

Safety Data Sheet

Section 1. Identification of the substance/mixture and of the company/undertaking

Product identifier:

Product name: 2,4-Tolylene diisocyanate

Reference number(SDS): 33377jis_J_E1-2

Product type:

Reagent

Recommended use of the chemical and restrictions on use

Recommended uses: Research and Development

Restrictions on uses: Do not use for other purposes.

Details of the supplier of the safety data sheet

Manufacturer/Supplier: JUNSEI CHEMICAL CO., LTD.

Address: 1-6, Ohmano-cho, Koshigaya-shi, Saitama 343-0844, Japan

Division: Quality Assurance Department

Telephone number: +81-48-986-6161

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e-mail address: shiyaku-t@junsei.co.jp

Section 2. Hazards identification

Classification of the substance or mixture**PHYSICAL AND CHEMICAL HAZARDS**

Self-reactive substances and mixtures: Type G

HEALTH HAZARDS

Acute toxicity (Inhalation): Category 1 (vapors)

Acute toxicity (Inhalation): Category 2 (dust/mist)

Skin corrosion/irritation: Category 2

Serious eye damage/eye irritation: Category 2

Respiratory sensitization: Category 1

Skin sensitization: Category 1

Carcinogenicity: Category 2

Specific target organ toxicity – single exposure: Category 1 (respiratory organs)

Specific target organ toxicity – repeated exposure: Category 1 (respiratory organs)

ENVIRONMENT HAZARDS

Hazardous to the aquatic environment, short-term (acute): Category 3

Hazardous to the aquatic environment, long-term (chronic): Category 3

(Note) GHS classification without description: Not classified/Classification not possible

Label elements**Hazard pictograms:**

Signal word: Danger

Hazard statements

H330–Fatal if inhaled (dust/mist/vapors)

H315–Causes skin irritation

H319–Causes serious eye irritation

H334–May cause allergy or asthma symptoms or breathing difficulties if inhaled

H317–May cause an allergic skin reaction

H351-Suspected of causing cancer

H370-Causes damage to organs (respiratory organs)

H372-Causes damage to organs through prolonged or repeated exposure (respiratory organs)

H402-Harmful to aquatic life

H412-Harmful to aquatic life with long lasting effects

Precautionary statements

Prevention

Obtain, read and follow all safety instructions before use.

Avoid release to the environment.

Do not breathe dust/mist/vapors.

In case of inadequate ventilation wear respiratory protection.

Use only outdoors or in a well-ventilated area.

Wash hands thoroughly after handling.

Contaminated work clothing should not be allowed out of the workplace.

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

Wash hands thoroughly after handling. Do not touch eyes.

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

Response

IF exposed or concerned: Get emergency medical help immediately.

Get emergency medical help immediately.

IF exposed or concerned, get medical advice.

Get medical help if you feel unwell.

If experiencing respiratory symptoms: Get emergency medical help immediately.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

IF ON SKIN: Wash with plenty of water.

If skin irritation or rash occurs: Get medical help.

Take off contaminated clothing and wash it before reuse.

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 help.

Storage

Store in a well-ventilated place. Keep container tightly closed.

Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3. Composition/information on ingredients

Substance/mixture:

Substance

Common name, synonyms: 4-Methyl-1,3-phenylene diisocyanate; 2,4-Diisocyanatotoluene

Ingredient name: 2,4-Tolylene diisocyanate

Content (%): 100

Chemical formula: C₉H₆N₂O₂

ENCS: 3-2214

CAS No.: 584-84-9

MW: 174.16

EC No.: 209-544-5

Note : The figures shown above are not the specifications of the product.

Section 4. First aid measures

Descriptions of first aid measures

General measures

IF exposed or concerned, get medical advice.
IF exposed or concerned: Get emergency medical help immediately.
Keep victim warm and quiet.
Call emergency medical service.
Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
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.

IF INHALED

IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Give artificial respiration if victim is not breathing.
Administer oxygen if breathing is difficult.
Get emergency medical help immediately.
IF INHALED: Get medical help.

IF ON SKIN

IF ON SKIN: Take off immediately all contaminated clothing. Immediately rinse with water for several minutes.
IF ON SKIN: Wash with plenty of water.
If skin irritation or rash occurs: Get medical help.
For minor skin contact, avoid spreading material on unaffected skin.
Remove and isolate contaminated clothing and shoes.

IF IN EYES

IF IN EYES: Immediately rinse with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical help.

IF SWALLOWED

Rinse mouth.
IF SWALLOWED: Get medical help.

Most important symptoms and effects, both acute and delayed

(Symptoms when inhalation or ingestion)

Abdominal pain. Headache. Cough. Sore throat Vomiting. Shortness of breath. Laboured breathing.

(Symptoms when skin and/or eye contact)

Conjunctival redness of the eyes. Redness of the skin. Pain. Blurred vision. Blisters.

Indication of any immediate medical attention and special treatment needed

Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.
Specific treatment is urgent.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

In case of fire, use dry powder, CO₂, water mist in large quantities to extinguish.

Unsuitable extinguishing media

Do not use direct water jet.

Specific hazards arising from the substance or mixture

Containers may explode when heated.
Fire may produce irritating, corrosive and/or toxic gases.
Runoff from fire control or dilution water may cause pollution.
Containers may explode if contaminated with water.

Advice for firefighters

Special extinguishing method

- Evacuate non-essential personnel to safe area.
- Apply water from a safe distance to cool and protect surrounding area.
- NO direct contact with water.

Special protective equipment and precautions for fire-fighters

- Wear fire resistant or flame retardant clothing.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Firefighters should wear self-contained breathing apparatus with a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- Keep unauthorized personnel away.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ventilate area until material pick up is complete.
- Wear proper protective equipment.
- PUBLIC SAFETY: Ventilate closed spaces before entering.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- EVACUATION : Spill: See the Table of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Environmental precautions

- Avoid release to headsprings, rivers, lakes, ocean and groundwater.

Methods and materials for containment and cleaning up

- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Cover with DRY earth, DRY sand, or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- All equipment used when handling the product must be grounded.

Preventive measures for secondary accident

- Collect spillage.
- Stop leak if you can do it without risk.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Prevent entry into waterways, sewers, basements or confined areas.
- DO NOT GET WATER on spilled substance or inside containers.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Keep out of low areas.

Reference to other sections

- Refer to section 8
- Refer to section 13

Section 7. Handling and storage

Engineering measures

- (Measures to prevent operator exposure)
 - Do not breathe dust/mist/vapors.
- (Measures to prevent fire and explosion)
 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- (Local ventilation/general ventilation)
 - Exhaust/ventilator should be available.

(Precautions)

Avoid contact with skin.

Avoid contact with eyes.

Advice on safe handling

Obtain, read and follow all safety instructions before use.

Use only outdoors or in a well-ventilated area.

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

Use personal protective equipment as required.

When using do not eat, drink or smoke.

Reaction with water or moist air will release toxic, corrosive or flammable gases.

Reaction with water may generate much heat which will increase the concentration of fumes in the air.

Avoidance of contact

See Section 10: Stability and Reactivity.

Advice on general occupational hygiene

Do not get in eyes, on skin, or on clothing.

Wash hands thoroughly after handling. Do not touch eyes.

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

Contaminated work clothing should not be allowed out of the workplace.

Take off contaminated clothing and wash it before reuse.

Conditions for safe storage

Keep container tightly closed.

Keep cool.

Store in accordance with local/regional/national/international regulations.

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

Incompatible substances

Refer to Section 10. Stability and reactivity.

Safe packaging material

Keep only in original packaging.

Specific end use(s)

See information in Section 7.1 and 7.2 for handling and storage recommendations. See Section 8 for exposure controls and personal protection recommendations.

Section 8. Exposure controls/personal protection

Permissible concentration

Control value and Concentration standard value under ISHA

Japan control value 0.005ppm

Occupational exposure limit values

JSOH

0.005ppm, 0.035mg/m³; (Ceiling) 0.02ppm, 0.14mg/m³

ACGIH

TWA: 0.001ppm(IFV); STEL: 0.005ppm(IFV) (Asthma; pulm func; eye irr)

Notation

Skin; DSEN; RSEN

Exposure controls

Appropriate engineering controls

Do not use in areas without adequate ventilation.

Eye wash station should be available.

Washing facilities should be available.

Individual protection measures, such as personal protective equipment

Respiratory protection

Select and wear respiratory protection in accordance with approved standards (e.g. JIS T8150).

Recommended respiratory protection: Self-Contained Breathing Apparatus (SCBA)

Hand protection

Wear protective gloves. Recommended material(s): butyl rubber, viton

Inspect before use and replace worn or damaged gloves.

Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions.

Chemical-resistant, impervious gloves complying with an approved standard (e.g. JIS T8116) should be used.

Eye/face protection

Wear safety glasses with side-shields.

Wear eye/face protection in accordance with approved standards (e.g. JIS T8147).

Skin and body protection

Wear impervious clothing and boots in case of repeated or prolonged treatment.

Personal protective equipment for the body and skin should be selected based on the task being performed and the risks involved.

Section 9. Physical and Chemical Properties**Information on basic physical and chemical properties**

Physical state: Liquid or crystals

Color: Colorless~Pale yellow

Odor: Pungent odor

Odor threshold: 0.4~2.14ppm; 3.2~17.12mg/m³

Melting point/Freezing point: >=21°C(freezing point)

Boiling point or initial boiling point and boiling range: 251°C

Flammability: Ignitable

Lower and upper explosion limit:

Lower explosion limit: 0.9 vol %

Upper explosion limit: 9.5 vol %

Flash point: Not measurable 127°C(Closed cup)

Auto-ignition temperature: 620°C

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: Reaction(hydrolysis)

Solubility in solvent: Miscible with alcohol (decomposition). Miscible with ether, acetone, benzene, carbon tetrachloride, chlorobenzene.

Partition coefficient n-octanol/water (log value): 3.4

Vapor pressure: 1.3 Pa (20°C)

Density and/or relative density: 1.22g/cm³(20°C)

Relative vapor density (Air=1): 6.0

Relative density of the Vapor/air – mixture at 20°C (Air = 1): 1.00

Particle characteristics data is not available.

Section 10. Stability and Reactivity**Reactivity**

React with water.

Chemical stability

Stable under normal storage/handling conditions.

Turns pale yellow on exposure to air.

Possibility of hazardous reactions

The substance polymerizes with water and many chemicals in a hazardous way. This generates fire or explosion hazard.

On combustion, forms toxic gases. This generates toxic hazard.

Conditions to avoid

Avoid direct sunlight, fire, flame, high temperature.

Contact with incompatible materials.

Incompatible materials

Acids, Bases, Oxidizing agents, Amines, Acyl chlorides, Water, Alcohols.

Hazardous decomposition products

Carbon oxides, Nitrogen oxides

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Product]

Based on available data, the classification criteria are not met.

[Data for components of the product]

[NITE-CHRIP]

rat LD50: 5800 mg/kg (source: NITE)

Acute toxicity (Dermal)

[Product]

Based on available data, the classification criteria are not met.

[Data for components of the product]

[NITE-CHRIP]

rabbit LD50: 10000 mg/kg (source: NITE)

Acute toxicity (Inhalation)

[Product]

Category 1, Fatal if inhaled (vapor)

Category 2, Fatal if inhaled (dust/mist)

[Data for components of the product]

[NITE-CHRIP]

vapor/mist: rat LC50: 13.9 – 49.8 ppm (test substance: commercial-grade TDI

(2,4-TDI : 2,6-TDI(this substance) = 80 : 20)) (source: NITE)

Skin corrosion/irritation

[Product]

Category 2, Causes skin irritation

[Data for components of the product]

[NITE-CHRIP]

Category 2 (source: NITE)

Serious eye damage/irritation

[Product]

Category 2, Causes serious eye irritation

[Data for components of the product]

[NITE-CHRIP]

Category 2 (source: NITE)

Respiratory or skin sensitization

Respiratory sensitization

[Product]

Category 1, May cause allergy or asthma symptoms or breathing difficulties if inhaled

[Data for components of the product]

[NITE-CHRIP]

Category 1 (source: NITE)

Skin sensitization

[Product]

Category 1, May cause an allergic skin reaction

[Data for components of the product]

[NITE-CHRIP]

Category 1 (source: NITE)

Germ cell mutagenicity

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Carcinogenicity

[Product]

Category 2, Suspected of causing cancer

[Data for components of the product]

[NITE-CHRIP]

Category 2 (source: NITE)

[IARC]

Group 2B : Possibly carcinogenic to humans

[ACGIH]

A3: Confirmed Animal Carcinogen with Unknown Relevance to Humans

[JSOH]

Group 2B: The agents which are probably or possibly carcinogenic to humans

[NTP]

(2,4-Tolylene diisocyanate)

RAHC : Reasonably Anticipated to be Human Carcinogens

[EU]

Category 2; Substances suspected human carcinogens

Reproductive toxicity

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Specific target organ toxicity – single exposure

[Product]

Category 1, Causes damage to organs

[Data for components of the product]

[NITE-CHRIP]

Category 1 (respiratory system) (source: NITE)

Specific target organ toxicity – repeated exposure

[Product]

Category 1, Causes damage to organs through prolonged or repeated exposure

[Data for components of the product]

[NITE-CHRIP]

Category 1 (respiratory system) (source: NITE)

Aspiration hazard

[Product]

Classification not possible (Insufficient data available or no data available).

[Data for components of the product]

No data available.

Section 12. Ecological Information

Ecotoxicity

Aquatic toxicity

[Product]

Category 3, Harmful to aquatic life

Category 3, Harmful to aquatic life with long lasting effects

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[NITE-CHRIP]

Crustacea (Palaemonetes pugio) 96-hour LC50: < 508.3 mg/L (source: NITE)

Hazardous to the aquatic environment, long-term (chronic)

[NITE-CHRIP]

Crustacea (Daphnia magna) 21-day NOEC (reproduction inhibition): 1.1 mg/L (source: NITE)

Water solubility

[Data for components of the product]

reaction (source: ICSC, 2018)

Persistence and degradability

[Data for components of the product]

Rapidly degradable (Degradation rate: 0% (by BOD); 100% (by GC))

(It is judged that it degrades 100% in water due to a degradation rate by GC of 100%.) (source: NITE)

Bioaccumulative potential

[Data for components of the product]

log Pow: 3.4 (source: ICSC, 2018)

Mobility in soil

Mobility in soil data is not available.

Other adverse effects

Ozone depleting chemical data is not available.

Section 13. Disposal considerations

Waste treatment methods

Waste from residues

Disposal should be in accordance with local, national, and international laws and regulations.

Comply with relevant laws and regulations as well as local municipal standards.

Avoid release to the environment.

Do not dump into sewers, on the ground or into any body of water.

Contaminated packing

Disposal should be in accordance with local, national, and international laws and regulations.

Comply with relevant laws and regulations as well as local municipal standards.

Dispose of container after using the contents completely.

Section 14. Transport Information

UNRTDG

UN number : UN2078

UN Proper Shipping Name : TOLUENE DIISOCYANATE

Transport hazard class(es) : 6.1

Packing group : II

Special provisions No.: 279

IMDG Code (International Maritime Dangerous Goods Regulations)

UN number : UN2078

UN Proper Shipping Name : TOLUENE DIISOCYANATE

Transport hazard class(es) : 6.1

Packing group : II
Special provisions No.: 279
IATA (Dangerous Goods Regulations)
UN number : UN2078
UN Proper Shipping Name : TOLUENE DIISOCYANATE
Transport hazard class(es) : 6.1
Hazard labels : Toxic
Packing group : II
Special provisions No.: A113
Marine pollutants (yes/no) : no
Special precautions for user
No information available.
Maritime transport in bulk according to IMO instruments
MARPOL Annex II – Noxious Liquid Substances
Noxious Liquid Substances ; Cat. Y
2,4-Tolylene diisocyanate
MARPOL Annex V – HME (Harmful to the Marine Environment)
Specific target organ toxicity – repeated exposure: cat.1
2,4-Tolylene diisocyanate
ERG GUIDE No.: 156

Section 15. Regulatory Information

Labor Standards Act, Japan
Chemical substances or compounds (including alloys) causing disease (item (iv)–1 of Appended Table 1–2 of Regulation)
Tolylene diisocyanate
U.S. Toxic Substances Control Act (TSCA) Inventory
Chemicals listed in TSCA Inventory
584–84–9
All components are listed or exempted.
Superfund Amendments and Reauthorizations Act (SARA), Title III
SARA 313 (TRI)
2,4-Tolylene diisocyanate

Other regulatory information

We are not able to check up the regulatory information with regard to the substances in your country or region, therefore, we request this matter would be filled by your responsibility.
Regulatory information with regard to this substance in your country or in your region should be examined by your own responsibility.
Ensure this material in compliance with federal requirements and ensure conformity to local regulations.
Regulatory information in this section are limited to intentional ingredient(s), but does not contain information on non-intentional ingredients or impurities which are not informed by supplier(s).

Chemical safety assessment

Advice on safe handling for this product can be found in sections 7 and 8 of this SDS.

Section 16. Other information

GHS classification and labelling
Self-Reactive Substances and Mixtures, Type G
H330–Acute toxicity, Category 1: H330 Fatal if inhaled (vapors)
H330–Acute toxicity, Category 2: H330 Fatal if inhaled (dust/mist)

2,4-Tolylene diisocyanate, JUNSEI CHEMICAL CO., LTD., 33377jis_J_E1-2, 27/Jul/2026

H315–Skin corrosion/irritation, Category 2: H315 Causes skin irritation

H319–Serious eye damage/eye irritation, Category 2: H319 Causes serious eye irritation

H334–Respiratory sensitization, Category 1: H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled

H317–Skin sensitization, Category 1: H317 May cause an allergic skin reaction

H351–Carcinogenicity, Category 2: H351 Suspected of causing cancer

H370–Specific target organ toxicity – single exposure, Category 1: H370 Causes damage to organs

H372–Specific target organ toxicity – Repeated exposure, Category 1: H372 Causes damage to organs through prolonged or repeated exposure

H402–Hazardous to the aquatic environment, short-term (acute), Category 3: H402 Harmful to aquatic life

H412–Hazardous to the aquatic environment, long-term (chronic), Category 3: H412 Harmful to aquatic life with long lasting effects

References and sources for data

Globally Harmonized System of classification and labelling of chemicals, UN

Recommendations on the TRANSPORT OF DANGEROUS GOODS 23rd edit., 2023 UN

IMDG Code, 2024 Edition (Incorporating Amendment 42–24)

IATA Dangerous Goods Regulations (67th Edition) 2026

2024 EMERGENCY RESPONSE GUIDEBOOK (US DOT)

2026 TLVs and BEIs. (ACGIH)

JIS Z 7252 : 2025

JIS Z 7253 : 2025

Recommendation of occupational exposure limits (2024–2025) (JSOH)

Notification No. 0111–1 (January 11, 2022), Chemical Hazards Control Division, Industrial Safety and Health Department, Labour Standards Bureau, MHLW in Japan

Supplier's data/information

Chemicals safety data management system "GHS Assistant" Version 4.39 (<https://www.asahi-ghs.com/>)

NITE Chemical Risk Information Platform "NITE-CHRIIP"

(https://www.chem-info.nite.go.jp/en/chem/chrip/chrip_search/systemTop)

GHS Classification Guidance for Enterprises 2019 Revised Edition (Ver. 2.1) (May. 2024, METI)

Abbreviations and acronyms

ACGIH – American Conference of Governmental Industrial Hygienists;

anh – anhydride;

ATE – Acute Toxicity Estimate;

BCF – Bioconcentration Factor;

BOD – Biochemical Oxygen Demand;

Cat. – Category;

Ceiling–C – Ceiling value;

COD – Chemical Oxygen Demand;

CSCL – Chemical Substances Control Law in Japan;

DSEN – Dermal Sensitization;

EC No. – The European Community number;

EC50 – Effective Concentration 50;

ENCS – Existing and New Chemical Substances Inventory under CSCL

EPA – US Environmental Protection Agency;

EU – European Union;

GHS – Globally Harmonized System of Classification and Labelling of Chemicals;

IARC – International Agency for Research on Cancer;

IATA – International Air Transport Association;

IBC Code – International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk;

IMDG Code – International Maritime Dangerous Goods Code;

ISHA – Industrial Safety and Health Act in Japan;

JSOH – Japan Society for Occupational Health;

LC50 – Lethal Concentration 50;

LD50 – Lethal Dose 50;

logPow – n-Octanol/water Partition Coefficient;

MARPOL – International Convention for the Prevention of Pollution from Ships;

METI – Ministry of Economy, Trade and Industry in Japan;

MHLW – Ministry of Health, Labour and Welfare in Japan;

MOE – Ministry of the Environment in Japan

NOEC – No Observed Effect Concentration;

NTP – US National Toxicology Program;

REACH – Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No.1907/2006;

RSEN – Respiratory Sensitization;

Skin – Danger of cutaneous absorption;

STEL – Short-term Exposure Limit;

STOT – Specific target organ toxicity;

SVHC – Substance of Very High Concern under REACH;

TWA – time-weighted average;

UN – United Nations;

UNRTDG – United Nations Recommendations on the Transport of Dangerous Goods;

General Disclaimer

The information relates to this specific material. It may not be valid for this material, if used in combination with any other materials or in any process. It is the user's responsibility to satisfy him-selves as to the suitability and completeness of this information for his own particular use.

This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.

The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties.

The GHS classification data given here is based on current Data published in Japan (National Institute of Technology and Evaluation (NITE) Chemical Risk Information Platform (NITE-CHRIP), up to FY2024).