediate medical assistance.

5) Delayed and immediate effects and also chronic effects from short and long term exposure

- Causes skin irritation
- May be fatal if swallowed and enters airways
- May cause damage to organs through prolonged or repeated exposure
- May cause drowsiness or dizziness
- Suspected of damaging fertility or the unborn child

6) Advice to physician

- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Exposures require specialized first aid with contact and medical follow-up .

5. Fire-Fighting measures

1) Suitable (and unsuitable) extinguishing media

○ Suitable extinguishing media

- CO2.
- Use dry sand or earth to smother fire.
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Water spray.

○ Unsuitable extinguishing media

- Direct water.

2) Special hazards arising from the substance or mixture

○ Pyrolytic product

- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
- Can decompose at high temperatures forming toxic gases.

○ Risk of fire and explosion

- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Can form explosive mixtures at temperatures at or above the flashpoint.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- May violently polymerize and result in fire and explosion.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.
- Vapor explosion hazard indoors, outdoors or in sewers.
- Vapors may form explosive mixtures with air.
- Some may burn but none ignite readily.
- Vapors may travel to source of ignition and flash back.

○ Other

- Fire may produce irritating, corrosive and/or toxic gases.
- Inhalation or contact with material may irritate or burn skin and eyes.
- Vapors may cause dizziness or asphyxiation without warning.
- May cause toxic effects if inhaled or absorbed through skin.

3) Special protective equipment for firefighters

- Move containers from fire area if you can do it without risk.
- Rescuers should put on appropriate protective gear.
- Substance may be transported hot.
- Substance may be transported in a molten form.
- Cautions ; Most of liquids are lighter than water.
- Dike fire-control water for later disposal; do not scatter the material.
- Evacuate area and fight fire from a safe distance.
- Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
- Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).

6. Accident release measures

1) Personal precautions, protective equipment and emergency procedures
   - The very fine particles can cause a fire or explosion, eliminate all ignition sources.
   - A vapor suppressing foam may be used to reduce vapors.
   - All equipment used when handling the product must be grounded.
   - Clean up spills immediately, observing precautions in Protective Equipment section.
   - Cover with plastic sheet to prevent spreading.
   - Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
   - Do not touch or walk through spilled material.
   - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
   - Please note that materials and conditions to be avoided.
   - Stop leak if you can do it without risk.

2) Environmental precautions
   - Prevent entry into waterways, sewers, basements or confined areas.
   - Runoff may cause pollution.

3) Methods and materials for containment and cleaning up
   - Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
   - Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
   - Absorb the liquid and scrub the area with detergent and water.
   - Dike and collect water used to fight fire.
   - Large Spill: Dike far ahead of liquid spill for later disposal.
   - Use clean non-sparking tools to collect absorbed material.

7. Handling and storage

1) Precautions for safe handling

- Measure atmospheric oxygen concentration and ventilate the area during the operation since low-closed area can cause oxygen deficiency.
- Please note that materials and conditions to be avoided.
- Use care in handling/storage.
- Use only in a well-ventilated area.
- All equipment used when handling the product must be grounded.
- Avoid breathing vapors from heated material.
- Avoid prolonged or repeated contact with skin.
- Caution: Heat.
- Do not enter storage area unless adequately ventilated.
- DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION;.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Handling refer to engineering control/personal protection section.
- Loosen closure cautiously before opening.

2) Conditions for safe storage (including any incompatibilities)

- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.

8. Exposure controls & personal protection

1) Chemical exposure limits, Biological exposure standard

Components	ACGIH regulations	Biological limit values
Toluene	20 ppm TWA	0.02 mg / l medium: blood time: prior to last shift of workweek parameter: Toluene; 0.03 mg / l Medium: Uric Time: End of Shift Parameter: Toluene; 0.3 mg / g Creatinine Medium: Urine Time: End of Shift Parameter: Ocresol with Hydrolysis (Background)

2) Appropriate engineering controls

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

3) Personal protective equipment

○ Respiratory protection

- If you have a direct contact or exposed to the material, wear the appropriate form of respiratory protection certified.

○ Eye protection

- If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles.

○ Hand protection

- Wear chemical safety gloves.

○ Skin protection

- Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

9. Physical and chemical information

Property name	Values	Source
Appearance		
Physical state	Liquid	HSDB
Color	Colourless	HSDB
Odor	Aromatic	HSDB
Odor threshold	2.14	
pH	No data available	
Melting point/freezing point	-94.99	HSDB
Initial boiling point and boiling range(℃)	110.6 ℃	HSDB
Flash point(℃)	4 ℃	HSDB
Evaporation rate	2.24 (Butyl Acetate=1)	
Flammability(solid, gas)	Flammable liquid	
Upper/lower flammability or explosive limits	Upper flammability limits : Ca. 7.1 %(V)/ Lower flammability limits : Ca. 1.1 %(V)	GESTIS
Vapour pressure	28.4 ㎜Hg (25℃)	HSDB
Solubility(ies)	0.526 g/100㎖ (25 ℃)	HSDB
Vapour density	3.1 (Air = 1.0)	HSDB
Relative density	No data available	
n-octanol/water partition coefficient	logPow 2.73	HSDB
Auto ignition temperature	480 ℃	HSDB
Decomposition temperature	No data available	
Viscosity(㎟/s, 40℃)	0.56 cP (25℃)	HSDB
Molecular weight(mass)	92.14	HSDB
Density	0.8669 g/㎤	
Specific gravity	Ca. 0.87 (20℃)	Experimental value

10. Stability and hazardous reactivity

1) Chemical stability and Possibility of hazardous reactions

- Runoff may create fire or explosion hazard.
- Some may burn but none ignite readily.
- Vapor explosion hazard indoors, outdoors or in sewers.
- Vapors may cause dizziness or asphyxiation without warning.
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Can decompose at high temperatures forming toxic gases.
- Can form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- Fire may produce irritating, corrosive and/or toxic gases.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Inhalation or contact with material may irritate or burn skin and eyes.
- May cause toxic effects if inhaled or absorbed through skin.
- May violently polymerize and result in fire and explosion.

2) Conditions to avoid

- Heat, contamination.
- Ignition source(heat, spark, flame, etc.).

3) Incompatible materials

- Combustibles, reducing material.

4) Hazardous decomposition products

- Corrosive/toxic fume.
- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
- Irritating, corrosive and/or toxic gas.

11. Toxicological information

1) Information on the likely routes of exposure

○ Skin Contact

- Can be absorbed in body by inhalation or contact skin and the digestive organs.

2) Delayed and immediate effects and also chronic effects from short and long term exposure

○ Acute toxicity

- Acute toxicity(Oral)
  - LD50 5580 ㎎ / ㎏ experimental species: Rat (EU Method B.1)
- Acute toxicity(Dermal)
  - LD50> 5000 ㎎ / ㎏ experimental species: Rabbit
- Acute toxicity(Inhalation:Gases)
  - No data available

- Acute toxicity(Inhalation:Vapours)
  - LC50> 20 ㎎ / ℓ experimental species: Rat (OECD TG 403)
- Acute toxicity(Inhalation:Dust/mist)
  - No data available

○ Skin corrosion/irritation
  - Ministry of Environment(Category 2)

○ Serious eye damage/eye irritation
  - Eye irritation test using rabbits are mild and observed other effects not observed

○ Respiratory sensitization
  - No data available

○ Skin sensitization
  - maximization test using guinea pig test results do not appear for skin sensitization on EU Method B.6, GLP

○ Carcinogenicity
  - 3 (IARC)
  A4 (ACGIH)

○ Germ cell mutagenicity
  - Using the in vitro gene mutation test in mammalian cell cultures OECD TG 476, returning with microbial mutation test EU Method B.13 / 14, regardless of the presence or absence of metabolic activation system voice, in vivo chromosomal aberration test results negative

○ Reproductive toxicity
  - Ministry of Environment(Category 2)

○ Specific target organ toxicity single exposure
  - Ministry of Environment(Category 3(Narcotic effects))

○ Specific target organ toxicity repeated exposure
  - Ministry of Environment(Category 2)

○ Aspiration hazard
  - Ministry of Environment(Category 1)

12. Ecological information

1) Ecotoxicity

- Hazardous to the aquatic environment, short-term (acute)
  No data available
- Hazardous to the aquatic environment, long-term (chronic)
  No data available
- Fish
  LC50 5.5 ㎎ / ℓ 96 hr Oncorhynchus kistutch
- Crustaceans

EC50 3.78 ㎎ / ℓ 48 hr Ceriodaphnia dubia

- Aquatic algae

  EC50 134 ㎎ / ℓ 3 hr Chlorella vulgaris (EC10 and NOEC: 10 mg / L)

2) Persistence and degradability

- Degradability

  (Evaporation without being adsorbed on the precipitate in water or biodegradable search (BOD: 80%, 20-yl))

- Biodegradation

  80% 20 day (rapid degradation)

3) Bioaccumulative potential

- n-octanol water partition coefficient

  2.73 log Kow

- Bioconcentration factor(BCF)

  90

4) Mobility in soil

No data available

5) Other adverse effects

No data available

13. Disposal considerations

1) Disposal methods

- Empty containers should be taken to an approved waste handling site for recycling or disposal.

2) Precautions (including disposal of contaminated container of package)

- Dispose of in accordance with local regulations.
- Send to a licensed waste management company.

14. Transport information

1) UN No. : 1294

2) Proper shipping name : TOLUENE

3) Hazard class : 3

4) Packing group : II

5) Marine pollutant : No

6) Special precautions for user related to transport or transportation measures :

Emergency measures in case of fire : F-E

Emergency measures in the effluent : S-D

- ADR

· Tunnel restriction code : D/E

- IMDG

· Marine pollutant : No

- Air transport(IATA)

· UN No. : 1294

· Proper shipping name : TOLUENE

· Class or division : 3

· Packing group : II

15. Regulatory information

Australia Industrial Chemicals Notification and Assessment Act

- Inventory - Australia - Inventory of Industrial Chemicals (AIIC)

- Toluene : Present

China Inventory of Existing Chemical Substances (IECSC)

- Inventory - China - Inventory of Existing Chemical Substances (IECSC)

- Toluene : Present [16691]

92/32/EEC

- Not applicable

European Union Official Journal of the European Communities 15 June 1990 - Annex Based on Article 13 of Directive 67/548/EEC Amended by Directive 79/831/EEC

- Inventory - European Union - European Inventory of Existing Commercial Chemical Substances (EINECS)

- Toluene : 203-625-9

Japan - ISHL Ordinance Hazardous Substances Whose Names Are to be Indicated on the Label

Japan Law Concerning the Examination and Regulations of Manufacture, etc. of Chemical Substances

- Inventory - Japan - Existing and New Chemical Substances (ENCS)

- Toluene : (3)-2, (3)-60

New Zealand Environmental Protection Authority, Inventory of Chemicals

- Inventory - New Zealand - Inventory of Chemicals (NZIoC)

- Toluene : HSNO Approval: HSR001227

Turkey Regulation on Inventory and Control of Chemicals

- Not applicable

Taiwan Chemical Substance Inventory

- Inventory - Taiwan - Taiwan Chemical Substance Inventory (TCSI)

- Toluene : Present

U.S. Toxic Substances Control Act

Vietnam National Chemicals Inventory (NCI)

- Inventory - Vietnam - National Chemicals Inventory (NCI) (DRAFT)

- Toluene : Present 01914

16. Other information

1) Reference

NCIS, KOSHA, Montreal Protocol, ECHA, OECD SIDS, EU IUCLID, HSDB(PubChem), NITE, NTP, ACGIH, IARC, NIOSH, ChemIDplus, EPA, EPI Suite, INCHEM

2) Issue date : 26-12-2022

3) Revision date

○ Revised date count : 3-1

○ Last revised date : 01-06-2026

4) Other

ACGIH : American Conference of Governmental Industrial Hygienists
ADR : Agreement Concerning the International Carriage of Dangerous Goods by Road
ATE : The Acute Toxicity Estimate
ECHA : European Chemicals Agency
EPA : United States Environmental Protection Agency
EPI Suite : The Estimation Programs Interface for Windows
EU IUCLID : International Uniform Chemical Information Database
HSDB : Hazardous Substances Data Bank
IARC : International Agency for Research on Cancer
IATA : International Air Transport Association
IMDG : International Maritime Dangerous Goods Codes
INCHEM : Internationally Peer Reviewed Chemical Safety Information
M-Factor : The Multiplication Factor
NIOSH : National Institute of Occupational Safety and Health
NITE : National Institute of Technology and Evaluation(JAPAN)
NTP : National Toxicology Program
SCL : Specific Concentration Limit
OECD SIDS : Organization for Economic Co-operation and Development Screening Information Dataset