REAGENTS DUKSAN

SAFETY DATA SHEET

According to OSHA Hazcom Standard 29 CFR 1910.1200

Toluene Diisocyanate

Date of issue: 2022-03-23 **Revision date: 2022-03-23** **Version: 1.1**

1. IDENTIFICATION

A. Product name

- Toluene Diisocyanate

B. Recommended use and restriction on use

- General use : for experimental, research and industrial use
- Restriction on use : Never drink, Not used except for experimental, research and industrial applications.

C. Manufacturer / Supplier / Distributor information

○ **Manufacturer information**

- Company name :
- Address :
- Emergency telephone number :

○ **Supplier/Distributer information**

- Company name :
- Address :
- Emergency telephone number :

2. HAZARD IDENTIFICATION

A. GHS Classification

- Acute toxicity (inhalation: vapor) : Category1
- Skin corrosion/irritation : Category2
- Respiratory sensitization : Category1
- Skin sensitization : Category1
- Carcinogenicity : Category2
- Specific target organ toxicity(Single exposure) : Category3(Respiratory tract irritation)
- Acute aquatic toxicity : Category3
- Chronic aquatic toxicity : Category3

B. GHS label elements

○ **Hazard symbols**



○ **Signal words**

- Danger

○ **Hazard statements**

- H315 Causes skin irritation
- H317 May cause an allergic skin reaction
- H330 Fatal if inhaled
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled
- H335 May cause respiratory irritation.
- H351 Suspected of causing cancer
- H402 Harmful to aquatic organisms.
- H412 Harmful to aquatic life with long lasting effects

○ **Precautionary statements**

1) Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
- P264 Wash hands thoroughly after handling.
- P271 Use only outdoors or in a well-ventilated area.
- P272 Contaminated work clothing should not be allowed out of the workplace.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
- P284 In case of inadequate ventilation wear respiratory protection.

2) Response

- P302+P352 IF ON SKIN: Wash with plenty of soap and water.
- P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P310 Immediately call a POISON CENTER or doctor/physician.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P320 Specific treatment is urgent
- P321 Specific treatment
- P332+P313 If skin irritation occurs: Get medical advice/attention.
- P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
- P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.
- P362+P364 Take off contaminated clothing and wash before reuse.

3) Storage

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification

- Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Toluene diisocyanate	2,4-Diisocyanato-1-methylbenzene ; 2,4-Toluenediisocyanate ; Isocyanic acid, methylphenylene ester ; 4-Methyl-meta-phenylene diisocyanate ; Isocyanic acid, 4-methyl-M-phenylene ester ; 4-Methyl-phenylene diisocyanate ; 4-Methyl-M-phenylene isocyanate ; 4-Methyl-phenylene isocyanate ;	584-84-9	100.0

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.
- Get medical attention immediately.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- Wash thoroughly after handling.

C. Inhalation contact

- Take specific treatment if needed.
- When exposed to large amounts of steam and mist, move to fresh air.

- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.
- Keep away from exposed sources immediately.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.
- Get medical attention immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.
- Remove to fresh air and keep at rest in a position comfortable for breathing.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Avoid use of water jet for extinguishing
- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray

B. Specific hazards arising from the chemical

- Causes skin irritation
- Fatal if inhaled
- Harmful to aquatic life with long lasting effects
- Harmful to aquatic organisms.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled

C. Special protective actions for firefighters

- Avoid inhalation of materials or combustion by-products.
- Cool containers with water until well after fire is out.
- Do not approach the tank surrounded by fire until it is extinguished.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Keep unauthorized personnel out.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Do not touch spilled material. Stop leak if you can do it without risk.
- Handle the damaged containers or spilled material after wearing appropriate protective equipment
- Move container to safe area from the leak area.
- Must work against the wind, let the upwind people to evacuate.
- Remove all sources of ignition.

B. Environmental precautions

- If large amounts have been spilled, inform the relevant authorities.
- Prevent runoff and contact with waterways, drains or sewers.

C. Methods and materials for containment and cleaning up

- Appropriate container for disposal of spilled material collected.
- Dike for later disposal.
- Disposal of waste shall be in compliance with the Wastes Control Act
- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not handle until all safety precautions have been read and understood.

B. Conditions for safe storage, including any incompatibilities

- Avoid direct sunlight.
- Check regularly for leaks.
- Do not apply any physical shock to container.
- Do not apply direct heat.
- Do not use damaged containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

○ **ACGIH TLV**

- [Toluene diisocyanate] : TWA 0.001 ppm , STEL 0.005 ppm

○ **OSHA PEL**

- [Toluene diisocyanate] : (C) 0.14

B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Individual protection measures, such as personal protective equipment

○ **Respiratory protection**

- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Consider warning properties before use.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- Respiratory protection is ranked in order from minimum to maximum.
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.

○ **Eye protection**

- Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.

○ **Hand protection**

- Wear appropriate chemical resistant glove.

○ **Skin protection**

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid
- Color	colorless (change to light yellow on air contact)
B. Odor	characteristic odor
C. Odor threshold	0.049-2.14 ppm
D. pH	Not available
E. Melting point/Freezing point	22 ℃
F. Initial Boiling Point/Boiling Ranges	251℃
G. Flash point	127℃
H. Evaporation rate	<1 (n-butyl acetate=1)

I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	9.5 / 0.9 %
K. Vapour pressure	1.3 ㎩ (20℃)
L. Solubility	124 (mg/L, react)
M. Vapour density	6
N. Specific gravity(Relative density)	1.2(25 ℃)
O. Partition coefficient of n-octanol/water	3.43 (OECD TG117, 22℃)(Log Kow)
P. Autoignition temperature	>598, EU Method A.15, GLP
Q. Decomposition temperature	-10300 (Btu/lb)
R. Viscosity	2 (21℃)
S. Molecular weight	174.2

10. STABILITY AND REACTIVITY

A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Hazardous Polymerization will not occur.

C. Conditions to avoid

- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with incompatible materials and condition.

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

○ **Respiratory tracts**

- May cause allergy or asthma symptoms or breathing difficulties if inhaled
- May cause respiratory irritation.

○ **Oral**

- Not available

○ **Eye·Skin**

- Causes skin irritation
- May cause an allergic skin reaction

B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- [Toluene diisocyanate] : LD50 5800 ㎎/㎏ Rat (ChemIDPlus)

*** Dermal**

- [Toluene diisocyanate] : LD50 >9400 ㎎/㎏ Rabbit (ECD TG 402, GLP) (ECHA)

*** Inhalation**

- [Toluene diisocyanate] : steam LC50 0.234 ㎎/ℓ 4 hr Rat (OECD TG403, GLP, Analogous substance CAS No. 26471-62-5TDI)(ECHA)

○ **Skin corrosion/irritation**

- Causes skin irritation

○ **Serious eye damage/irritation**

- Not available

○ **Respiratory sensitization**

- May cause allergy or asthma symptoms or breathing difficulties if inhaled

○ **Skin sensitization**

- May cause an allergic skin reaction

○ **Carcinogenicity**

*** IARC**

- Not available

*** OSHA**

- Not available

*** ACGIH**

- [Toluene diisocyanate] : A3

*** NTP**

- Not available

*** EU CLP**

- Not available

○ **Germ cell mutagenicity**

- Not available

○ **Reproductive toxicity**

- Not available

○ **STOT-single exposure**

- May cause respiratory irritation.

○ **STOT-repeated exposure**

- Not available

○ **Aspiration hazard**

- Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ **Fish**

- [Toluene diisocyanate] : LC50 133 ㎎/ℓ 96 hr Oncorhynchus mykiss(Analogous substance CAS No. 26471-62-5) (ECHA)

○ **Crustaceans**

- [Toluene diisocyanate] : LC50 12.5 ㎎/ℓ 48 hr Daphnia magna(OECD TG 202, Analogous substance CAS No. 26471-62-5) (ECHA)

○ **Algae**

- [Toluene diisocyanate] : EC50 3230 ㎎/ℓ 96 hr Skeletonema costatum(Analogous substance CAS No. 26471-62-5)(ECHA)

B. Persistence and degradability

○ **Persistence**

- [Toluene diisocyanate] : log Kow 0.21

○ **Degradability**

- [Toluene diisocyanate] : 0(ECHA)

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Toluene diisocyanate] : BCF 380 (NITE)

○ **Biodegradation**

- [Toluene diisocyanate] : 50 ~ 90 % 2 hr (27℃)(ECHA)

D. Mobility in soil

- Not available

E. Other adverse effects

- [Toluene diisocyanate] : crustaceans: 21d-NOECDaphnia magna=1.1 mg/L OECD TG 211, GLP CAS No. 26471-62-5(ECHA)

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- It shall be treated by incineration
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable
- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them

B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act

- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG CODE/IATA DGR)

- 2078

B. Proper shipping name

- TOLUENE DIISOCYANATE

C. Hazard Class

- 6.1

D. IMDG CODE/IATA DGR Packing group

- II

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-A (Toxic substances)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

○ **POPs Management Law**

- [Toluene diisocyanate] : Not applicable

○ **Information of EU Classification**

*** Classification**

- [Toluene diisocyanate] : H315,H317,H319,H330,H334,H335,H351,H412

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- Not applicable

*** CERCLA Section 103 (40CFR302.4)**

- [Toluene diisocyanate] : 45.3599 kg 100 lb

*** EPCRA Section 302 (40CFR355.30)**

- [Toluene diisocyanate] : 226.7995 kg 500 lb

*** EPCRA Section 304 (40CFR355.40)**

- [Toluene diisocyanate] : 45.3599 kg 100 lb

*** EPCRA Section 313 (40CFR372.65)**

- [Toluene diisocyanate] : Applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2022-03-23

C. Revision number and Last date revised

- 1 times, 2022-03-23

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).