

SAFETY DATA SHEET

Date Printed: June 4, 2018

Version: 5

Revision date: June 9, 2020

Regulation: In accordance with Commission Regulation (EU) CLP 1272/2008

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

1.1 Product identifier

1.1.1. Product name: KONNATE T-100

1.1.2. EC No.: 209-544-5

1.1.3. REACH Registration No.: 01-2119486974-18-0000

1.1.4. CAS No.: 584-84-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Identified Uses

- Manufacture
- Formulation: Adhesives and sealants industrial use, other composite material industrial use, manufacturing of TDI, coating industrial use, flexible foam industrial use, formulating, repackaging and distribution, manufacturing of other substances, elastomers, TPU, polyimide and synthetic fibres industrial use
- Uses at industrial sites: Manufacturing of TDI, other composite material industrial use, coating industrial use, adhesives and sealants industrial use, formulating, repackaging and distribution, flexible foam industrial use, manufacturing of other substances, elastomers, TPU, polyimide and synthetic fibres industrial use
- Uses by professional workers: other composite material professional use, adhesives and sealants professional use, coating professional use

1.2.2. Recommended use

- Soft foam is being used in footwear, furniture, automotive, bedding, toys and semi-rigid foams used car interiors, etc.

1.2.3. Restrictions on use

- Do not use for purposes other than those recommended.

1.3 Details of the supplier of the safety data sheet

1.3.1. Manufacturer

Company name: TDI Plant, Hanwha Solutions Co, Ltd.

Address: 46-47, Yeosusandan 2-ro, Yeosu-si, Jeollanam-do, Korea

Prepared by: TDI Production Team

Contact Telephone: +82-61-688-4888

1.3.2. Supplier & Distributor

Company name: Hanwha Solutions Co, Ltd.

Address: Hanwha Building, 86 Cheonggyecheon-ro, Jung-gu, Seoul, Korea

Prepared by: TDI Sales Team

Contact Telephone: +82-2-729-2700

1.3.3. Fax: +82-2-729-5347

1.3.4. Email Address: alvin@hanwha.com

1.4. Emergency telephone number

1.4.1. Emergency Telephone: +82-2-729-3079, +82-61-688-4888

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 (CLP)

Physical / Chemical Hazards:

Classification according to Regulation (EC) 1272/2008 (CLP):

Not classified

Health Hazards:

Classification according to Regulation (EC) 1272/2008 (CLP):

Acute toxicity (inhalation: vapors): Category 1

Skin corrosion/irritation: Category 2

Eye Damage/irritation: Category 2A

Skin sensitization: Category 1

Respiratory sensitization: Category 1

Carcinogenicity: Category 2

Specific target organ toxicity (Single exposure): Category 3 (respiratory tract irritation)

Environmental Hazards:

Classification according to Regulation (EC) 1272/2008 (CLP):

Not classified

2.2 Label elements

Hazard pictograms:



Signal word: Danger

Hazard statement:

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H319 Causes serious eye irritation

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.

Additional precautionary statements: Not applicable

Precautionary statements

- Precaution:

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/vapors/spray.

P261 Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 Wash your 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.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P284 Wear respiratory protection.

- Treatment:

P302+P352 If on skin: Wash with plenty of soap and water.

P304+P340 If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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 you feel unwell.

P320 Specific treatment is urgent (see Section 8 on this label).

P321 Specific treatment (see Section 8 on this label).

P332+P313 If skin irritation occurs: Get medical advice/ attention.

P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

P337+P313 If eye irritation persists: 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.

- Storage:

P403+P233: Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

- Disposal:

P501 Dispose the contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards

- **Additional precautionary statements:** Not applicable

- **National Fire Protection Association (NFPA)**

Health: 2

Flammability: 1

Reactivity: -

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS No.	EC No.	Conc. / %	Classification according to 1272/2008/EEC	(Pre) Registration No.
Toluene diisocyanate	584-84-9	209-544-5	100	Carc. 2, Acute Tox. 2 *, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1, Aquatic Chronic 3	01-2119486974-18-0000

Note C: Some organic substances may be marketed either in a specific isomeric form or as a mixture of several isomers. In this case the supplier must state on the label whether the substance is a specific isomer or a mixture of isomers.

4. FIRST AID MEASURES

4.1 Description of first aid measures

4.1.1. General information:

Remove soiled or soaked clothing immediately, do not allow to dry.

Adhere to personal protective measures when giving first aid.

Clean body thoroughly (Bad, shower).

4.1.2. Following inhalation:

If inhaled: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Immediately call a poison center or doctor/physician.

If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

4.1.3. Following skin contact:

If skin irritation or rash occurs: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.

Call emergency medical service.

Remove and isolate contaminated clothing and shoes.

In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

For minor skin contact, avoid spreading material on unaffected skin.

4.1.4. Following eye contact:

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

4.1.5. Following ingestion:

If exposed or concerned: Get medical advice/ attention.

Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or others proper respiratory medical device.

4.1.6. Self-protection of the first aider:

First aider: Pay attention to self-protection!

4.2 Most important symptoms and effects, both acute and delay Acute effects:

- Inhalation: May cause acute toxic effects.
- Skin contact: Contact with this substance will cause skin irritation moderately.
- Eye contact: May cause severe irritation of eyes.

4.3 Indication of immediate medical attention and notes for physician

- Exposures require specialized first aid with contact and medical follow-up.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

- Suitable extinguisher: Alcohol foam, carbon dioxide, water spray, dry chemical, foam-extinguishing agent
- Unsuitable extinguisher: High volume water jet

5.2 Special hazards arising from the substance or mixture

- Thermal decomposition products: Cyanide, carbon oxides, nitrogen (nitrogen oxide, TDI vapors, carbon dioxide, carbon monoxide, hydrogen chloride, hydrogen cyanide)
- Vapor-air mixtures are explosive above flash point.
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- Containers may explode when heated or if contaminated with water.
- When heated, vapors may form explosive mixtures with air: explosion hazards indoors, outdoors and in sewers
- Vapors may travel to source of ignition and flash back.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.

5.3 Advice for firefighters

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas.
- Substance will react with water (some violently) into releasing flammable, toxic or corrosive gases and runoff.
- Move containers from fire area if you can do it without risk.
- Do not get water inside containers.
- Fire involving Tanks; Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out.
- Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Fire involving Tanks; Always stay away from tanks engulfed in fire.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

- Avoid breathing dust/fume/gas/mist/vapors/spray.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Isolate hazard area.
- Keep unnecessary and unprotected personnel from entering.
- Eliminate all ignition sources.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

- A vapor suppressing foam may be used to reduce vapors.
- Do not get water inside containers.
- Please note that there are materials and conditions to avoid.

6.2 Environmental precautions

- Runoff from fire control may be corrosive and/or toxic and cause pollution.
- Prevent entry into water ways, sewers, basements or confined areas.

6.3 The methods of purification and removal

- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Reduce dust and prevent scattering by moistening with water.
- Absorb the liquid and scrub the area with detergent and water.
- Cover with Dry earth, DRY sand or other non-combustible material and put on the plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Dissolve in water and collect for proper disposal.
- TDI neutralizer

Powder, aqueous ammonia, alcoholic solution and calcium hydroxide are suitable as neutralizing agent when the leak.

- 1) Powder

Sawdust	23.0 WT%
Clay	38.5 WT%
Ethanol	19.2 WT%
Triethanol amine	3.8 WT%
Ammonia concentrations	3.8 WT%
Water	11.7 WT%
- 2) Aqueous ammonia

Ammonia concentrations	3 - 8 WT%
Liquid detergent	0.2-0.5 WT%
Water	90-95 WT%
- 3) Alcoholic solution

Alcohol	50 WT%
Ammonia concentrations	5 WT%
Water	45 WT%
- 4) Calcium hydroxide

- *Caution) 1. Alcohol solution must be careful when you use it to fire flammable.
 2. Neutralizer amount is equal or more to the amount of spilled TDI.
 3. If the neutralizer is not urgently prepared, use the wet sand in a simple way.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

- Do not handle until all safety precautions have been read and understood.
- Avoid breathing dust/fume/gas/mist/vapors/spray.
- Wash your hands thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- Follow all MSDS/label precautions even after container is emptied because they may retain product residues.
- Use carefully in handling/storage.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- All equipment used when handling the product must be grounded.
- You need measurement of air concentration and ventilation in low, closed and confined areas due to lack of oxygen.

- Avoid contact with water.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a cool, well-ventilated place. Keep container tightly closed.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Store in a nitrogen filled container when stored again.
- Protect against moisture.
- Custody temperature 20 ~ 30 °C are proper and it is made to freeze from below 25 °C and DIMER creates is paid attention from high temperature

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure limits

o EU regulation:

- Austria: TWA[TMW]=0.005ppm(0.035mg/m³), STEL[KZW](4x15min)=0.02ppm(0.14mg/m³)
- Belgium: TWA=0.005ppm(0.037mg/m³), STEL=0.02ppm(0.14mg/m³)
- Czech Republic: TWA=0.05mg/m³

o U.S regulation:

- NIOSH: Not available
- OSHA: TWA=0.005 ppm(0.04mg/m³), STEL=0.02ppm(0.15 mg/m³), Ceiling=0.02ppm(0.14mg/m³)

o ACGIH: TWA=0.005 ppm, STEL=0.02ppm

o Biological exposure index: 5 µg/g

o Others:

- Argentina: TWA[CMP]=0.005ppm, STEL[CMP-CPT]=0.02ppm
- Bahrain: TWA=0.005ppm(0.035mg/m³), STEL=0.02ppm(0.14mg/m³)
- Chile: TWA LPP=0.004ppm(0.03mg/m³), STEL LPT=0.02ppm(0.14mg/m³)

o DNELs, PNECs:

Exposure route of relevance	DNELs, DMELs PNECs											
	Industrial				Professional				Consumer			
	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect	Long term, Local effects	Long term, systemic effects	Short term, local effects	Short term, systemic effect
Human: oral (mg/kg bw/day)	-	-	-	-	-	-	-	-	-	-	-	-
Human: inhalation (mg/m ³)	35	35	140	140	-	-	-	-	-	-	-	-
Human: dermal (mg/kg bw/day)	-	-	-	-	-	-	-	-	-	-	-	-
Environment : water	12.5 ug/L (Freshwater), 1.25 ug/L (Marine water), 125 ug/L (Intermittent releases)											
Environment : air	-											
Environment : soil	1 mg/kg soil dw											
Environment : sediment	-											

Environment : STP	1 mg/L
Environment : Predators	-

8.2 Exposure controls

Appropriate engineering controls:

- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
- If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the recommended exposure limit.
- Facilities for storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Individual protection measures, such as personal protective equipment:

Respiratory protection:

- Follow the European Standard EN149. Use a European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Eye protection:

- Wear the protective glasses or breathable safety goggles to protect from vaporous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection:

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection:

- Wear appropriate resistant protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance

Description :	Liquid
Color:	colorless to yellowish
Odor:	characteristic, pungent
Odor threshold:	0.049~2.14 ppm
pH :	Not applicable
Melting point/freezing point:	21~23.5°C
Initial boiling point and boiling range:	251°C
Flash point:	127°C
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Upper/lower flammability or explosive limits:	UEL 9.5% / LEL 0.5%
Vapor pressure:	0.03mmHg (25°C)
Vapor density:	6 (Air=1)
Relative density:	1.22 (25°C)
Solubility(ies):	Insoluble
Partition coefficient: n-octanol/water:	Log Kow=0.21(estimated)
Auto-ignition temperature:	> 600°C
Decomposition temperature:	Not available
Viscosity:	3.1cP (25 °C)
Explosive properties:	Not available
Oxidizing properties:	Not available
Molecular weight:	174.2g/mol

10. STABILITY AND REACTIVITY

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions

- Stable(Non-hazardous polymerization occurs slowly above 40 °C)
- Reacts exothermically with water yielding carbon dioxide and an organic base.
- May darken on exposure to sunlight
- Toxic gas that may accumulate in a closed space
- May decompose at high temperatures into forming toxic gases.
- Containers may explode when heated or if contaminated with water.
- When heated, vapors may form explosive mixtures with air: explosion hazards indoors, outdoors and in sewers
- Some of these materials may burn, but none ignite readily.
- Some may produce flammable hydrogen gas upon contact with metals.
- CORROSIVE and/or TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Contact with molten substance may cause severe burns to skin and eyes.

10.2 Conditions to avoid

- Keep away from heat/sparks/open flames/hot surfaces.
- Containers may be exploded and ruptured when heated.
- People should avoid inhalation and to avoid the contact with water.

10.3 Incompatible materials

- Acid, acyl chloride, alcohol, aluminum, amines, ammonia, aniline, strong bases, copper and copper alloys, activated hydrogen, metal, strong oxidizing agents, plastics, rubber, coating, polyurethane, surface active agents, zinc alloy

10.4 Hazardous decomposition products:

- Thermal decomposition products: Cyanide, carbon oxides, nitrogen (nitrogen oxide, TDI vapors, carbon dioxide, carbon monoxide, hydrogen chloride, hydrogen cyanide)

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects	
(a) Acute toxicity	
Oral	Not classified
	Rat(female) LD ₅₀ =4,130 mg/kg bw (read-across, CAS No. 26471-62-5) (OECD TG 401)
Dermal	Not classified
	Rabbit, LD ₅₀ >9,400 mg/kg bw (read-across, CAS No. 26471-62-5) (OECD TG 402)
Inhalation	Category 1
	Rat, LC ₅₀ (4h) = 0.234 mg/L (read-across, CAS No. 26471-62-5) (OECD TG 403)
(b) Skin Corrosion/ Irritation	Category 2
	In a primary dermal irritation study with six albino female rabbits, slight to severe erythema and very slight to moderate oedema were observed at 24 hours. Skin effects were reversible within 3 weeks. The primary dermal irritation index (based on scores obtained at 24 and 72 hours) was 3.6 on 0-8 scale.

(c) Serious Eye Damage/ Irritation	Category 2A
	In an eye irritation study with albino rabbits (Wazeter, 1964), TDI induced moderate to severe corneal opacity continued to exhibit diffuse opaque areas 30 days after instillation. Circumcorneal injection of the iris was observed in all groups treated, but cleared in all group by the eighth day. And all three groups showed severe irritation of the conjunctivae, which continue for 18 days. (cornea score=0.66/4, iris score=0.33/2, conjunctivae score=3/3, chemosis scroe=4/4)(read-across, CAS No. 26471-62-5)
(d) Respiratory sensitization	Category 1
	In respiratory sensitization study with guinea pigs(female), results show that detection of antibodies and elicitation of pulmonary hypersensitivity response is dependent upon physicochemical properties of <i>hapten-protein</i> conjugate. (read-across, CAS No. 26471-62-5)
(e) Skin Sensitization	Category 1
	According to the respiratory sensitation assay with guinea pig, the test substance was shown to be a potential respiratory sensitiser. (read-across, CAS No. 26471-62-5)
(f) Carcinogenicity	Category 2
	- ACGIH: A4 (Not Classifiable as a Human Carcinogen) - EU CLP 1272/2008: 2 (Suspected of causing cancer)
(g) Mutagenicity	Not classified
	<i>In vitro</i> : Bacterial Reverse Mutation Assay: with/without metabolic activation: Positive (OECD TG 471) <i>In vitro</i> : Mammalian Chromosome Aberration Test: with/without metabolic activation: Negative (OECD TG 473, GLP) <i>In vivo</i> : Mammalian Erythrocyte Micronucleus Test: Negative (read-across, CAS No. 26471-62-5) (OECD TG 474, GLP) <i>In vivo</i> : Unscheduled DNA synthesis: Negative (read-across, CAS No. 26471-62-5) (GLP)
(h) Reproductive toxicity	Not classified
	- Clinical signs of toxicity (nasal discharge in males and red-tinged fur in females) were observed in the high-exposure F0 group. And histopathology revealed a significant increase in the incidence of rhinitis in the nasal turbinate of F0 animals (both sexes). Hyperplasia and dysplasia of the respiratory epithelium of F0 males and hyperplasia was significantly increased in F0 females. In the high-exposure group (males), there was a significant increase in the incidence of submucosal lymphoid infiltrates in both the larynx and the trachea as well as a significant increase in the incidence of intracellular eosinophilic droplets. (NOAEC(P)=0.08 ppm, NOAEC(F1)=0.3 ppm, NOAEC(F2)=0.02 ppm) (read-across, CAS No. 26471-62-5) (OECD TG 416, GLP) - According to Prenatal Developmental Toxicity Study with rat, significant body weight reduction, significant body weight gain reduction and significantly reduced food consumption. No effect level for maternal and developmental toxicity is 0.1 ppm. (NOAEC(maternal toxicity, teratogenicity)=0.1 ppm, LOAEC(maternal toxicity, fetotoxicity)=0.5 ppm)(read-across, CAS No. 26471-62-5)(OECD TG 414, GLP)
(i) Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation)
	- According to measurement of respiratory rate using mouse, Effect on respiratory rate was concentration and time dependent. (RD50(decrease of respiratory rate)=0.199 ppm / 4hr)

	- Lesions occurring in the resp tract of mice after exposure to 10 sensory irritants, at a concn which elicited a resp rate decr of 50%, were compared with respect to type and severity. The RD50 of 2,4-toluene diisocyanate was 0.4 ppm. All irritants produced lesions in the nasal cavity with a distinct anterior-posterior severity gradient.
(j) Specific target organ toxicity (repeat exposure)	Not classified
	In a combined chronic toxicity and carcinogenicity study with mice, increased clinical signs of swollen abdomens and opaque watery eyes were observed from week 65 onwards. And histopathology revealed marked inflammatory processes in trachea, larynx, bronchi, lungs and predominantly in nasal turbinate (chronic and necrotic rhinitis) of male and female animals. (NOAEC(male)=0.05 ppm, NOAEC(female)<0.05 ppm, LOAEC(male)=0.15 ppm, LOAEC(male)=0.05 ppm) (read-across, CAS No. 26471-62-5) (OECD TG 453, GLP) This substance has already been classified for specific health hazard categories (acute inhalation, skin/respiratory sensitization, skin/eye/respiratory irritation, etc.) due to membrane irritation, sensitization, etc., and therefore should not be classified for specific target organ toxicity.
(k) Aspiration Hazard	Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity	
Acute toxicity	Not classified
	Fish: <i>Oncorhynchus mykiss</i> , LC ₅₀ (96h)=133 mg/L static (read-across, CAS No. 26471-62-5) (OECD TG 203) Invertebrate: <i>Daphnia magna</i> , EC ₅₀ (48h)=12.5 mg/L static (read-across, CAS No. 26471-62-5) (OECD TG 202) Algae: <i>Skeletonema costatum</i> , EC ₅₀ (96h)=3,230 mg/L static (read-across, CAS No. 26471-62-5) (OECD TG 201)
	Chronic toxicity
Chronic toxicity	Not classified Invertebrate: <i>Daphnia magna</i> , NOEC(21d)=1.1 mg/L static (read-across, CAS No. 26471-62-5) (OECD TG 211, GLP)
12.2 Persistence and degradability	Persistence: Low persistency (log Kow is more than 4 estimated.) (Log Kow=0.21) Degradability: Half lifecycle 0.5~1.6hr (27°C, pH=6.3, 7)
12.3 Bio-accumulative potential	Bioaccumulation: Bioaccumulation is expected to be low according to the BCF <500 (BCF = 136.4L/kg wet-wt(estimated)) Biodegradation: As not well-biodegraded, it is expected to have high accumulation potential in living organisms (0% biodegradation was observed after 28 days) (read-across, CAS No. 26471-62-5) (OECD TG 302 C)
12.4 Mobility in soil	High potency of mobility to soil. (Koc =1,760(estimated))
12.5 Results of PBT and vPvB assessment	The substance is not PBT / vPvB
12.6 Hazardous to the ozone layer	Not classified
12.7 Other adverse effects	Not available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.

13.1.1 Product/Packaging disposal:

- Consider the required attentions in accordance with waste treatment management regulation.

13.1.2 Waste treatment-relevant information:

Waste must be disposed of in accordance with directive 2008/98/EC.

13.1.3 Sewage disposal-relevant information:

Release to the environment or sewage system is prohibited. Must be treated as hazardous waste.

13.1.4 Other disposal recommendations: Not available

14. TRANSPORT INFORMATION

14.1 UN No.: 2078

14.2 UN Proper shipping name: TOLUENE DIISOCYANATE

14.3 Transport Hazard class

ADR: 6.1

IMDG: 6.1

ICAO/IATA: 6.1

RID: 6.1

14.4 Packing group: II

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user

in case of fire: F-A

in case of leakage: S-A

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulation/legislation specific for mixture

EU Regulatory Information

EU classification

EU 1272/2008(CLP)

Classification: Carc. 2, Acute Tox. 2 *, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1, Aquatic Chronic 3

Risk phrases: H351, H330, H335, H315, H319, H334, H317, H412

Safety phrases: P201, P202, P280, P260, P271, P284, P264, P261, P284, P272, P273, P308+P313, P304+P340, P310, P320, P312, P302+P352, P321, P332+P313, P362+P364, P305+P351+P338, P337+P313, P342+P311, P333+P313, P405, P403+P233, P501

EU SVHC list: Not regulated

EU Authorization list: Not regulated

EU Restriction list: Not regulated

Waste Framework Directive 2008/98/EC: Not regulated

Foreign Inventory Status

- Korea management information: Existing Chemical Substance (KE-10929), Accident precaution chemicals

Phase-in substance subject to registration (210),
Toxic Chemical (2010-1-611)

- European Inventory of Existing Commercial Chemical Substances(EINECS): Present (209-544-5)
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (11920)
- Japan management information: Existing and New Chemical Substances (ENCS): (3)-2214
- Canada management information: Domestic Substances List (DSL): Present
- Australia management information: Australia Inventory of Chemical Substances (AICS): Present
- New Zealand management information: New Zealand Inventory of Chemicals (NZIoC): HSNO Approval: HSR001552
- Philippines management information: Philippines Inventory of Chemicals and Chemical Substances (PICCS): Present

15.2 Chemical safety assessment: Not available

16. OTHER INFORMATION

Product safety data sheet for prepared in accordance with Regulation (EU) 1272/2008

16.1 Indication of changes:

- Preparation date: June 4, 2018
- Version: 5
- Revision date: June 9, 2020

16.2 Key literature reference and sources for data:

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>
 NIOSH (The National Institute for Occupational Safety and Health)
 ACGIH (American Conference of Governmental Industrial Hygienists)
 TOMES-LOLI®; <http://www.rightanswerknowledge.com/loginRA.asp> ◦ National Emergency
 Management Agency-Korea dangerous material inventory management system;
<http://www.nema.go.kr/hazmat/main/main.jsp>
 Waste Control Act enforcement regulation attached [1]
 National chemicals information systems; <http://ncis.nier.go.kr>

16.3 Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008(CLP):

Classification according to Regulation (EC) 1272/2008 (CLP)	Classification procedure
-	-

16.4 Abbreviations

EC₅₀: median effective concentration
 LC₅₀: median lethal concentration
 LD₅₀: median lethal dose
 OEL: Occupational exposure limit
 PBT: Persistent, bioaccumulative, toxic chemical
 STEL: short-term exposure limit
 TWA: time weighted average
 vPvB: very persistent, very bioaccumulative chemical
 EWC: the European Waste Code

16.5 Other

- Product should be handled, stored, and used in accordance with the generally accepted industrial hygiene practices and in conformity with all the applicable legal regulations.
- The information provided herein is based on the knowledge possessed at this present time from the view point of safety requirements.
- It should, therefore, not be construed as guaranteeing specific properties.