

Material Safety Data Sheet Toluene

Section 1 - Product Identification

Synonym	: Methylbenzol, Phenylmethane, Toluol, Methylbenzene.
Chemical Formula	: C ₇ H ₈
Company Identification	: Tradeasia International Pte. Limited
Address	: 133 Cecil Street # 12-03 Keck Seng Tower, Singapore Tel: +65-6227 6365 Fax: +65-6225 6286 Email: contact@chemtradeasia.com
Recommended use	: Aviation gasoline and high-octane admixtures; benzene, phenol and caprolactam; coatings, pigments, raw rubber, resins, most oils, rubber, ethylene organic fine powder flux; dilution of nitrocellulose paint agents, thinners; adhesive solvents for plastic toys and model airplanes; chemicals (benzoic acid, benzyl and benzyl derivatives, saccharin, pharmaceuticals, dyes, fragrances),; sources of toluene diisocyanate (amino ethyl formate resin); explosives; toluenesulfonic acid (cleaning agent); scintillation counter substances.

Section 2 – Hazards Identification

2.1. Classification

Flammable Liquid: Category 2
Acute Toxicity: Category 4 (Oral)
Skin corrosion/irritation: Category 2
Serious eye damage/irritation: Category 2
Specific Target Organ - Repeated Exposure: Category 2
Acute aquatic toxicity: Category 3
Aspiration Hazard: Category 1

2.2. Label elements

Symbols/Pictograms



Signal Word

Danger

Hazard Statements

Highly flammable liquid and vapor
Harmful if swallowed
Causes skin irritation
Causes eye irritation

May cause kidney failure
Harmful to aquatic life
May be fatal if swallowed and enters airways

Precautionary Statements

Place the container in a well-ventilated place
Keep away from flammable substances - no smoking
Avoid contact with eyes
Wear appropriate protective clothing

2.3. Other hazards

Not available

Section 3 – Composition/Information on Ingredients

Chemical Name	EC No/CAS No	Purity, %
Toluene	108-88-3	min. 98

Section 4 – First-Aid Measures

4.1. Description of first aid measures

Eyes

Immediately gently brush or vacuum off excess of the chemical.
Hold the eyelids open and rinse the contaminated eye with warm, running water for 20 minutes.
Be careful not to let the contaminated water run into unaffected eye.
Get medical attention immediately.

Skin

Immediately gently brush or vacuum off excess of the chemical.
Wash skin thoroughly but gently with water and non-abrasive soap.
Remove contaminated clothing, shoes, and leather accessories (eg, watch straps, belts) when flushing the skin.
If irritation persists after rinsing, seek medical attention immediately.
Contaminated clothing, shoes, and leather accessories must be completely decontaminated before reuse or disposal.

Ingestion

Do not give anything by mouth if the patient is about to lose consciousness, has lost consciousness, or has convulsions.
If the patient is conscious, have the patient rinse the mouth thoroughly with water.
Do not induce vomiting.
Give the patient 240 to 300 ml of water.
If the patient vomits spontaneously, reduce the risk of aspiration by leaning forward, let them gargle and give water repeatedly.
Get medical attention immediately.

Inhalation

Take precautionary measures to ensure your own safety before rescue.
Remove sources of contamination or move victim to fresh air.
Immediately administer artificial respiration by a trained person if breathing stops; perform CPR if heart stops.

Get medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

Vapors may cause headache, fatigue, dizziness, numbness, nausea, and depress the central nervous system.

4.3. Protection of first responders

First aid should be performed in safe areas wearing Class C protective equipment.

4.4. Notes for physician

If swallowed, consider gastric lavage.

Section 5 – Fire Fighting Measures

5.1. Suitable Extinguishing media

Alcohol foam, dry chemical powder, carbon dioxide.

5.2. Specific hazards arising from the chemical

Its vapor and liquid are flammable, the liquid will accumulate electric charge, the vapor will be heavier than air and will spread to a distance, and may cause flashback in case of fire.

High temperature will cause decomposition and production of poisonous gas, and the container in the fire area may rupture and explode.

5.3. Special fire fighting procedures

Retreat completely and extinguish fire from a safe distance or protected location.

Position yourself upwind to avoid dangerous vapors and toxic decomposition products.

Stop the spill before putting out the fire. If the spill cannot be stopped and there is no danger around, let the fire burn out. If the spill is not stopped and put out the fire first, the vapor will form an explosive mixture with air and then ignite.

Isolate untouched material and protect personnel.

Move the container away from fire if it is safe to do so.

Cool fire exposed tanks or containers with water mist.

Fire fighting with water mist may not be effective unless firefighters are trained in fire fighting with various flammable liquids.

If the spill does not ignite, spray with water mist to disperse vapors and protect those trying to stop the spill.

Firefighting with water jets is ineffective.

For large-scale fires in large areas, use unmanned water mist control racks or automatic water swing.

Get as far away from the fire as possible and allow the fire to burn out.

Keep away from storage tanks.

Immediately leave the tank if the safety valve has sounded or is discolored by fire.

Persons not wearing special protective equipment are not allowed to enter.

5.4. Special protective equipment for firefighters

Firefighters must wear air breathing apparatus, fire suits and protective gloves.

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Restrict access to the contaminated area until it has been completely cleaned up.

Make sure clean-up is done by trained personnel.

Wear appropriate personal protective equipment.

6.2. Environmental precautions

Ventilate the area.

Extinguish or remove all ignition sources.

Notify government safety, health and environmental protection units.

Avoid spills entering sewers or confined spaces.

6.3. Methods and material for containment and cleaning up

Do not touch spills.

Where safety permits, try to prevent or reduce spillage.

Contain spillage with soil, sand, or similar stable, non-flammable material that will not react with spillage.

When a small amount of spillage occurs, absorb it with an absorbent that will not react with the spillage.

Contaminated absorbents are equally hazardous as spills and must be placed in properly capped and labeled containers. Flush spill area with water.

In the event of a large spill: Contact fire, emergency response units and suppliers for assistance.

Section 7 – Handling and Storage

7.1. Precautions for safe Handling

This substance is a flammable and toxic liquid. Engineering controls should be used and personal protective equipment should be used during disposal; workers should be properly

Sex and safe use training.

Remove all sources of ignition and keep away from heat and incompatibilities.

Work areas should have a "No Smoking" sign.

Liquids can accumulate charge, hence consider additional designs to increase conductivity. All barrels, transfer containers and pipelines must be grounded, the grounding must be in contact with bare metal. During the conveying operation, the flow rate should be reduced, the operation time should be increased, the time the liquid remains in the pipeline should be increased, or the operation should be performed at low temperature.

When dispensing operations are not performed in a closed system, ensure that the dispensing vessel and the receiving conveying equipment and vessel are equipotentially connected.

Empty tubs, containers, and lines may still contain hazardous residues, and no welding, cutting, drilling, or other hot work should be performed until they have been cleaned.

Drums or storage containers can be filled with inert gas to reduce the risk of fire and explosion.

Use a ventilation system that does not produce sparks in the workplace, and the equipment should be explosion-proof.

Keep walkways and exits clear.

For storage areas and heavily operated areas, consider installing spill and fire detection systems and appropriate automatic fire protection systems or adequate and available emergency treatment equipment. The operation should avoid the generation of fog droplets or vapors, operate in a well-ventilated designated area with minimum usage, and separate the operation area from the storage area.

Wear appropriate personal protective equipment as necessary to avoid contact with this chemical or contaminated equipment.

Do not use incompatible materials (such as strong oxidizers) that increase the risk of fire and explosion.

Use storage containers made of compatible substances and be careful not to spray when dispensing.

Do not pressurize liquids from containers with air or inert gas.

Do not carry out compounding work in storage areas unless the compounding area is isolated by a refractory structure.

Use approved flammable liquid storage containers and dispensing equipment.

Do not return contaminated liquids to original storage containers.

Containers should be labeled, kept tight and protected from damage when not in use.

7.2. Conditions for safe storage, including any incompatibilities

Store in a cool, dry, well-ventilated place where direct sunlight cannot be exposed, away from heat, ignition sources and incompatible materials.

Storage equipment should be constructed of refractory materials.

Floors should be constructed of impermeable materials to avoid absorption from the floor.

Set up slopes or thresholds or trenches at doorways so that spills can be drained to a safe place.

Storage areas should be clearly marked, free of obstructions, and accessible to designated or trained personnel.

The storage area should be separated from the work area; store away from lifts, buildings, room exits or main passages.

Appropriate fire extinguishers and equipment for cleaning up spills should be available near the storage area.

Periodically inspect storage containers for damage or leaks.

Check that all incoming containers are properly labeled and undamaged.

Limited storage.

Contain spills in storage containers made of compatible materials.

The tank is grounded and equipotentially connected to other equipment.

All drums storing flammable liquids should be fitted with pressure relief and vacuum relief valves.

Store according to the storage temperature recommended by the chemical manufacturer or supplier. If necessary, a temperature detection alarm can be installed to warn whether the temperature is too high or too low.

Avoid storing in large quantities indoors, and store in isolated fireproof buildings as much as possible.

The exhaust pipe of the storage tank should be equipped with a flame arrester.

The storage tank must be a ground storage tank, the entire bottom area should be sealed to prevent leakage, and there must be a liquid-proof embankment that can contain the entire capacity.

Section 8 – Exposure Controls/Personal Protection

8.1. Appropriate engineering controls

Use only a non-sparking, grounded ventilation system.

The exhaust port must lead directly to the outside and make sure you take important measures to protect the environment.

Local exhaust and process containment may be required when this substance is used in large quantities.

Sufficient fresh air is supplied to supplement the air drawn by the exhaust system.

8.2. Individual protection measures, such as personal protective equipment (PPE)

Skin protection

The material of impermeable gloves is preferably PVC, Teflon, Viton, 4H, Barricade, Responder, etc.

Body Protection

One-piece protective clothing.

Work shoes.

Shower/eye rinsing equipment is available in the work area.

Respiratory protection

Below 500ppm: chemical canister type, powered air purification type, air supply type, self-contained respiratory protective equipment containing organic vapor canister.

Unknown concentration: positive pressure self-contained respiratory protective equipment, positive pressure full-scale air-supplied respiratory protective equipment supplemented by positive pressure self-contained respiratory protective equipment.

Evacuation: gas mask containing organic vapor filter canister, escape type self-contained respiratory protective equipment.

Hygiene measures

Take off contaminated clothing as soon as possible after work, wash it before wearing it or discard it, and inform the laundry staff of the danger of contamination.

Smoking or eating and drinking are strictly prohibited in the workplace.

Wash hands thoroughly after handling this item.

Keep the workplace clean.

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State: Clear liquid

Appearance: Colorless

Odor: Aromatic specific smell

Odor threshold: 0.16-37ppm (detection), 1.9-69ppm (detection)

pH: Not available

Vapor Pressure: 22 mmHg @20°C

Vapor Density: 3.1 (air=1)

Explosion limits: 1.2 % ~ 7.1 %

Evaporation rate: 2.24 (butyl acetate = 1)

Flammability: Not available

Boiling Point: 110.6 °C

Flash point : 4.4 °C (closed cup)

Melting Point: -95°C

Decomposition Temperature: Not available

Octanol/Water Partition Coefficient : 2.73

Auto-ignition temperature : 480°C

Solubility: 54~58 mg/100 ml (water)

Density: 0.86

Section 10 – Stability and Reactivity

10.1. Reactivity

Stable under normal temperatures and pressures.

10.2. Chemical stability

Stable under normal temperatures and pressures.

10.3. Possibility of hazardous reactions

Strong Oxidizers: Increases Fire and Explosion Hazards.

Mixtures of toluene and dinitrogen tetroxide: May be initially detonated by impurities.

Nitric Acid: Reacts violently in the presence of sulfuric acid.

Sulfuric acid: Exothermic reaction.

Perchlorates: Forms explosive mixtures.

Sulfur dichloride: Violent reaction, iron or ferric chloride will accelerate the reaction.

4-Nitromethane: Forms sensitive, explosive mixtures.

Uranium hexafluoride: Violent reaction.

10.4. Conditions to avoid:

Static electricity, flame, sparks, heat and ignition sources.

10.5. Incompatible materials

Perchlorate, Sulfur Dichloride, 4-Nitromethane, Uranium Hexafluoride, Strong Oxidizers, Nitrous Oxide, Nitric Acid, Sulfuric Acid.

10.6. Hazardous decomposition products

Not available.

Section 11 – Toxicological Information

11.1. Health effects associated with ingredients

Acute toxicity

LD50: <870 mg/kg (rat, swallowed)

LC50: 6000 ppm/6H (rat, inhalation)

11.2. Symptoms

Irritation, lethargy, headache, fatigue, dizziness, numbness, nausea, confusion, incoordination, depression of central nervous system, unconsciousness, dermatitis.

11.3. Acute toxicity

Inhalation

Vapor concentration about 50ppm: slight drowsiness and headache; 50-100ppm: irritation of nose, throat and respiratory tract; about 100ppm: cause fatigue and dizziness more than 200ppm; cause: symptoms similar to drunkenness, dizziness, numbness and mild nausea.

Over; 500ppm causes confusion and incoordination; higher concentrations (about 10000ppm) further depress the central nervous system, causing unconsciousness and death; more severe exposure may cause kidney failure.

Ingestion

Absorbed from ingestion, resulting in inhibition of the central nervous system, symptoms as described in inhalation.

May cause aspiration, which is the inhalation of material into the lungs when ingested or vomited, which may cause lung irritation, damage to lung tissue and death.

Eye contact

Brief (3-5 minutes) exposure to 300ppm vapor or prolonged (6-7 hours) exposure to 100ppm can cause mild irritation.

Skin contact

Initial exposure may cause mild irritation, prolonged exposure may cause dermatitis (dry, red skin).

11.3. Chronic or long-term toxicity

Nervous System: Chronic damage to the central nervous system, memory loss, disturbed sleep, lack of willpower and uncoordinated movements.

Long-term exposure may affect hearing.

Long-term exposure below 200ppm has no apparent renal damage; below 500ppm no liver effects.

Causes dermatitis (red, itchy, dry skin).

During testing, 1500mg/m³/24H (female rats 1-8 days of pregnancy, inhalation) caused embryotoxicity and abnormal development.

IARC classifies it as Group 3: Cannot be classified carcinogenic to humans

Section 12 – Ecological Information

12.1. Ecotoxicity

LC50 (fish): 7.3-22.8mg/l/96H

EC50 (Aquatic Invertebrates): Not Available

Bioconcentration Factor (BCF): 1.67-380

12.2. Bioaccumulative potential

In the rat experiment, after inhaling 300ppm, there is no accumulation in the body.

12.3. Mobility in soil

Not available

12.4. Persistence and Degradability

When toluene is released into the air, it can be rapidly decomposed by reacting with photochemical hydroxyl groups.

Its half-life can range from three hours to one day. However, this material can decompose as soon as it is washed by rain.

Toluene was found to be rapidly decomposed in various standard biodegradability tests.

Toluene has no obvious bioconcentration in fish and invertebrates in water.

Half-life (air): 10 to 104 hours

Half-life (water surface): 96-528 hours

Half-life (groundwater): 168 to 672 hours

Half-life (soil): 96 to 528 hours

12.5. Other adverse effects

Not available

Section 13 – Disposal Considerations

13.1. Disposal methods

Refer to relevant regulations for handling.

Store waste to be disposed of according to storage conditions.

Can be disposed of by specific incineration or sanitary landfill methods.

Section 14 – Transport Information

14.1. Transport Regulations

UN number	UN1294
UN proper shipping name	Toluene
Transport hazard class(es)	Class 3 flammable liquids
Packing Group	II
Marine Pollutant	No

Section 15 – Regulatory Information

15.1. Safety, health and environmental regulations

1. Rules for Occupational Safety and Health Facilities
2. Hazardous chemicals labelling and communication rules
3. Organic solvent poisoning prevention rules
4. Tolerable exposure standards for labor workplaces
5. Road traffic safety rules
6. Methods and facility standards for storage, removal and disposal of industrial waste
7. Setting standards and safety management measures for public dangerous goods and flammable high-pressure gases
8. Designation and Operational Management of Priority Management Chemicals
9. Types of industrial raw materials for pioneer chemicals and methods for declaration and inspection

Section 16 : Additional Information

16.1. List of abbreviation and acronyms used in this MSDS

SDS : Safety Data Sheets

Index N° : atomic number of the element most characteristic of the properties of the substance

CAS No : Chemical Abstracts Service number

EC No : EINECS Number : European Inventory of Existing Commercial Substances

Repr. Cat. 2 : Substance presumed human reproductive toxicant

Acute Oral Cat. 5 : Substance which is of relatively low acute oral toxicity.

GHS : Globally Harmonised System of Classification and Labelling

LD₅₀ : Median Lethal Dose

LC₅₀ : Lethal Concentration, 50%

N.A. : Not Applicable

OSHA : Occupational Safety & Health Administration

Cal OSHA : The State of California Division of Occupational Safety and Health (DOSH)

PEL : Permissible Exposure Limits

ACGIH : American Conference of Governmental Industrial Hygienists

TLV : Threshold Limit Value

Japanese MITI : Japanese Ministry of International Trade and Industry

EC₅₀ : Half maximal effective concentration

UN : United Nations

U.S. EPA TSCA Inventory: Inventory of the chemical substances manufactured or processed in the United States according to Toxic Substances Control Act compiled and published under the authority of the Environmental Protection Agency

Canadian DSL: Canadian Domestic Substances List

16.2. References

1. CHEMINFO database, CCINFO CD, 2005-3
2. HAZARDTEXT database, TOMES PLUS CD, Vol.65, 2005
3. RTECS database, TOMES PLUS CD, Vol.65, 2005
4. HSDB database, TOMES PLUS CD, Vol.65, 2005
5. Chinese Database of Hazardous Chemical Substances, Environmental Protection Agency
6. ChemWatch database, 2005-1

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