

## Safety Data Sheet

### 1. Product and company identification

Product name : Toluene  
Name of manufacturer : KANTO CHEMICAL CO., INC.  
Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, Japan  
Name of section : Electronic materials division technical department  
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SDS No. : GE00023

### 2. Summary of danger and Hazard

#### GHS classification

##### Physical and chemical hazard

Flammable liquids : Category 2  
Pyrophoric liquids : Out of category

##### Human health hazard

Acute toxicity(oral) : Out of category  
Acute toxicity(dermal)  
: Out of category

Acute toxicity(inhalation:vapors)  
: Category 4

Skin corrosion/irritation  
: Category 2

Serious eye damage/eye irritation  
: Category 2B

Skin sensitization : Out of category

Reproductive toxicity  
: Category 1A

Specific target organ systemic toxicity(single exposure)  
: Category 1 , Category 3 (respiratory tract irritation) , Category 3 (anesthetic action)

Specific target organ systemic toxicity(repeated exposure)  
: Category 1

Aspiration hazard : Category 1

##### Environmental hazard

Hazardous to the aquatic environment-acute hazard  
: Category 2

Hazardous to the aquatic environment-chronic hazard  
: Category 3

Pictogram or symbol



Signal word

: Danger

Hazard statement

: Highly flammable liquid and vapor

Harmful if inhaled

Causes skin irritation

Causes eye irritation

May damage fertility or the unborn child

May cause harm to breast-fed children

Causes damage to organs (central nervous system)

May cause respiratory irritation

May cause drowsiness and dizziness

Causes damage to organs (central nervous system, kidney) through prolonged or repeated exposure

May be fatal if swallowed and enters airways

Toxic to aquatic life

Harmful to aquatic life with long lasting effects

Cautions

Safety measurements

: Do not handle until all safety precautions have been read and understood.

Keep away from ignition sources such as heat, sparks, or open flame.

Keep containers tightly closed.

Ground container and receiving equipment in case of transport and stirring.

Use explosion-proof apparatus.

Use only non-sparking tools.

Do not breathe dust, mist, and vapor.

Avoid contact during pregnancy and while nursing.

Use only in a well-ventilated area.

Avoid release to the environment.

Do not eat, drink or smoke when using this product.

Wear appropriate protective gloves, glasses, clothing, face shield, or mask.

Wash protective equipment thoroughly after use.

Wash hands thoroughly after handling.

First-aid measures

: If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical treatment if you feel unwell.

If swallowed: Rinse mouth, do not induce vomiting. Immediately get medical treatment.

If in eyes : Rinse cautiously with water for several minutes. Get medical treatment.

If on skin : Remove contaminated clothing and the substance. Get medical treatment, if you feel unwell.

Wash hands thoroughly after handling.

If exposed, get medical treatment.  
Get medical treatment, if you feel unwell.

Storage : Tightly container closed and store in a well-ventilated area.  
Store locked up.

Disposal : Dispose of contents and containers appropriately in accordance with related regulations.

### 3. Composition/Information on ingredients

Substance/Mixture : Substance  
Chemical name or commercial name : Toluene  
Synonyms : Methylbenzene, Toluol  
Ingredients and composition : Toluene min. 99.5%  
Chemical formula : C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>  
CAS No. : 108-88-3  
TSCA Inventory : Registered  
EINECS No. : 2036259  
Dangerous and hazardous ingredients : Toluene

### 4. First aid measures

Inhalation : Remove the victim to fresh air, and make him blow his nose and gargle.

Skin contact : Wash the affected areas under running water.

Eye contact : Wash the affected areas under running water for at least 15 minutes.  
If necessary, get medical treatment.

Ingestion : The chemical is volatile. Do not induce vomiting because it increases the risk of aspiration into the lungs. Get medical attention immediately. If necessary, rinse mouth with water.

Protection for first aid person : Rescuers should wear proper protective equipment like rubber gloves, goggles.

### 5. Fire fighting measures

Extinguishing media : Dry chemical powder, carbon dioxide, dry sand, foam  
Prohibited extinguishing media : Water spray

Particular fire fighting : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Foam extinguisher is effective for a large scale fire.

Protection for firefighters : Wear breathing apparatus.

### 6. Accidental release measures

Cautions for personnel : Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

Cautions for environment : Attention should be given to avoid discharge of spilled product into rivers and resulting environmental damage. When diluting spill with large amounts of water, discharge of untreated wastewater into the environment must be avoided.

Removal measure : Absorb spill with inert material (e.g., diatomaceous earth, sand) and flush spillage area with copious amounts of water.

Prevention of second accident

: Remove nearby sources of ignition and prepare extinguishing media.

## 7. Cautions of handling and storage

Handling

Engineering measures : As toluene has easily static electricity, earth the pipes, hoses, bottles when transporting.

Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited.

Ventilate well at working places.

Cautions for safety handling

: Use with an enclosed system or a local exhaust ventilation. Use in well-ventilated areas.

Cautions : Do not allow contact with oxidizing substances.

Storage

Adequate storage condition

: Store in a dark, cool place and tightly closed.

Safety adequate container materials

: Glass, SUS

Do not use vinyl chloride resin, acrylic resin, polystyrene etc.

## 8. Exposure control/Personal protection

Engineering measures : Use with an enclosed system or a local exhaust ventilation.

Control parameters

ACGIH (2015) : 20ppm (TLV-TWA)

Transdermal absorption

Protective equipment

Respiration protective equipment

: Chemical cartridge respirator with an organic vapor cartridge or airline respirator

Hands protective equipment

: Impervious protective gloves

Eyes protective equipment

: Safety goggles

Skin and body protective equipment

: Protective clothing, protective boots

## 9. Physical and chemical properties

Appearance : Liquid  
Color : Colorless  
Odor : Aromatic odor  
pH : Not available  
Boiling point : 110.6°C  
Melting point : -95°C  
Flash point : 4.4°C  
Auto-ignition point : 536°C  
Explosion characteristics  
Explosion limit : upper : 7.1vol% lower : 1.2vol%  
Vapor pressure : 13.3hPa (27°C)  
Vapor density : 3.2  
Density : 0.867g/cm<sup>3</sup> (20°C)  
Solubility  
Solubility in solvents : Water : 0.045% (20°C)  
Miscible with many kinds of organic solvents.  
log Pow : 2.69  
Other data : Viscosity : 0.5866cP (20°C)

#### 10. Stability and reactivity

Stability : Stable under normal conditions.  
Reactivity : May react with oxidizing substances.  
Incompatible conditions : Light, heat  
Incompatible materials : Oxidizing substances  
Hazardous decomposition products  
: Carbon monoxide

#### 11. Toxicological information

Acute toxicity : Oral : Out of category  
Dermal : Out of category  
Harmful if inhaled(vapor) (category 4)  
Inhalation(dust, mist) : Not possible to classify because of insufficient data.  
rat oral LD50=5000mg/kg  
rat inhalation LC50=4000ppm/4H(vapor)  
rat skin LD50=12000mg/kg

Skin corrosion/irritation : Causes skin irritation(category 2)

In a semi-occlusive application test in which the substance 0.5mL was applied to seven rabbits for 4 hours, by 72 hours all animals exhibited erythema, ranging from very slight to severe, and slight oedema. On day 7, erythema ranged from well-defined to severe for all animals, and oedema ranged from very slight to slight for 5 animals. Thus, the substance was classified into category 2 based on evidence of moderate irritation.

Serious eye damage/eye irritation

: Causes eye irritation(category 2B)

In an ocular irritation test in which the substance 0.1mL was applied to six rabbits, redness, chemosis, and discharge were observed in all six animals 1 hour after exposure, and the symptoms persisted 24, 48 hours after exposure, and then irritation decreased. Only redness was observed 72 hours after exposure, and all animals were free of ocular irritation on day 7. Thus, the substance was classified into category 2B based on evidence of mild irritation.

Respiratory sensitization or Skin sensitization

: Respiratory sensitization : Not possible to classify because of insufficient data.

Skin sensitization : Out of category

No skin sensitization by maximization test with guinea pig.

Mutagenicity

: Not possible to classify because of insufficient data.

There are two negative data on dominant lethal studies in mice by oral or inhalation administration (germ cell mutagenicity tests in vivo), five negative data on chromosome aberration tests in mouse or rat bone-marrow cells by oral, inhalation or intraperitoneal administration (somatic cell mutagenicity tests in vivo), and two negative data on micronucleus examinations in mouse bone-marrow cells by oral or intraperitoneal administration (somatic cell mutagenicity tests in vivo).

Carcinogenic effects

: Not possible to classify because of insufficient data

IARC classifies it as group 3(not classifiable as to its carcinogenicity to humans).

Effects on the reproductive system

: May damage fertility or the unborn child(category 1A)

May cause harm to breast-fed children

Human epidemiological studies suggest increased incidence of natural abortion after toluene exposure, abnormal development and malformation of newborns caused by prenatal toluene abuse and decreased plasma concentrations of luteinizing hormone and testosterone after toluene exposure. Based on the description that "toluene easily crosses the placenta and is secreted into breast milk", "Additional category: Effects on and via lactation" was added.

Specific target organ systemic toxicity single exposure

: Cause damage to organs (central nervous system) (category 1)

May cause respiratory irritation(category 3) - May cause drowsiness and dizziness(category 3)

Human studies have shown that following inhalation exposure to 750mg/m<sup>3</sup> for 8 hours, muscle weakness, confusion, dyssynergia, and mydriasis were noted, and at 3000ppm, severe fatigue, marked nausea, and mental confusion were noted, and severe incidental exposure resulted in coma. In addition, there are many reports that the substance adversely affects central nervous system. Thus, it was classified into category 1 (central nervous system). Meanwhile, it is well known that acute exposure of humans to high concentrations of the substance easily causes anesthetic actions, and there are many cases of workers who lost consciousness due to the substance vapor. Moreover, there is animal evidence of anesthetic actions following inhalation exposure to mice or rats. Thus, it was classified into category 3 (anesthetic actions). Furthermore, human volunteers exposed to a low concentration (200ppm) developed transient, mild upper respiratory irritation. Thus, it was classified into category 3 (respiratory tract irritation).

Specific target organ systemic toxicity repeated exposure

: Cause damage to organs (central nervous system, kidney) through prolonged or repeated exposure(category 1)

Based on the human evidence including toluene induces drug dependency, and inhalant abuse of toluene causes chronic central nervous system damage including restricted vision, headache associated with nystagmus and hearing loss, tremor, ataxia and amnesia. Furthermore renal dysfunction manifested as proteinuria and hematuria was also observed. Thus, it was classified into category 1 (central nervous system, kidney).

Aspiration hazard : May be fatal if swallowed and enters airways(category 1)

Since toluene is a hydrocarbon and its dynamic viscosity is 0.86mm<sup>2</sup>/S (40 °C), it is classified into category 1.

12. Ecological information

Ecotoxicity

Fish toxicity

: Toxic to aquatic life(category 2)

Harmful to aquatic life with long lasting effects(category 3)

Crustacea(Ceriodaphnia dubia) EC50=3.78mg/L/48H

Persistence and degradability

: High biodegradability

123% by BOD

Bioaccumulative potential : Low or no bioaccumulative potential in fish or shells

Mobility in soil : It is expected to have moderate mobility in soil (Koc:270).

13. Disposal consideration

Residual disposal

: Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.

Containers

: In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

UN class

: Class 3(Flammable liquids) P. G. II

UN number

: 1294

Marine regulation information

UN No. : 1294  
Proper shipping name : TOLUENE  
Class : 3  
Sub risk : -  
Packing group : II  
Marine pollutant : Not applicable

Aviation regulation information

UN No. : 1294  
Proper shipping name : Toluene  
Class : 3  
Sub risk : -  
Packing group : II

15. Regulatory information

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information

References

Dictionary of Organic Compounds, The society of Synthetic Organic Chemistry, Kodansha Ltd. (1985)

Dangerous Properties of Industrial Materials, 6th ed. N. I. Sax Van Nostrand Reinhold Company (1984)

Handbook of Dangerous Substances Springer-Verlag Tokyo (1991)

Handbook of 16817 Chemical Products, The Chemical Daily Co. (2017)

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z7253, and it has the same required elements on the Material Safety Data Sheet (MSDS) which is prepared based on JIS Z7250:2010.