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MATERIAL SAFETY DATA SHEET(JURA Model)

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME : ＴＤＩ－８０
PRODUCT CODE :
COMPANY IDENTIFICATION
Company name : Japan Urethane Raw Materials Association
Address :
Department :
Telephone :
Emergency telephone :
Fax :
e-mail address :
MSDS №. : 0331
RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS ON USE :
The main use is polyurethane raw materials (flexible and semi rigid foam, rigid foam, elastomer, artificial leather and synthetic leather, spandex fiber, paint, glue, binder, etc).

2. HAZARD IDENTIFICATION

GHS CLASSIFICATION OF THE SUBSTANCE OR MIXTURE
PHYSICAL HAZARDS
- Explosives : Not applicable
- Flammable gases : Not applicable
- Flammable gases : Not applicable
- Flammable aerosols : Not applicable
- Oxidizing gases : Not applicable
- Gases under pressure : Not applicable
- Flammable liquids : Not classified
- Flammable solids : Not applicable
- Self-reactive substances and mixtures : Not applicable
- Pyrophoric liquids : Not classified
- Pyrophoric solids : Not applicable
- Self-heating substances and mixtures : Not applicable
- Substances and mixture which, in contact with water, emit flammable gases : Not classified
- Oxidizing liquids : Not classified
- Oxidizing solids : Not applicable
- Organic peroxides : Not applicable

- Corrosive to metals：Not classified

HEALTH HAZARDS

- Acute toxicity (oral) : Not classified
- Acute toxicity (oral) : Not classified
- Acute toxicity (skin) : Not classified
- Acute toxicity (inhalation: gas) : Not applicable
- Acute toxicity (inhalation: vapour) : Category 1
- Acute toxicity (inhalation: dust, mist) : Not applicable
- Skin corrosion / irritation : Category 2
- Serious eye damages / eye irritation : Category 2A
- Respiratory sensitization : Category 1
- Skin sensitization : Category 1
- Germ cell mutagenicity : Not classified
- Carcinogenicity : Not classified
- Reproductive toxicity : Not classified
- Specific target organ toxicity single exposure : Category 3 (respiratory tract irritation)
- Specific target organ toxicity: repeated exposure : Not classified
- Aspiration hazard : Not classified

ENVIRONMENTAL HAZARDS

- Aquatic toxicity (acute) : Category 3
- Aquatic toxicity (chromic) : Not classified

GHS LABEL ELEMENTS INCLUDING PRECAUTIONARY STATEMENTS

SYMBOL

SIGNAL WORD : DANGER

HAZARD STATEMENT

- Fatal if inhaled.
- Causes skin irritation.
- Causes serious eye irritation.
- May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- May cause allergic skin reaction.
- Irritation to the respiratory system.
- Harmful to aquatic life.

PRECAUTIONARY STATEMENTS:

【Prevention】

- Do not handle until all safety precautions have been read and understood.
- Obtain special instructions before use.
- Do not eat, drink or smoke when using this product.

- Wear protective gloves/goggles/clothing and respiratory protection.
- Use only outdoors or in well-ventilated area.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Contaminated work clothing should not be allowed out of workplace.
- Avoid release to the environment.
- Avoid contact with water and alkali.
- Do not use near fire.

【Response】

- If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- If swallowed: Rinse mouth with water. Do not induce vomiting.
- If in eyes: Rinse with water for 15 minutes. Remove contact lenses, if present and easy to do.
- If on skin: Wash with plenty of soap and water.
- If on skin (or hair): Remove all contaminated clothing.
- Wash contaminated clothing before re-using.
- IF exposed or concerned, or if you feel unwell: Get medical advice/attention.
- Dry chemical powder should be used for small fire. In case of larger fires, large volume of water spray should be used.
- In case of spill, recover the spilled substance as possible. After neutralizing with NH3 or alcohols absorb it with sand.

【Strage】

- Store in a dry place. Keep container tightly closed in the locked place.

【Disposal】

- Dispose of contents / container to waste in accordance with local / regional / national / international regulations (to be specified).

3. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE/MIXTURE : substance

CHEMICAL NAME : Tolylene diisocyanate, Toluene diisocyanate, TDI

Component	Content	METI №	ISHA №	CAS №
Tolylene diisocyanate	> 98 %	3-2214	Existing	26471-62-5
2,4-Tolylene diisocyanate	about 80 %	3-2214	Existing	584-84-9
2,6-Tolylene diisocyanate	about 20 %	3-2214	Existing	91-08-7

HAZADOUS INGREDIENT(s) : 2,4-Tolylene diisocyanate 80%
2,6-Tolylene diisocyanate 20%

4. FIRST AID MEASURES

IF INHALED

- Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- Immediately call a POISON CENTER.
- Get medical advice/attention immediately.
- If not breathing, give artificial respiration.

- If serious cough or phlegm occurs, get medical examination immediately.

IF ON SKIN

- Remove all contaminated clothing immediately.
- Wash off soap and water.
- Wash skin with water stream or shower.
- If skin irritation occurs or feel unwell, get medical advice/attention.
- Take off contaminated clothing and wash before reuse.

IF IN EYES

- Immediately rinse with fresh water for 15 minutes even if very small contact.
- Rinse carefully with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists, get medical advice/attention.

IF SWALLOWED

- Rinse the patient mouth with water and give ca. 250ml milk or water to him to drink. Do not induce vomiting. Never give anything by mouth to an unconscious person.
- Get medical advice/attention (washing of stomach) immediately.

5. FIRE-FIGHTING MEASURES

SUITABLE EXTINGUISHING MEDIA：

Dry chemical powder, CO_2, foam, water spray in case of larger fires

UNSUITABLE EXTINGUISHING MEDIA：Water jet

SPECIFIC EXTINCTION METHOD

- Dry chemical powder or CO_2 should be used for small fire.
- In case of larger fires, large volume of water spray should be used.
- Keep surrounding areas cool by spraying water.
- Neutralize the spilled TDI after extinguished.

SPECIAL PROTECTIVE FOR FIRE- FIGHTERS

- During a fire, isocyanate vapour and hazardous gases may be generated, fireman has to wear self-contained breathing apparatus and other protective equipments.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

- Forbid any person without wearing proper protection equipments into the spilled area. Ventilate the spilled area.

ENVIRONMENTAL PRECAUTIONS

- Do not let this chemical enter the environment.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

- Neutralize and absorb the spilled substance with sand. Clean the spilled area with plenty of water.
- In case of larger spill, countermeasure for prevention to flow out and recover the spilled substance as possible.
- After recovery, neutralize the spilled area.
- Don't close tightly container with collected material. Waste should be disposed of as described in chapter

"13. DISPOSAL CONSIDERATIONS".

・ Example of neutralizing agent(wt%) : water/sodium carbonate/liquid detergent=90-95/5-10/0.2-2

7. HANDLING AND STORAGE

HANDLING

TECHNICAL MEASURE

- Take measures of as described in chapter "8. EXPOSURE CONTROLS / PERSONAL PROTECTION" and wear an ppropriate protective equipment.
- Should be established the adequate local exhauster in the indoor working area.
- Handle under effective ventilation if product is heated.

LOCAL-VENTILATION/WHOLE-VENTILATION

- Set local exhaust or general ventilation of as described in chapter "8. EXPOSURE CONTROLS / PERSONAL PROTECTION".

NOTES

- Do not handle until all safety precautions have been read and understood.
- Do not contact, inhale and ingest.
- Wash hands thoroughly after handling.
- Use only outdoors or in well ventilated areas.
- Avoid release contaminated clothing to out of work place.
- Do not eat, drink or smoke when using this product.

SAFETY TREATMENT NOTES

- Pay attention to avoid contact with water or substance which react with isocyanate.
- Always has a stock of enough personal protectors and neutralizing agent for emergency.
- Take care of falling or tumble for handling containers.

CONTACT AEVASION

- Refer to 10. STABILITY AND REACTIVITY

STORAGE

TECHNICAL MEASURE

- An indoor storehouse should be built by a fireproof construction and having well ventilation and its floor should be made of impermeable materials.
- Insure sufficient light to handle.

APPROPRIATE SAFEKEEPING CONDITION

- Keep containers tightly closed and storage in well ventilated areas.
- The storehouse should be locked.
- Once a container is opened, the container should be sealed with dry nitrogen or dry air and be closed tightly.
- Put up the sign of "Flammable" and "Off limit !".

INCOMPATIBLE SUBSTANCES

- Refer to 10. STABILITY AND REACTIVITY

PACKAGING MATERIALS

- Containers accepted Fire & Disaster Management Act and UN regulation should be used.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

FACILITY AND EQUIPMENT MEASURES

- Facilities in where this materials is handled should be structured by the perfectly closed system. Should be established the adequate local exhauster if vapor/mist generate.
- Operator should wear appropriate protection. Make available emergency safety shower and eye wash in the work area. The floor should be made of impermeable materials.

CONTROL LIMIT : 0.005 ppm

OCCUPATIONAL EXPOSURE LIMITS

- J. Soc. Occup.Health : TWA 0.005 ppm（0.035 mg/m^3）（2009）[8)]
  C 0.02 ppm （0.14 mg/m^3）
- ACGIH : TWA 0.001 ppm （2010）[9)]
  STEL 0.003 ppm

PERSONAL PROTECTIVE EQUIPMENT

- Respiratory protection : compressed air open-circuit self-contained breathing apparatus; JIS T 8155, supplied-air respirators; JIS T 8153
- Hand protection : Protective gloves (impermeable)
- Eye protection : Protective glasses, goggles
- Skin and body protection : Protective clothing, safety boots

HYGIENE MEASURES

- Wash hands thoroughly after handling.
- Avoid release contaminated clothing to out of work place.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colorless or light yellow clear liquid
Odour	:	Irritating odor
pH	:	No Data
Boiling point	:	251℃
Freezing point	:	11.5～13.5℃
Flash point	:	135℃
Explosion properties	:	0.9 v/v%(118℃)-9.5 v/v%(150℃)
Vapor pressure	:	0.014 hPa(20℃)
Vapor density	:	6(air=1)
Specific gravity	:	about 1.22(25℃)
Solubility	:	Not soluble in water Soluble in organic solvents(esters,ketones)
Octanol/water partition coefficient	:	3.74 (2,4-TDI 80％、2,6-TDI 20％)(estimation)
Decomposition temperature	:	No Data
Viscosity	:	3mPa･s(25℃)

10. STABILITY AND REACTIVITY

STABILITY

- Stable for normal storage and handling.

REACTIVITY

- Exothermic reaction with amines, water and alcohols.
- Exothermic homo-polymerization itself in the presence of basic substance or a certain material compound.
- Reacts with water forming CO_2.

POSSIBILITY OF HAZARDOUS REACTIONS

- Exothermic reaction with active hydrogen compounds (water, alcohols, amines), in closed containers, Reacts with water forming CO_2, risk of bursting owing to increase of pressure.

INCOMPATIBLE MATERIALS

- Copper and its alloy, Aluminum, Poly vinyl chloride

HAZARDOUS DECOMPOSITION PRODUCTS

- Nitrogen compounds

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY [ORAL]：Not classified

2,4/2,6-TDI(80/20), LD_{50}, oral rat 5840mg/kg (Wazeter 1964a[11)]), 7800mg/kg (CERI 1998[12)]),other similar studies available.

ACUTE TOXICITY [SKIN]：Not classified

TDI unspecified isomers, LD_{50}, dermal, rabbit, >9400mg/kg. (Wazeter 1964b[13)]).

ACUTE TOXICITY [INHALATION (GAS)]：Not applicable.

Liquid (GHS definition)

ACUTE TOXICITY [INHALATION (VAPOUR)]：Category 1

The saturated vapour concentration of TDI at 25℃ is about 160mg/m^3 (22ppm). In the workplace exposure is likely to vapour only. In animal tests at the high concentrations used above the saturated vapour concentration, it may be assumed that both vapour and aerosol were present. 2,4/2,6-TDI(80/20), LC_{50}, 1hr, rat, 470mg/m^3 (66ppm) (Doe and Horspool 1980[14)]), LC_{50}, 6hr, mouse, 100-140mg/m^3 (14-19ppm) (Mackay 1992[15)]).

ACUTE TOXICITY [INHALATION(DUST,MIST)]：Not applicable

The saturated vapour concentration of TDI at 25℃ is about 160mg/m^3 (22ppm). It may be assumed that in the high exposure LC_{50} studies both vapour and aerosol were present. For worker exposures vapour exposures are likely, see vapour section for classification.

SKIN CORROSION/IRRITATION：Category 2

(Duprat et al. 1976[16)]) 2,4-TDI. (Knapp and Baker 1974a,b[17),18)]) TDI unspecified. (Woolhiser et al. 1998[19)]) TDI unspecified. EU category irritant (R38).

SERIOUS EYE DAMAGE/EYE IRRITATION：Category 2A

TDI unspecified. (Knapp and Baker 1974[17),18)], Woolhiser et al. 1998[19)]). EU category irritant R36). US EPA HPV, irritant.

RESPIRATORY SENSITIZATION：Category 1

2,4/2,6-TDI(80/20), Respiratory sensitisation demonstrated in animal and man. (CERI hazard data collection 97-20 1998[12)], WHO 1987[20)], DFG 2003[21)], ACGIH 2004[22)], ACC 2004[23)], Botham et al. 1988[24)], Karol 1983[25)], Pauluhn and Mohr 1998[26)]). EU respiratory sensitiser (R42).

SKIN SENSITIZATION: Category 1

2,4/2,6-TDI(80/20), Skin sensitisation demonstrated in animal and man.(CERI hazard data collection 97-20 1998[12], WHO 1987[20], DFG 2003[21], ACC 2004[22], van Och et al. 2000[27], Zissu et al. 1998[28]). EU skin sensitiser (R43).

GERM CELL MUTAGENICITY：Not classified

2,4/2,6-TDI(80/20). There are no germ cell mutagenicity data. There are somatic cell mutagenicity data in vitro and in vivo and in particular mammalian studies, which are negative. (ACC 2004[23], Seel et al. 1999[29], Mackay 1992[15], Benford and Riley 1988[30], Loeser 1983[31]).

CARCINOGENICITY：Not classified

2,4/2,6-TDI(80/20), Carcinogenicity studies in rats and mice with inhalation exposure (the relevant route for human exposure) did not reveal any carcinogenic potential when tested up to the maximum tolerated does (Loeser 1983[31]). The carcinogenicity study dosing by the oral route (DHHS NTP 1986[32]) has been criticised for a variety of problems including exceeding the maximum tolerated dose, poor gavage technique causing deaths, and particularly inadequate storage of test material resulting in degradation of test chemical (Dieter et al. 1990[33], Schulz 1985[34]). As the test substance dosed included degradation products, this study is considered to be invalid and thus unreliable for classification purposes. In spite of the major study deficiencies some agencies have used the data for classification: (ACGIH 2004[22]) classification A4, (IARC 1999[35]) 2B, and EU category 3 (R40). Epidemiological studies of TDI exposed workers show no increased carcinogenicity related to TDI exposure.

REPRODUCTIVE TOXICITY：Not classified

2,4/2,6 TDI (80/20), Fertility: No adverse effects in a 2-generation study in rats. No indication of selective developmental toxicity at exposure levels without maternal toxicity (Tyl et al. 1999a,b[36],[37]).

SPECIFIC TARGET ORGAN TOXICITY-SINGLE EXPOSURE：Category 3 (respiratory tract irritation)

For animals transient effects (Shiotsuka 1987[38], Weyel et al. 1982[39], Sangha and Alarie, 1979[40]). For people irritation is detected at 0.05–0.1ppm (Henschler 1962[41]).

SPECIFIC TARGET ORGAN TOXICITY-REPEATED EXPOSURE：Not classified

2,4/2,6 TDI (80/20), Comment: Lung decrement has been reported in some studies as a consequence of repeated exposure to TDI. However, this effect can only be observed after inhalation exposure in the tissue at the point of contact and does not represent systemic toxicity. It is a local effect that is already covered by respiratory irritation (TOST single exposure, Cat. 3) and respiratory sensitization (Category 1). Ott (2002)[42] and Ott, Diller and Jolly (2003)[43], indicate that respiratory sensitisation may have contributed to the lung decrement reported in some studies. Therefore, it is concluded that possible lung effects do not qualify as specific target organ systemic toxicity after repeated exposure in accordance to chapter 3.9.1.6. of the GHS (UNECE 2003[44]). In addition, all warning and safety measures for local effects as well as for acute inhalation toxicity category 1 already provide for a protection of workers and professional users that are involved in the handling of TDI.

ASPIRATION HAZARD：Not classified

Not applicable.

12. ECOLOGICAL INFORMATION

AQUATIC TOXICITY[ACUTE]：Category 3

2,4/2,6-TDI(80/20), Daphnia magna, OECD 202, 48hr EC_{50} = 12.5mg/l (Tadokoro et al. 1997[45]). EU 52, Harmful to aquatic organisms.

AQUATIC TOXICITY [CRONIC] : Not classified

2,4/2,6-TDI(80/20), Daphnia magna, OECD 211, 21day NOEL = 1.1mg/l (Cerbelaud et al. 1997[46]).

13. DISPOSAL CONSIDERATIONS

THE REMAINDER WASTE

- Product waste must be incinerated in a hazardous waste incinerator in accordance with the relevant regulation oneself or must be incinerated by waste treatment company having the official approval of regulation.
- Notify dangerous and hazardous information thoroughly to waste treatment company.
- Contaminated clothing also should be disposed by appropriated process after harmless treatment.

POLLUTION CONTAINER AND PACKING

- Used containers could be recycled by cleaning or should be disposed accordance with official regulation.
- In case of disposal, remove all contents

14. TRANSPORT INFORMATION

INTERNATIONAL REGULATIONS

Air : Transport in accordance with ICAO-TI/IATA-DGR.

Sea : Transport in accordance with IMDG Code.

UN number : 2078

Hazard class : Class 6.1

Domestic Regulations

Land : Follow the mode of transportation as provided in the Fire and isaster Management Act, Industrial Safety and Health Act, Road Vehicles Act, etc.

Sea : Follow the mode of transportation as provided in the Ships Safety Act.

Air : Follow the mode of transportation as provided in the Aviation Law.

Special precaution

- Follow Fire and Disaster Management Act (Class 4-3).
- Follow Ship Safety Act (Class 6.1).

Emergency response guideline number : 156

15. REGULATORY INFORMATION

Industrial Safety and Health Act

Ordinance on Prevention of Hazards due to Specified Chemical-Substances (appended table 3 of article 2 of Order)	: Tolylene diisocyanate (Category Ⅱ)
Labeling substances (Article 57-1 of Act, appended table 2 of article 30 of Ordinance)	: Tolylene diisocyanate
Notifiable substances (Article 57-2 of Act, appended table 9 of article 18 of Order)	: Tolylene diisocyanate
Mutagenicity substances (guideline and notification substances)	: 2,6-Tolylene diisocyanate

Labor Standards Act

Illness chemical substances : Tolylene diisocyanate
(items 4-1 in appended table 1-2 of Ordinance 35)
(Public notice of the Ministry of Health and Welfare No. 36 of March 30, 1978)

Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law)

Class I Designated Chemical Substances : Tolylene diisocyanate
(Effective from October 1,2009) (Cabinet Order №1-298)

Fire and Disaster Management Act (Fire Service Law)

Dangerous Substances : Class 4-3

Ship Safety Act : Class 6.1

Aviation Law : Class 6.1

Act Relating to the Prevention of Marine Pollution and Maritime Disaster

Harmful liquid Substances : Category Y
(appended table 1 of Order)

Air Pollution Control Act

Substances of Hazardous Air Pollutant : Tolylene diisocyanate

16. OTHER INFORMATION

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All specifications are to be created based on the information we can get at this time may be revised by new knowledge.
The content, the physico-chemical property and so on are not a guaranteed-performance.
Notes are usually aimed at handling. If special handling, usage, please Usage for safety measures.

CONTACT

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