

1. PRODUCT NAME: Toluene Diisocyanate 80/20
2. CHEMICAL NAME: Toluene Diisocyanate
3. SYNONYMS: TDI 80/20
4. CAS NUMBER: 26471-62-5
5. COMPOSITION: 2,4-Toluene Diisocyanate (584-84-9) 80%
2,6-Toluene Diisocyanate (91-08-7) 20%

IN CASE OF
TRANSPORT EMERGENCY
CONTACT CHEMTREC
USA: 1-800-424-9300
INTERNATIONAL: 1-703-527-3887

6. PROPERTIES: Form: liquid
Odour: strong, pungent odour
Colour: clear
pH value: No data available.
Boiling point: approx. 248 °C (760 mmHg)
Vapour pressure: 0.025 mmHg (25 °C)
Conditions to avoid: > 40 degrees Celsius
Avoid moisture.
Substances to avoid: water, alcohols, strong bases
Hazardous reactions: The product is chemically stable. Reacts with water, with formation of carbon dioxide. Risk of bursting. Reacts with alcohols. Reacts with acids. Reacts with alkalis. Reacts with amines. Risk of exothermic reaction. Risk of violent reaction. Risk of polymerization. Contact with certain rubbers and plastics can cause brittleness of the substance/product with subsequent loss in strength.
Decomposition products: Hazardous decomposition products: TDI, carbon monoxide, hydrogen cyanide, nitrogen oxides, aromatic isocyanates, gases/vapours
Corrosion to metals: No corrosive effect on metal.

7. HAZARDS: DANGER: POISON. HARMFUL IF INHALED. SENSITIZATION CAN OCCUR IN SOME INDIVIDUALS, LEADING TO ASTHMA-LIKE SPASMS OF THE BRONCHIAL TUBES AND DIFFICULTY BREATHING. INDIVIDUALS WITH A HISTORY OF RESPIRATORY ILLNESS, ASTHMATIC CONDITIONS, EYE DAMAGE OR TDI SENSITIZATION SHOULD NOT BE EXPOSED TO THIS PRODUCT. TDI IS INCLUDED IN THE NTP ANNUAL REPORT ON CARCINOGENS. PRELIMINARY RESULTS FROM A TDI HEALTH STUDY INDICATE THAT OVEREXPOSURE TO A RESPIRATORY IRRITANT (CHLORINE OR PHOSGENE FOR EXAMPLE), RESULTING IN LOWER RESPIRATORY TRACT SYMPTOMS COULD INCREASE THE RISKS OF DEVELOPING ASTHMA-LIKE REACTIONS FROM SUBSEQUENT TDI EXPOSURE.

Potential health effects

Primary routes of exposure

Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquified gases.

Acute toxicity:

Information on: TDI

Inhalation of TDI vapors may cause irritation of the mucous membranes of the nose, throat or trachea, breathlessness, chest discomfort, difficult breathing and reduced pulmonary function. Airborne overexposure well above the PEL may result additionally in eye irritation, headache, chemical bronchitis, asthma-like findings or pulmonary edema. Isocyanates have also been reported to cause hypersensitivity pneumonitis, which is characterized by flu-like symptoms, the onset of which may be delayed.

Irritation:

Information on: TDI

Eye contact with TDI may result in conjunctival irritation and mild corneal opacity. Skin contact may

result in dermatitis, either irritative or allergic.

Repeated dose toxicity:

Information on: TDI

Acute or chronic overexposure to isocyanates may cause sensitization in some individuals, resulting in allergic symptoms of the lower respiratory tract (asthma-like), including wheezing, shortness of breath and difficulty breathing. Subsequent reactions may occur at or substantially below the PEL and TLV. Asthma caused by isocyanates, including TDI, may persist in some individuals after removal from exposure and may be irreversible. Some isocyanate sensitized persons may experience asthma reactions upon exposure to non-isocyanate containing dusts or irritants. Cross sensitization to different isocyanates may occur.

Information on: TDI

Long-term overexposure to isocyanates has also been reported to cause lung damage, including reduced lung function, which may be permanent. Dermal exposure to isocyanates may lead to pulmonary sensitization.

Information on: TDI

Preliminary results from a TDI health study indicate that overexposure to a respiratory irritant (for example chlorine or phosgene) resulting in lower respiratory tract symptoms could increase the risks of developing asthma-like reactions from subsequent TDI exposure.

Information on: TDI

TDI was carcinogenic to rats and mice at maximum tolerated doses in a National Toxicology Program (NTP) feeding study; however, it was not carcinogenic in a lifetime inhalation study. Based on the results of the feeding study, TDI is listed in the NTP Annual Report on Carcinogens and IARC included TDI in Group 2B (sufficient evidence of carcinogenicity in animals).

Information on: TDI

Minimal fetotoxicity and maternal toxicity were observed in rats exposed to 0.5 ppm of mixture of 2,4 and 2,6-toluenediisocyanate. No effects were noted at the lower doses. No embryotoxicity or teratogenicity were noted in the study.

Medical conditions aggravated by overexposure:

Medical supervision of all employees who handle or come into contact with isocyanates is recommended.

The isocyanate component is a respiratory sensitizer. It may cause allergic reaction leading to asthma-like spasms of the bronchial tubes and difficulty in breathing. Preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum) are suggested. Persons with history of respiratory disease or hypersensitivity should not be exposed to this product. Persons with asthmatic conditions, chronic bronchitis, other chronic respiratory diseases, recurrent eczema or pulmonary sensitization should be excluded from working with isocyanates. Once a person is diagnosed as having pulmonary sensitization (allergic asthma) to isocyanates, further exposure is not recommended.

8. FIRE FIGHTING Flash point: 270 °F

INFORMATION: Autoignition: > 620 °C

Lower explosion limit: 0.9 %(V)

Upper explosion limit: 9.5 %(V)

Suitable extinguishing media: water fog, foam, carbon dioxide

Hazards during fire-fighting: nitrous gases, fumes/smoke, isocyanate, vapour

Protective equipment for fire-fighting: Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

9. PERSONAL Advice on system design:

PROTECTION Provide local exhaust ventilation to control vapours/mists.

MEASURES: Personal protective equipment

Respiratory protection:

For situations where the airborne concentrations may exceed the level for which an air purifying respirator is effective, or where the levels are unknown or Immediately Dangerous to Life or Health (IDLH), use



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NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full face piece pressure demand supplied-air respirator (SAR) with escape provisions. When atmospheric levels may exceed the occupational exposure limit (PEL or TLV) NIOSH-certified air-purifying respirators equipped with an organic vapor sorbent and particulate filter can be used as long as appropriate precautions and change out schedules are in place.

Hand protection:

Chemical resistant protective gloves, Suitable materials, chloroprene rubber (Neoprene), chlorinated polyethylene, polyvinylchloride (Pylox), butyl rubber, fluoroelastomer (Viton), nitrile rubber (Buna N)

Eye protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Suitable materials, saran-coated material

General safety and hygiene measures:

Wear protective clothing as necessary to prevent contact. Eye wash fountains and safety showers must be easily accessible. Observe the appropriate PEL value. Wash soiled clothing immediately. Contaminated equipment or clothing should be cleaned after each use or disposed of.

10. FIRST AID General advice:

PROCEDURES: Remove contaminated clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

If on skin:

Wash affected areas thoroughly with soap and water. Immediate medical attention required.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

If swallowed:

Rinse mouth and then drink plenty of water. Do not induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

Note to physician

Antidote: Specific antidotes or neutralizers to isocyanates do not exist. Treatment: Treatment should be supportive and based on the judgement of the physician in response to the reaction of the patient.

11. EXPOSURE toluene-2,4-diisocyanate

LIMITS:

OSHA CLV 0.02 ppm 0.14 mg/m³ ;

ACGIH TWA value 0.005 ppm ; STEL value 0.02 ppm ;

toluene-2,6-diisocyanate

ACGIH TWA value 0.005 ppm ; STEL value 0.02 ppm ;

12. TOXICOLOGICAL Acute toxicity

INFORMATION: Oral:

LD50/rat: 5,800 mg/kg Slightly toxic.

Inhalation:

LC50/rat: <= 0.78 mg/l / 1 h

Moderately toxic.

LC50/rat: 0.1 mg/l / 4 h

Moderately toxic.

Dermal:

LD50/rabbit: > 9,400 mg/kg

Practically nontoxic.



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Skin irritation:
rabbit: (FHSA Guideline)
Chronic toxicity
Carcinogenicity:
No compound related carcinogenic effects.
Reproductive toxicity:
No reproductive effects.

13. ECOLOGICAL INFORMATION: Acute and prolonged toxicity to fish:
static

zebra fish/LC50 (24 h): > 500 mg/l
Practically nontoxic.
Acute toxicity to aquatic invertebrates: static
Grass shrimp/LC50 (96 h): approx. 508 mg/l
Practically nontoxic. static
Pond snail/LC50 (24 h): > 500 mg/l
Practically nontoxic.
Chronic toxicity to aquatic invertebrates:
Daphnia magna EC50 (24 h) approx. 750 mg/l
Practically nontoxic.
Daphnia magna EC50 (24 h) > 500 mg/l
Practically nontoxic.
Other terrestrial non-mammals:
OECD Guideline 205 redwinged blackbird/LD50: 100 mg/kg = 100
OECD Guideline 205 European Starling/LD50: > 100 mg/kg = > 100

14. DISPOSAL CONSIDERATIONS: TDI is listed as a hazardous waste under Section 261.33 (f) of EPA's RCRA regulations and requires special handling for disposal. Incinerate waste containing TDI in a RCRA-licensed facility.

Container disposal:

Empty containers must be neutralized with a decontaminant. Refer to 40 CFR § 261.7 (residues of hazardous waste in empty containers). Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. Under no circumstances should empty drums be burned or cut open with gas or electric torch as toxic decomposition products may be liberated.

15. CARCINOGENIC PROPERTIES & NOTIFICATIONS: None Established

16. TRANSPORT INFORMATION: Land transport
USDOT

Proper shipping name: TOLUENE DIISOCYANATE
Hazard class: 6.1
ID-number: UN 2078
Packing group: II
Sea transport
IMDG
Proper shipping name: TOLUENE DIISOCYANATE
Hazard class: 6.1
ID-number: UN 2078
Packing group: II
Marine pollutant: NO



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Air transport
IATA/ICAO
Proper shipping name: TOLUENE DIISOCYANATE
Hazard class: 6.1
ID-number: UN 2078
Packing group: II

17. HANDLING & STORAGE: Handling
General advice:
Mix thoroughly before use. If bulging of drum occurs, transfer to well ventilated area, puncture to relieve pressure, open vent and let stand for 48 hours before resealing. Protection against fire and explosion:
No explosion proofing necessary.
Storage
General advice:
Formation of CO₂ and build up of pressure possible. Protect against contamination. Keep container tightly closed and in a well-ventilated place. Outage of containers should be filled with dry inert gas at atmospheric pressure to avoid reaction with moisture.
Storage incompatibility:
General: Segregate from bases.
Storage stability:
Storage temperature: 65 - 105 °F
Protect against moisture. Store at indicated temperature to prevent freezing and isomer separation or discolourization and dimerization. Thaw solidified substance/product at temperature < 95 °F to prevent discolourization.
18. ACCIDENTAL RELEASE MEASURES: Personal precautions: Clear area. Ensure adequate ventilation. Wear suitable personal protective clothing and equipment.
Environmental precautions: Do not discharge into drains/surface waters/groundwater.
Cleanup: Dike spillage.
19. REGULATORY INFORMATION: Federal Regulations
Registration status:
TSCA, US released / listed
OSHA hazard category: Acute target organ effects reported, IARC 1, 2A or 2B carcinogen, Sensitizer, Highly toxic - inhalation, OSHA PEL established, Skin and/or eye irritant, Chronic target organ effects reported, NTP listed carcinogen, ACGIH TLV established
CERCLA RQ CAS Number Chemical name
100 LBS 91-08-7; 584-84-9 toluene-2,6-diisocyanate; toluene-2,4-diisocyanate
SARA 313:
CAS Number Chemical name
91-08-7 toluene-2,6-diisocyanate
584-84-9 toluene-2,4-diisocyanate
State regulations
State RTK
CAS Number Chemical name State RTK
584-84-9 toluene-2,4-diisocyanate MA, NJ, PA
91-08-7 toluene-2,6-diisocyanate MA, NJ, PA
CA Prop. 65:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.