MATERIAL SAFETY DATA SHEET

TOLUENE DIISOCYANATE (TDI)

Gujarat Narmada Valley Fertilizers Company Ltd, NARMADANET 80

1. PRODUCT AND COMPANY IDENTIFICATION

Product name :	TDI
Chemical formula :	C9 H6 O2 N2
Product Use Description :	Cast Elastomer
Company :	Gujarat Narmada Valley Fertilizers Company Ltd., GNFC Corporate Office, P.O. Narmadanagar-392 015 Dist. Bharuch. State: Gujarat . Country: India
Telephone :	91-2642-247360
Fax:	91-2642-247185

2. COMPOSITION/INFORMATION ON

INGREDIENTS

Components	**CAS Number**	**Concentration (Weight)**
Toluenediisocyanate, 2,6	91-08-7	20 ± 1
Toluenediisocyanate, 2,4	584-84-9	80 ± 1

CHEMICAL FAMILY: Isocyanates

3. HAZARDS IDENTIFICATION

Emergency Overview

Severe respiratory irritant.
Moderate skin irritant.
Severe eye irritant.
May cause sensitization by skin contact.
May cause sensitization by inhalation.

Potential Health Effects

Inhalation : May cause nose, throat, and lung irritation. Inhalation of vapors and/or aerosols in high concentration may cause irritation of respiratory system.

Eye contact : Severe eye irritation.

Skin contact : Causes skin irritation.

Chronic Health Hazard : This product contains listed carcinogen(s) according to IARC, ACGIH,

NTP and/or OSHA in concentrations of 0.1 percent or greater. Repeated or prolonged contact causes sensitization, asthma and eczemas.

Exposure Guidelines

Target Organs : Respiratory system.
Skin.
Eyes.

Symptoms : Repeated and/or prolonged exposure to low concentrations of vapors and/ or aerosols may cause: Sore throat.

Aggravated Medical Condition

Asthma. Adverse respiratory effects (such as cough, tightness of chest or shortness of breath). Skin disorders and Allergies. Adverse skin effects (such as rash, irritation or corrosion). Adverse eye effects (such as conjunctivitis or corneal damage). Eye disease

4. FIRST AID MEASURES

General advice : Seek medical advice. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately.

Eye contact : Rinse immediately with plenty of water also under the eyelids for at least 20 minutes. Remove contact lenses.

Skin contact : Wash off immediately with plenty of water for at least 20 minutes. Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Take off contaminated clothing and shoes immediately. NOTE TO PHYSICIANS: Application of corticosteroid cream has been effective in treating skin irritation.

Ingestion: If a person vomits when lying on his back, place him in the recovery position. Prevent aspiration of vomit. Turn victim's head to the side.

Inhalation : If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. Move to fresh air.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Alcohol-resistant foam.
Carbon dioxide (CO2).
Dry chemical.
Dry sand.
Limestone powder.

Specific hazards :	Incomplete combustion may form carbon monoxide. Downwind personnel must be evacuated. Burning produces obnoxious and toxic fumes.
Special protective equipment :	Use personal protective equipment. Wear self contained breathing for fire-fighters apparatus for fire fighting if necessary.
Further information :	Do not allow run-off from fire fighting to enter drains or water courses.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions :	Use self-contained breathing apparatus and chemically protective clothing. Wear suitable protective clothing, gloves and eye/face protection. Evacuate personnel to safe areas.
Environmental precautions :	Construct a dike to prevent spreading.
Methods for cleaning up :	Approach suspected leak areas with caution. Contact Air Products' Emergency Response Center for advice. Place in appropriate chemical waste container.
Additional advice :	If possible, stop flow of product.

7. HANDLING AND STORAGE

Handling

Handle under inert gas atmosphere in dry equipment. Maintain a nitrogen atmosphere in the head space of the drum. Do not use air pressure to remove contents. To prepare for unloading, the drum with bung vent inserted should be placed in a warm room, drum warmer or meltdown oven for period of time sufficient to melt the desired amount of prepolymer. Liquid prepolymer can then be removed from the drum by inserting a drum spigot or ball valve in the 2 inch bung, positioning on a drum tilter, tilting and pouring out the required amount. Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Avoid breathing vapors and/or aerosols. Avoid contact with eyes. Use only in well-ventilated areas. Use personal protective equipment. When using, do not eat, drink or smoke.

Storage

Store under a nitrogen atmosphere. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Provide readily accessible eye wash stations and safety showers.

Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.

Personal protective equipment

Respiratory protection :	Wear appropriate respirator when ventilation is inadequate.
Hand protection :	Polyvinyl Alcohol Gloves (PVA). Loose fitting thermal insulated or leather gloves. Impervious gloves. The breakthrough time of the selected glove(s) must be greater than the intended use period.
Eye protection :	Full face shield with goggles underneath when molten material is being handled. Chemical resistant goggles must be worn.
Skin and body protection :	Long sleeve shirts and trousers without cuffs.
Environmental exposure Controls:	Construct a dike to prevent spreading.
Special instructions for:	Provide readily accessible eye wash stations and safety protection and hygiene showers. Wash at the end of each workshift and before eating, smoking or using the toilet.

Exposure limit(s)

Toluene diisocyanate	Time Weighted Average (TWA):	ACGIH 0.005 ppm	-
Toluene diisocyanate	Short Term Exposure Limit (STEL):	ACGIH 0.02 ppm	-

9. PHYSICAL AND CHEMICAL PROPERTIES

Form :	Liquid.
Color :	Light yellow.
Odor :	Pungent.
Molecular Weight :	174 g/mol
Relative density :	1.21 (water = 1)
Vapor pressure :	< 0.21 mmHg at 70 °F (21 °C)
Density :	75.538 lb/ft3 (1.21 g/cm3) at 70 °F (21 °C)
Boiling point/range :	484 °F (251 °C)
Flash point:	127 °C
Water solubility:	Reacts slightly with water.

10. STABILITY AND REACTIVITY

Stability :	Stable under normal conditions.
Materials to avoid:	Oxidizing agents.
Hazardous decomposition:	Isocyanates.
Products	Carbamates.
	Cyanic acids.
	Cyanogen
	Nitrile
	Toxic cyanates.
	Carbon monoxide.
	Carbon dioxide (CO2).
	Phosgene.

11. TOXICOLOGICAL INFORMATION

Acute Health Hazard

Ingestion :	LD50 : 4,100 mg/kg
	Species : Rat.
Inhalation :	LC50 (4 h) : > 14 ppm
	Species : Rat.
Skin. :	LD50 : > 9,400 mg/kg
	Species : Rabbit.

Eye irritation/corrosion : Severe eye irritation.

Acute dermal: irritation/corrosion Moderate skin irritation.

Sensitization : May cause sensitization by inhalation. May cause sensitization by skin contact.

Chronic Health Hazard

In recent National Toxicology Program toxicity studies, toluene diisocyanate (TDI), when given orally by stomach tube as a concentrated mixture in corn oil, produced tumors in male and female rats and female mice but not male mice.

Carcinogenicity

Toluenediisocyanate, 2,6-	IARC : 2B - Possible carcinogen.
	NTP CARC : Anticipated carcinogen.
Toluenediisocyanate,	2,4- IARC : 2B - Possible carcinogen.
	NTP CARC : Anticipated carcinogen.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Aquatic toxicity : No data is available on the product itself.
Toxicity to other organisms : No data available.

Persistence and degradability

Mobility : No data available.
Bioaccumulation : No data is available on the product itself.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products : Contact supplier if guidance is required.

Contaminated packaging: Dispose of container and unused contents in accordance with federal, state, and local requirements.

14. TRANSPORT INFORMATION

CFR

Proper shipping name : Toluene diisocyanate
Class 6.1
UN/ID No. UN2078
Packing group : II

IATA

Proper shipping name : Toluene diisocyanate
Class : 6.1
UN/ID No. : UN2078
Packing group : II

IMDG

Proper shipping name : TOLUENE DIISOCYANATE
Class : 6.1
UN/ID No. : UN2078
Packing group : II

CTC

Proper shipping name : TOLUENE DIISOCYANATE
Class : 6.1
UN/ID No. : UN2078
Packing group : II

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard (29 CFR 1910.1200) Hazard Class(es) Irritant. Sensitizer. Highly Toxic.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	EINECS	Included on EINECS inventory or polymer substance, monomers included on EINECS inventory or no longer polymer.
Canada	DSL	Included on Inventory.
Australia	AICS	Included on Inventory.
Japan	ENCS	Included on Inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Included on Inventory.
Philippines	PICCS	Included on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification:
Acute Health Hazard

EPA SARA Title III Section 313 (40 CFR 372) Component(s) above 'de minimus' level:
Toluene diisocyanate

Safe Drinking Water & Toxic Enforcement Act
WARNING! This product contains a chemical known in the State of California to cause cancer. Toluene diisocyanate
WHMIS Hazard Classification

Very Toxic Material Causing Immediate and Serious Toxic Effects, Very Toxic Material Causing Other Toxic Effects, Toxic Material Causing Other Toxic Effects

16. OTHER INFORMATION

HMIS Rating
Health : 2
Flammability : 1
Physical hazard : 1

Prepared by : Gujarat Narmada Valley Fertilizers Company Ltd, Bharuch (India)
For additional information, please visit website at
http//www.gnfc.in