MSDS_Number : No Data

## 1. Identification

A. Product name : PROTECH PT-3000 A
○ Usage category : No Data

B. Recommended Use and Restriction on Use
○ General use : Polyaspartic flooring
○ Restriction on use : Restricted to use other than recommended use

C. Manufacturer / Supplier / distributor information
○ Company name : NOROO Paint & Coatings Co., Ltd.
○ Address : 351, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, Korea
○ Emergency telephone number : +82-31-467-6114

## 2. Hazard identification

A. GHS Classification
Acute toxicity (inhalation: vapor) Category 1
Carcinogenicity Category 1B
Germ cell mutagenicity Category 1B
Chronic aquatic toxicity Category 3
Skin sensitization Category 1(1A, 1B)
Aspiration hazard Category 1

B. GHS label elements
○ Hazard symbols

○ Signal words : DANGER
○ Hazard statements :
H330 Fatal if inhaled
H350 May cause cancer
H340 May cause genetic defects
H412 Harmful to aquatic life with long lasting effects
H317 May cause an allergic skin reaction
H304 May be fatal if swallowed and enters airways
○ Precautionary statements
- Prevention
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P284 (In case of poor ventilation) Wear respiratory protection.
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P273 Avoid release to the environment.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
- Response
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310 Immediately call a POISON CENTER or doctor/physician.
P320 Specific treatment
P308+P313 If exposed or concerned: Get medical advice / attention.
P302+P352 IF ON SKIN: Wash with plenty of soap and water.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P321 Specific treatment
P362+P364 Take off contaminated clothing and wash before reuse.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331 Do NOT induce vomiting.
- Storage
P403+P233 Store in a well-ventilated place. Keep container tightly closed
P405 Save by locking.
- Disposal
P501 Dispose of the contents and containers in accordance with waste-related laws.

C. Other hazards which do not result in classification : (NFPA Classification)

| NFPA grade / Chemical Name | Health | Flammability | Reactivity | GHS Classification |
|---|---|---|---|---|
| Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate) | NO DATA | NO DATA | NO DATA | NO DATA |
| Solvent naphtha (petroleum), light arom. | 1 | 2 | 0 | H303, H304, H313, H340, H350, H412 |

| | | | | |
|---|---|---|---|---|
| 2-Butenedioic acid (E)-, diethyl ester | 1 | 1 | 0 | H303, H313, H330 |
| 4,4-Dimethyl-1,3-oxazolidine | 2 | 2 | 0 | H303, H313, H330 |

## 3. Composition/information on ingredients

| Chemical Name | Trade names and Synonyms | CAS-NO | Content(%) |
|---|---|---|---|
| Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate) | Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate) | 136210-30-5 | 80~90 |
| Solvent naphtha (petroleum), light arom. | Solvent naphtha (petroleum), light arom. | 64742-95-6 | 11~21 |
| 2-Butenedioic acid (E)-, diethyl ester | 2-Butenedioic acid (E)-, diethyl ester | 623-91-6 | 1~10 |
| 4,4-Dimethyl-1,3-oxazolidine | 4,4-Dimethyl-1,3-oxazolidine | 51200-87-4 | 1~10 |

## 4. First-aid measures

A. Eye Contact : If irritation, pain, swelling, tears or glaring happens, take medical assistant immediately Flush exposed eyes with plenty of water for more than 15minutes.

B. Skin Contact : Wash off with soap and water for more than 15 minutes. And take medical assistant immediately. If symptoms like irritation or pain occurs, take medical assistant immediately. Remove exposed clothing, and wash off exposed area with soap and water.

C. Inhalation : Take a medical assistant immediately. Remove contaminated clothing and shoes, and isolate it. If hard to breathe, administering oxygen Perform the artificial respiration, using the pocket mask with one way valves or other respiratory medical devices. If inhalated or swallowed, do not perform the inhalation phase of breathing If not breathing, perform the artificial respiration. Avoid from exposure, and move into an area with fresh air.

D. Ingestion Contact : It is need to be considered that early removal of some ingested material by gastric lavage must be weighed against potential complications of bleeding or perforation Take proper medical assistant by symtoms. If ingested large quantity, take medical assistant. If unconscious, do not induce vomiting. In case of vomiting, keep head down under hip to prevent lung inhalation. Inducing vomit.

E. Notes to Physician : There is no specific antidote and take an appropriate medical treatment.

## 5. Fire-fighting measures

A. Suitable (Unsuitable) extinguishing media
- ○ Suitable extinguishing media : Powder extinguishing agent, gaseous Extinguishing Agent, and regular foam.
- ○ (Unsuitable) extinguishing media : Water is not appropriate extinguishing agent
- ○ Case of big fire : Use appropriate protective device depend on the situation. Stay away more than 800m to avoid tank explosion. Spread large amount of the extinguishing agent as a mist form with staying against wind.

B. Specific hazards arising from the chemical
- ○ Pyrolysate : Carbon dioxide, toxic carbon compounds/Nitrogen compounds/sulfur compounds
- ○ Fire and Explosion danger : Risk of medium-sized fire.

C. Special protective actions for fire-fighters
- ○ Personal Precautions, protective equipment : Gas mask or air respirator, heat resistant clothing, heat resistant helmet, heat resistant gloves, heat resistant boots
- ○ Emergency procedures : Block the area except for the fire-suppression personnel. Cooling containers with water long time after extinguish fire. If there is no risk, moving containers away from fire. Use appropriate extinguishing agents to catch fire.

## 6. Accidental release measures

A. Personal Precautions, protective equipment and emergency procedures
- ○ Personal Precautions, protective equipment : Gas mask for organic gases, other appropriate protective device / clothing / gloves.
- ○ Emergency procedures : Do not contact on the bare skin Do work with the personal protected devices such as gas mask for organic gases other appropriate protective devices / clothing / gloves. Spray water to reduce amount of steam. Take an action to block the leakage if there is no risk.

B. Environmental precautions
- ○ Atmosphere : Using local ventilation to Minimize the exposure to worker. Do install the local ventilations and full ventilation system
- ○ Soil : Use absorbent to collect the appropriate container. Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers.
- ○ Under water : Collect spilled material with mechanic devices Use absorbent to collect the appropriate container.

C. Methods and materials for containment and cleaning up
- ○ Small spill : Move to appropriate container for disposal of spilled material collected. Absorb for use sand or other non-combustible material.
- ○ Large spill : Notify to central and local government, when emissions are above regulation. Prohibit access of unnecessary people, isolate hazard area to secure.

## 7. Handling and storage

A. Precautions for safe handling : Use local ventilations and a full ventilation system when handling Seal the container for minimizing the petroleum steam Ground for preventing the static discharge Keep or handle followed by Dangerous goods Safety Management Act

B. Conditions for safe storage, including any incompatibilities : Stored in an isolated place, freezing caution, high temperature body caution. Avoid strong oxidizing agents, acid. Storage temperature: 5 ~ 35 ℃ Avoid direct sunlight while storing outdoor. Because of evaporation and contamination concerns, airtight the container and store in a well-

ventilated building.

## 8. Exposure controls/personal protection

A. Exposure Limits

○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ Solvent naphtha (petroleum), light arom.
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ 2-Butenedioic acid (E)-, diethyl ester
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ 4,4-Dimethyl-1,3-oxazolidine
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

B. Engineering Controls :

▷ Do install the local ventilations and full ventilation system
▷ Using local ventilation to Minimize the exposure to worker.
▷ NO DATA
▷ NO DATA

C. Personal Protective Equipment

○ Respiratory protection : Respiratory protection is ranked in order from minimum to maximum Respiratory protection may be needed, while frequent use or heavy exposure. Consider warning properties before use. Use the personal protect respirator for organic solvent or higher level of capacity when workers are supposed to be exposed under unsuitable respiratory working condition, or longer period exposure than standard level. Respirators should be authorized by Korea Occupational Safety and Health Agency

○ Eye protection : Let workers do wear the safety glasses in case hazard caused by mist may be expected. Install washing facilities and an emergency washing facilities close to workplace. Use the respirator for organic solvent or higher level.

○ Hand protection : Wear appropriate protective gloves Wear the chemical protective gloves Do the workers wear the impermeable protective gloves made from rubber/PVC due to skin irritation may be supposed by chronicle and long period exposure.

○ Skin protection : Wear cleanroom garment or appropriate protective clothing to prevent contamination Wear appropriate chemical protective clothing. Work after wearing the impermeable protective apron made by rubber/PVC in case hazard caused by exposure or spill, wear the impermeable whole body protective clothing if needed.

## 9. Physical and chemical properties

A. Appearance : light yellow liquid

B. Odor : aromatic smell

C. Odor threshold : NO DATA

D. PH : NO DATA

E. Melting point/Freezing point(℃) : NO DATA

F. Initial Boiling Point/Boiling Ranges(℃) : NO DATA

G. Flash point(℃) : 97.2

H. Evaporating Rate : NO DATA

I. Flammability(solid, gas)(℃) : 97.2

J. Upper/Lower Flammability or explosive limits : NO DATA

K. Vapour pressure : NO DATA

L. Solubility : NO DATA

M. Vapour density : NO DATA

N. Specific gravity : approx. 1.03

O. Partition coefficient of n-octanol/water : NO DATA

P. Autoignition temperature(℃) : NO DATA

Q. Decomposition temperature(℃) : NO DATA

R. Viscosity : approx. 130 CPS

S. Molecular weight : NO DATA

## 10. Stability and reactivity

A. Chemical stability : NO DATA

B. Possibility of hazardous reactions : Avoid contaminants and friction Do not contact with heat, spark, flame or other flammable sources

C. Conditions to avoid : Oxidation agent, metal and combustable materials

D. Hazardous decomposition products : Thermal decomposition products (carbon etc.,)

## 11.Toxicological information

A. Information on the likely routes of exposure
○ Respiratory tracts : Adverse lung effects, Dyspnoea, Hypothermia, Vomitting
○ Oral : Vomitting, Diarrhea, Stomach pain, Irregular heartbeat
○ Skin : Irritation, Burn, Adverse nerve effects
○ Eye : Irritation, eye damage

B. Delayed and immediate effects and also chronic effects from short and long term exposure
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- Acute toxicity
Oral : NO DATA
Dermal : NO DATA
Inhalation : NO DATA
- Skin corrosion/irritation : NO DATA
- Serious eye damage/irritation : NO DATA
- Respiratory sensitization : NO DATA
- Skin sensitization : NO DATA
- Carcinogenicity
IARC : NO DATA
OSHA : NO DATA
ACGIH : NO DATA
NTP : NO DATA
EU CLP : NO DATA
- Germ cell mutagenicity : NO DATA
- Reproductive toxicity : NO DATA
- STOT-single exposure : NO DATA
- STOT-repeated exposure : NO DATA
- Aspiration hazard : NO DATA
○ Solvent naphtha (petroleum), light arom.
- Acute toxicity
Oral : LD50 = 8400 mg/kg Rat
Dermal : LD50 > 2000 mg/kg Rabbit
Inhalation : LD50 > 2000 mg/kg Rabbit
- Skin corrosion/irritation : weakstimulus(rabbit)
- Serious eye damage/irritation : Mild irritant(rabbit)
- Respiratory sensitization : NO DATA
- Skin sensitization : Non-sensitizer (Guinea pig)
- Carcinogenicity
IARC : NO DATA
OSHA : NO DATA
ACGIH : NO DATA
NTP : NO DATA
EU CLP : Carc. 1B
- Germ cell mutagenicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
- Reproductive toxicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
- STOT-single exposure : Affecting the central nervous system. Inhalation of high concentrations vapors may cause loss of consciousness.
- STOT-repeated exposure : NO DATA
- Aspiration hazard : Harmful aspiration concerns
○ 2-Butenedioic acid (E)-, diethyl ester
- Acute toxicity
Oral : LD50 1367 mg/kg Rat (female, 1500-2000 mg/kg (male))
Dermal : LD50 3560 mg/kg rabbit
Inhalation : LD50 3560 mg/kg rabbit
- Skin corrosion/irritation : NO DATA
- Serious eye damage/irritation : NO DATA
- Respiratory sensitization : NO DATA
- Skin sensitization : NO DATA
- Carcinogenicity
IARC : NO DATA
OSHA : NO DATA
ACGIH : NO DATA
NTP : NO DATA
EU CLP : NO DATA
- Germ cell mutagenicity : NO DATA
- Reproductive toxicity : NO DATA
- STOT-single exposure : NO DATA
- STOT-repeated exposure : Repeated toxicity NOEL ≤ 11mg/kg/day
- Aspiration hazard : NO DATA
○ 4,4-Dimethyl-1,3-oxazolidine
- Acute toxicity
Oral : LD50 950 mg/kg Rat
Dermal : LD50 1400 mg/kg rabbit
Inhalation : LD50 1400 mg/kg rabbit
- Skin corrosion/irritation : NO DATA
- Serious eye damage/irritation : NO DATA
- Respiratory sensitization : NO DATA

- Skin sensitization : NO DATA
- Carcinogenicity
  IARC : NO DATA
  OSHA : NO DATA
  ACGIH : NO DATA
  NTP : NO DATA
  EU CLP : NO DATA
- Germ cell mutagenicity : Mutagenicity Studies: positive
- Reproductive toxicity : Mutagenicity Studies: positive
- STOT-single exposure : NO DATA
- STOT-repeated exposure : NO DATA
- Aspiration hazard : NO DATA

## 12. Ecological information

A. Ecotoxicity
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- Fish : NO DATA
- Crustaceans : NO DATA
- Algae : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Fish : LC50 = 9.22 ㎎/ℓ 96 hr Oncorhynchus mykiss
- Crustaceans : EC50 = 6.14 ㎎/ℓ 48 hr Daphnia magna
- Algae : EC50 = 19 ㎎/ℓ 72 hr Selenastrum capricornutum

○ 2-Butenedioic acid (E)-, diethyl ester
- Fish : LC50 4.5 ㎎/ℓ 96 hr
- Crustaceans : EC50 11 ㎎/ℓ 24 hr
- Algae : EC50 1.1 ㎎/ℓ 72 hr

○ 4,4-Dimethyl-1,3-oxazolidine
- Fish : LC50 59 ㎎/ℓ 96 hr Lepomis cyanellus
- Crustaceans : EC50 45 ㎎/ℓ 48 hr Daphnia magna
- Algae : NO DATA

B. Persistence and degradability
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- Persistence : NO DATA
- Degradability : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Persistence : log Kow = 2.1 ~ 6 (Estimates)
- Degradability : BOD5/COD = 0.43

○ 2-Butenedioic acid (E)-, diethyl ester
- Persistence : log Kow 2.12
- Degradability : NO DATA

○ 4,4-Dimethyl-1,3-oxazolidine
- Persistence : log Kow -0.08 (Estimates)
- Degradability : NO DATA

C. Bioaccumulative potential
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- Bioaccumulative potential : NO DATA
- Biodegration : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Bioaccumulative potential : NO DATA
- Biodegration : NO DATA

○ 2-Butenedioic acid (E)-, diethyl ester
- Bioaccumulative potential : NO DATA
- Biodegration : 92 ~ 95 (%) 28 day

○ 4,4-Dimethyl-1,3-oxazolidine
- Bioaccumulative potential : BCF 3.16 (Estimates)
- Biodegration : NO DATA

D. Mobility in soil
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
▷ NO DATA

○ Solvent naphtha (petroleum), light arom.
▷ NO DATA

○ 2-Butenedioic acid (E)-, diethyl ester
▷ NO DATA

○ 4,4-Dimethyl-1,3-oxazolidine
▷ Koc 9.432 (Estimates)

E. Other adverse effects
○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
▷ NO DATA

○ Solvent naphtha (petroleum), light arom.
▷ NO DATA

○ 2-Butenedioic acid (E)-, diethyl ester
▷ NO DATA

○ 4,4-Dimethyl-1,3-oxazolidine
▷ NO DATA

## 13. Disposal considerations

A. Disposal methods : Disposal material should keep in the airtighted container, and consign according to Waste Mateial Management Act

B. Special precautions for disposal : Discard it followed by appropriate regulations Prohibit the unauthorized disposal and incineration due to adversely affect natural ecosystems

## 14. Transport information

A. UN number : Non regulated

B. Proper shipping name : N/A

C. Hazard class : Non dangerous goods

D. Packing group : N/A

E. Marine pollutant : N/A

F. Special precautions for user related to transport or transportation measures
- ○ EmS FIRE SCHEDULE : N/A
- ○ EmS SPILLAGE SCHEDULE : N/A

## 15. Regulatory information

○ Tetraethyl N,N'-(methylenedi-4,1-cyclohexanediyl)bis(aspartate)
- Information of EU Classification
  - ▷ Classification : NO DATA
  - ▷ Risk Phrases : NO DATA
  - ▷ Safety Phrase : NO DATA
- U.S. Federal regulations
  - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : NO DATA
  - ▷ CERCLA Section 103 (40CFR302.4) : NO DATA
  - ▷ EPCRA Section 302 (40CFR355.30) : NO DATA
  - ▷ EPCRA Section 304 (40CFR355.40) : NO DATA
  - ▷ EPCRA Section 313 (40CFR372.65) : NO DATA
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Information of EU Classification
  - ▷ Classification : NO DATA
  - ▷ Risk Phrases : NO DATA
  - ▷ Safety Phrase : NO DATA
- U.S. Federal regulations
  - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
  - ▷ CERCLA Section 103 (40CFR302.4) : notapplicable
  - ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
  - ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
  - ▷ EPCRA Section 313 (40CFR372.65) : notapplicable
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ 2-Butenedioic acid (E)-, diethyl ester
- Information of EU Classification
  - ▷ Classification : NO DATA
  - ▷ Risk Phrases : NO DATA
  - ▷ Safety Phrase : NO DATA
- U.S. Federal regulations
  - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : NO DATA
  - ▷ CERCLA Section 103 (40CFR302.4) : NO DATA
  - ▷ EPCRA Section 302 (40CFR355.30) : NO DATA
  - ▷ EPCRA Section 304 (40CFR355.40) : NO DATA
  - ▷ EPCRA Section 313 (40CFR372.65) : NO DATA
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ 4,4-Dimethyl-1,3-oxazolidine
- Information of EU Classification
  - ▷ Classification : NO DATA
  - ▷ Risk Phrases : NO DATA
  - ▷ Safety Phrase : NO DATA
- U.S. Federal regulations
  - ▷ OSHA PROCESS SAFETY (29CFR1910.119) : NO DATA
  - ▷ CERCLA Section 103 (40CFR302.4) : NO DATA
  - ▷ EPCRA Section 302 (40CFR355.30) : NO DATA
  - ▷ EPCRA Section 304 (40CFR355.40) : NO DATA
  - ▷ EPCRA Section 313 (40CFR372.65) : NO DATA
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

## 16. Other information

A. Reference
This MSDS is based on 'Industrial safety and health' Act paragraph 41 and Proclamation of Ministry of Labor and Employment 2016-19, and considered domestic regulations.
This MSDS is based on KOSHA, NITE, ESIS, NLM, SIDS, IPCS, NCIS.

B. Issue date : 2021-06-09

C. Revision number and Last date revised : 1. 2021-06-09

D. Other : " WWW.NOROO.CO.KR"

MSDS_Number : No Data

## 1. Identification

A. Product name : PROTECH PT-3000 B
○ Usage category : No Data

B. Recommended Use and Restriction on Use
○ General use : Polyaspartic flooring
○ Restriction on use : Restricted to use other than recommended use

C. Manufacturer / Supplier / distributor information
○ Company name : NOROO Paint & Coatings Co., Ltd.
○ Address : 351, Bakdal-ro, Manan-gu, Anyang-si, Gyeonggi-do, Korea
○ Emergency telephone number : +82-31-467-6114

## 2. Hazard identification

A. GHS Classification
Flammable liquids Category 3
Acute toxicity (inhalation: vapor) Category 3
Carcinogenicity Category 1B
Germ cell mutagenicity Category 1B
Chronic aquatic toxicity Category 2
Specific target organ toxicity(Repeated exposure) Category 2
Aspiration hazard Category 1
Ozone Layer Hazards

B. GHS label elements
○ Hazard symbols

○ Signal words : DANGER
○ Hazard statements :
H226 Flammable liquid and vapour
H331 Toxic if inhaled
H350 May cause cancer
H340 May cause genetic defects
H411 Toxic to aquatic life with long lasting effects
H373 Prolonged or repeated exposure may cause damage to the liver, testes, skin, respiratory system, blood and central nervous system of the body (Refer Section SDS 11)
H304 May be fatal if swallowed and enters airways
H420 It destroys the upper layer of the ozone layer and is harmful to public health and environment.
○ Precautionary statements
- Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames and other sources of ignition. no smoking
P223 Do not contact with water
P240 Ground container and receiving equipment
P241 Use explosion-proof equipment (electricity, ventilation, lighting, etc.)
P242 Use only non-sparking tools. Flammable liquids (chapter 2.6) 1, 2, 3
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
- Response
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).
P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P310 Immediately call a POISON CENTER or doctor/physician.
P321 Specific treatment
P308+P313 If exposed or concerned: Get medical advice / attention.
P391 Collect spillage.
P314 Get medical advice/attention if you feel unwell.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331 Do NOT induce vomiting.
- Storage
P403+P235 Store in a well-ventilated place. Keep cool.
P403+P233 Store in a well-ventilated place. Keep container tightly closed

P405 Save by locking.
- Disposal
P501 Dispose of the contents and containers in accordance with waste-related laws.
P502 Please refer to the information on (recycling/recycling) provided by (manufacturer/supplier).

C. Other hazards which do not result in classification : (NFPA Classification)

| NFPA grade<br>Chemical Name | Health | Flammability | Reactivity | GHS Classification |
|---|---|---|---|---|
| 1,6-Diisocyanatohexane homopolymer | 2 | 1 | 1 | NO DATA |
| Solvent naphtha (petroleum), light arom. | 1 | 2 | 0 | H226, H304, H313, H340, H350, H411 |
| Xylene | NO DATA | NO DATA | NO DATA | H226, H304, H313, H331, H373 |
| Ethylbenzene | 2 | 3 | 0 | H226, H304, H313, H331, H420 |

## 3. Composition/information on ingredients

| Chemical Name | Trade names and Synonyms | CAS-NO | Content(%) |
|---|---|---|---|
| 1,6-Diisocyanatohexane homopolymer | 1,6-Diisocyanatohexane homopolymer | 28182-81-2 | 60~70 |
| Solvent naphtha (petroleum), light arom. | Solvent naphtha (petroleum), light arom. | 64742-95-6 | 29~39 |
| Xylene | Xylene | 1330-20-7 | 1~10 |
| Ethylbenzene | Ethylbenzene | 100-41-4 | 0.1~4 |

## 4. First-aid measures

A. Eye Contact : If irritation, pain, swelling, tears or glaring happens, take medical assistant immediately Flush exposed eyes with plenty of water for more than 15minutes.

B. Skin Contact : Wash off with soap and water for more than 15 minutes. And take medical assistant immediately. If symptoms like irritation or pain occurs, take medical assistant immediately. Remove exposed clothing, and wash off exposed area with soap and water.

C. Inhalation : Take a medical assistant immediately. Remove contaminated clothing and shoes, and isolate it. If hard to breathe, administering oxygen Perform the artificial respiration, using the pocket mask with one way valves or other respiratory medical devices. If inhalated or swallowed, do not perform the inhalation phase of breathing If not breathing, perform the artificial respiration. Avoid from exposure, and move into an area with fresh air.

D. Ingestion Contact : It is need to be considered that early removal of some ingested material by gastric lavage must be weighed against potential complications of bleeding or perforation Take proper medical assistant by symtoms. If ingested large quantity, take medical assistant. If unconscious, do not induce vomiting. In case of vomiting, keep head down under hip to prevent lung inhalation. Inducing vomit.

E. Notes to Physician : There is no specific antidote and take an appropriate medical treatment.

## 5. Fire-fighting measures

A. Suitable (Unsuitable) extinguishing media
○ Suitable extinguishing media : Powder extinguishing agent, gaseous Extinguishing Agent, and regular foam.
○ (Unsuitable) extinguishing media : Water is not appropriate extinguishing agent
○ Case of big fire : Use appropriate protective device depend on the situation. Stay away more than 800m to avoid tank explosion. Spread large amount of the extinguishing agent as a mist form with staying against wind.

B. Specific hazards arising from the chemical
○ Pyrolysate : Carbon dioxide, toxic carbon compounds/Nitrogen compounds/sulfur compounds
○ Fire and Explosion danger : Risk of medium-sized fire.

C. Special protective actions for fire-fighters
○ Personal Precautions, protective equipment : Gas mask or air respirator, heat resistant clothing, heat resistant helmet, heat resistant gloves, heat resistant boots
○ Emergency procedures : Block the area except for the fire-suppression personnel. Cooling containers with water long time after extinguish fire. If there is no risk, moving containers away from fire. Use appropriate extinguishing agents to catch fire.

## 6. Accidental release measures

A. Personal Precautions, protective equipment and emergency procedures
○ Personal Precautions, protective equipment : Gas mask for organic gases, other appropriate protective device / clothing / gloves.
○ Emergency procedures : Do not contact on the bare skin Do work with the personal protected devices such as gas mask for organic gases other appropriate protective devices / clothing / gloves. Spray water to reduce amount of steam. Take an action to block the leakage if there is no risk.

B. Environmental precautions
○ Atmosphere : Using local ventilation to Minimize the exposure to worker. Do install the local ventilations and full ventilation system
○ Soil : Use absorbent to collect the appropriate container. Trap spilled material at bottom in deep water pockets, excavated holding areas or within sand bag barriers.
○ Under water : Collect spilled material with mechanic devices Use absorbent to collect the appropriate container.

C. Methods and materials for containment and cleaning up
○ Small spill : Move to appropriate container for disposal of spilled material collected. Absorb for use sand or

other non-combustible material.
○ Large spill : Notify to central and local government, when emissions are above regulation. Prohibit access of unnecessary people, isolate hazard area to secure.

## 7. Handling and storage

A. Precautions for safe handling : Use local ventilations and a full ventilation system when handling Seal the container for minimizing the petroleum steam Ground for preventing the static discharge Keep or handle followed by Dangerous goods Safety Management Act

B. Conditions for safe storage, including any incompatibilities : Stored in an isolated place, freezing caution, high temperature body caution. Avoid strong oxidizing agents, acid. Storage temperature: 5 ~ 35 ℃ Avoid direct sunlight while storing outdoor. Because of evaporation and contamination concerns, airtight the container and store in a well-ventilated building.

## 8. Exposure controls/personal protection

A. Exposure Limits
○ 1,6-Diisocyanatohexane homopolymer
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ Solvent naphtha (petroleum), light arom.
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ Xylene
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

○ Ethylbenzene
- ACGIH : NO DATA
- Biological exposure indices : NO DATA

B. Engineering Controls :
▷ Do install the local ventilations and full ventilation system
▷ Using local ventilation to Minimize the exposure to worker.
▷ NO DATA
▷ NO DATA

C. Personal Protective Equipment
○ Respiratory protection : Use the personal protect respirator for organic solvent or higher level of capacity when workers are supposed to be exposed under unsuitable respiratory working condition, or longer period exposure than standard level. Respirators should be authorized by Korea Occupational Safety and Health Agency
○ Eye protection : Let workers do wear the safety glasses in case hazard caused by mist may be expected. Install washing facilities and an emergency washing facilities close to workplace. Use the respirator for organic solvent or higher level.
○ Hand protection : Wear the chemical protective gloves Do the workers wear the impermeable protective gloves made from rubber/PVC due to skin irritation may be supposed by chronicle and long period exposure.
○ Skin protection : Wear appropriate chemical protective clothing. Work after wearing the impermeable protective apron made by rubber/PVC in case hazard caused by exposure or spill, wear the impermeable whole body protective clothing if needed.

## 9. Physical and chemical properties

A. Appearance : Liquid

B. Odor : Specific Odor

C. Odor threshold : NO DATA

D. PH : NO DATA

E. Melting point/Freezing point(℃) : NO DATA

F. Initial Boiling Point/Boiling Ranges(℃) : NO DATA

G. Flash point(℃) : 27

H. Evaporating Rate : NO DATA

I. Flammability(solid, gas)(℃) : NON Flammable

J. Upper/Lower Flammability or explosive limits : NO DATA

K. Vapour pressure : NO DATA

L. Solubility : Water insoluble

M. Vapour density : NO DATA

N. Specific gravity : 1.0±0.3

O. Partition coefficient of n-octanol/water : NO DATA

P. Autoignition temperature(℃) : NO DATA

Q. Decomposition temperature(℃) : NO DATA

R. Viscosity : 40 ~ 60 KU

S. Molecular weight : NO DATA

## 10. Stability and reactivity

A. Chemical stability : NO DATA

B. Possibility of hazardous reactions : Avoid contaminants and friction Do not contact with heat, spark, flame or other flammable sources

C. Conditions to avoid : Oxidation agent, metal and combustable materials

D. Hazardous decomposition products : Thermal decomposition products (carbon etc.,)

## 11.Toxicological information

A. Information on the likely routes of exposure
- ○ Respiratory tracts : Adverse lung effects, Dyspnoea, Hypothermia, Vomitting
- ○ Oral : Vomitting, Diarrhea, Stomach pain, Irregular heartbeat
- ○ Skin : Irritation, Burn, Adverse nerve effects
- ○ Eye : Irritation, eye damage

B. Delayed and immediate effects and also chronic effects from short and long term exposure
- ○ 1,6-Diisocyanatohexane homopolymer
  - Acute toxicity
    Oral : NO DATA
    Dermal : NO DATA
    Inhalation : NO DATA
  - Skin corrosion/irritation : NO DATA
  - Serious eye damage/irritation : NO DATA
  - Respiratory sensitization : NO DATA
  - Skin sensitization : NO DATA
  - Carcinogenicity
    IARC : NO DATA
    OSHA : NO DATA
    ACGIH : NO DATA
    NTP : NO DATA
    EU CLP : NO DATA
  - Germ cell mutagenicity : NO DATA
  - Reproductive toxicity : NO DATA
  - STOT-single exposure : NO DATA
  - STOT-repeated exposure : This risk may be increased by exposure to a case : Respiratory disorders, skin disorders and allergies
  - Aspiration hazard : NO DATA
- ○ Solvent naphtha (petroleum), light arom.
  - Acute toxicity
    Oral : LD50 = 8400 mg/kg Rat
    Dermal : LD50 > 2000 mg/kg Rabbit
    Inhalation : LD50 > 2000 mg/kg Rabbit
  - Skin corrosion/irritation : weakstimulus(rabbit)
  - Serious eye damage/irritation : Mild irritant(rabbit)
  - Respiratory sensitization : NO DATA
  - Skin sensitization : Non-sensitizer (Guinea pig)
  - Carcinogenicity
    IARC : NO DATA
    OSHA : NO DATA
    ACGIH : NO DATA
    NTP : NO DATA
    EU CLP : Carc. 1B
  - Germ cell mutagenicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
  - Reproductive toxicity : EU CLP: 1B (case containing less than 0.1% of the benzene in a weight ratio of the material not applied to the present classification)
  - STOT-single exposure : Affecting the central nervous system. Inhalation of high concentrations vapors may cause loss of consciousness.
  - STOT-repeated exposure : NO DATA
  - Aspiration hazard : Harmful aspiration concerns
- ○ Xylene
  - Acute toxicity
    Oral : LD50=3550 mg/kg rat
    Dermal : LD50 4350 mg/kg Rabbit
    Inhalation : LD50 4350 mg/kg Rabbit
  - Skin corrosion/irritation : Skin irritation test in rabbits Causes moderate irritation.
  - Serious eye damage/irritation : Skin irritation test in rabbits Causes moderate irritation.
  - Respiratory sensitization : NO DATA
  - Skin sensitization : NO DATA
  - Carcinogenicity
    IARC : Group 3
    OSHA : NO DATA
    ACGIH : A4
    NTP : NO DATA
    EU CLP : NO DATA
  - Germ cell mutagenicity : If three people a voice dynamics, somatic cell mutagenicity tests in vivo (micronucleus test, chromosome test) Voice
  - Reproductive toxicity : If three people a voice dynamics, somatic cell mutagenicity tests in vivo (micronucleus

test, chromosome test) Voice
- STOT-single exposure : NO DATA
- STOT-repeated exposure : NO DATA
- Aspiration hazard : In the liquid can cause chemical pneumonia if swallowed.

○ Ethylbenzene
- Acute toxicity
  Oral : LD50 = 3500 ㎎/㎏ Rat
  Dermal : LD50 = 15400 ㎎/㎏ Rabbit
  Inhalation : Steam LC50 = 4000 ppm 4 hr Rat (Equivalents : 17.4 ㎎/L)
- Skin corrosion/irritation : skin Irritation test result weak Irritation
- Serious eye damage/irritation : Rabbit eye irritation test results in a slight conjunctival irritation, recoverable damage.
- Respiratory sensitization : NO DATA
- Skin sensitization : NO DATA
- Carcinogenicity
  IARC : Group 2B
  OSHA : NO DATA
  ACGIH : A3
  NTP : NO DATA
  EU CLP : NO DATA
- Germ cell mutagenicity : Micronucleustest Negative (7)
- Reproductive toxicity : Micronucleustest Negative (7)
- STOT-single exposure : It causes central nervous system effects in laboratory animals and airway irritation.
- STOT-repeated exposure : NO DATA
- Aspiration hazard : Hydrocarbons. Swallowing the liquid by aspiration may cause chemical pneumonia. Ties seongryul 0.74 ㎟ / s (25 ℃)

## 12. Ecological information

A. Ecotoxicity

○ 1,6-Diisocyanatohexane homopolymer
- Fish : NO DATA
- Crustaceans : NO DATA
- Algae : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Fish : LC50 = 9.22 ㎎/ℓ 96 hr Oncorhynchus mykiss
- Crustaceans : EC50 = 6.14 ㎎/ℓ 48 hr Daphnia magna
- Algae : EC50 = 19 ㎎/ℓ 72 hr Selenastrum capricornutum

○ Xylene
- Fish : NO DATA
- Crustaceans : NO DATA
- Algae : NO DATA

○ Ethylbenzene
- Fish : LC50 = 9.09 ㎎/ℓ 96 hr
- Crustaceans : LC50 = 0.4 ㎎/ℓ 96 hr
- Algae : NO DATA

B. Persistence and degradability

○ 1,6-Diisocyanatohexane homopolymer
- Persistence : NO DATA
- Degradability : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Persistence : log Kow = 2.1 ~ 6 (Estimates)
- Degradability : BOD5/COD = 0.43

○ Xylene
- Persistence : NO DATA
- Degradability : NO DATA

○ Ethylbenzene
- Persistence : NO DATA
- Degradability : NO DATA

C. Bioaccumulative potential

○ 1,6-Diisocyanatohexane homopolymer
- Bioaccumulative potential : NO DATA
- Biodegration : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Bioaccumulative potential : NO DATA
- Biodegration : NO DATA

○ Xylene
- Bioaccumulative potential : NO DATA
- Biodegration : 39 (%)

○ Ethylbenzene
- Bioaccumulative potential : NO DATA
- Biodegration : NO DATA

D. Mobility in soil

○ 1,6-Diisocyanatohexane homopolymer
▷ NO DATA

○ Solvent naphtha (petroleum), light arom.
▷ NO DATA

○ Xylene
▷ log Kow = 3.12 (measured) (ortho), 3.2 (measured) (meta), 3.15 (measurements) (p) (5)

○ Ethylbenzene

▷ log Kow = 3.15 (11)

E. Other adverse effects
○ 1,6-Diisocyanatohexane homopolymer
▷ NO DATA
○ Solvent naphtha (petroleum), light arom.
▷ NO DATA
○ Xylene
▷ NO DATA
○ Ethylbenzene
▷ NO DATA

## 13. Disposal considerations

A. Disposal methods : Disposal material should keep in the airtighted container, and consign according to Waste Mateial Management Act

B. Special precautions for disposal : Discard it followed by appropriate regulations Prohibit the unauthorized disposal and incineration due to adversely affect natural ecosystems

## 14. Transport information

A. UN number : 1263

B. Proper shipping name : Paint (including paint, lacquer, enamel, colorants, shellac solutions, varnish, polish, liquid filler and liquid lacquer sealer) or related materials (including paint diluent and reductant). (Solvent naphtha (petroleum), light arom.)

C. Hazard class : 3

D. Packing group : III

E. Marine pollutant : be applicable

F. Special precautions for user related to transport or transportation measures
○ EmS FIRE SCHEDULE : F-E
○ EmS SPILLAGE SCHEDULE : S-E

## 15. Regulatory information

○ 1,6-Diisocyanatohexane homopolymer
- Information of EU Classification
▷ Classification : NO DATA
▷ Risk Phrases : NO DATA
▷ Safety Phrase : NO DATA
- U.S. Federal regulations
▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
▷ CERCLA Section 103 (40CFR302.4) : notapplicable
▷ EPCRA Section 302 (40CFR355.30) : notapplicable
▷ EPCRA Section 304 (40CFR355.40) : notapplicable
▷ EPCRA Section 313 (40CFR372.65) : notapplicable
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ Solvent naphtha (petroleum), light arom.
- Information of EU Classification
▷ Classification : NO DATA
▷ Risk Phrases : NO DATA
▷ Safety Phrase : NO DATA
- U.S. Federal regulations
▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
▷ CERCLA Section 103 (40CFR302.4) : notapplicable
▷ EPCRA Section 302 (40CFR355.30) : notapplicable
▷ EPCRA Section 304 (40CFR355.40) : notapplicable
▷ EPCRA Section 313 (40CFR372.65) : notapplicable
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ Xylene
- Information of EU Classification
▷ Classification : NO DATA
▷ Risk Phrases : NO DATA
▷ Safety Phrase : NO DATA
- U.S. Federal regulations
▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
▷ CERCLA Section 103 (40CFR302.4) : 45.3599 kg 100 lb
▷ EPCRA Section 302 (40CFR355.30) : notapplicable
▷ EPCRA Section 304 (40CFR355.40) : notapplicable
▷ EPCRA Section 313 (40CFR372.65) : pertinent
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

○ Ethylbenzene
- Information of EU Classification

▷ Classification : NO DATA
▷ Risk Phrases : NO DATA
▷ Safety Phrase : NO DATA

- U.S. Federal regulations
  ▷ OSHA PROCESS SAFETY (29CFR1910.119) : notapplicable
  ▷ CERCLA Section 103 (40CFR302.4) : 453.599 kg 1000 lb
  ▷ EPCRA Section 302 (40CFR355.30) : notapplicable
  ▷ EPCRA Section 304 (40CFR355.40) : notapplicable
  ▷ EPCRA Section 313 (40CFR372.65) : pertinent
- Rotterdam Convention listed ingredients : NO DATA
- Stockholm Convention listed ingredients : NO DATA
- Montreal Protocol listed ingredients : NO DATA

## 16. Other information

A. Reference
This MSDS is based on 'Industrial safety and health' Act paragraph 41 and Proclamation of Ministry of Labor and Employment 2016-19, and considered domestic regulations.
This MSDS is based on KOSHA, NITE, ESIS, NLM, SIDS, IPCS, NCIS.

B. Issue date : 2021-06-09

C. Revision number and Last date revised : 1. 2021-06-09

D. Other : " WWW.NOROO.CO.KR"