Hanwha Solutions

SAFETY DATA SHEET

Date Printed: March 15, 2023
Version: 11
Regulation: According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

1. Identification

1.1 Product identifier
1.1.1 Product of name: Eco-DEHCH
1.1.2 Other means of identification: Diethyl hexyl cyclohexane

1.2 Recommended use of the chemical and restrictions on use
1.2.1 Recommended use: Chemical additive of PVC, plastic, rubber, ink, glue, paint, lubricant
1.2.2. 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: Hanwha Solutions Co, Ltd.
Address: Ulsan plant, Hanwha Solutions Co, Ltd., 22, Yongyeon-ro 230beon-gil, Nam-gu, Ulsan, Korea
Prepared by: Plasticizers Production Team (3rd Ulsan plant)
Contact Telephone: +82-52-279-1024, Fax: +82-52-279-1007
1.3.2 Supplier & Distributor
Company name: Hanwha Solutions Co, Ltd.
Address: 21F, Hanwha Bldg., 86, Cheonggyecheon-ro, Jung-gu, Seoul, Korea
Prepared by: PSR/Plasticizer Sales Team
Contact Telephone: +82-2-729-5051, Fax: +82-2-729-5057

1.4 Emergency phone number
Emergency phone: +82-2-729-5051

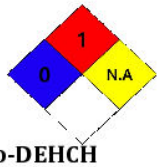
2. Hazard(s) identification

2.1 Classification of the substance or mixture
According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Physical / Chemical Hazards: Not classified
Health Hazards: Not classified
Environmental Hazards: Not classified

2.2 Label elements, including precautionary statements
- **Pictogram and symbol**: Not applicable
- **Signal word**: Not applicable
- **Hazard statements**: Not applicable
- **Precautionary statements:** Not applicable
  - **Prevention:** Not applicable
  - **Treatment:** Not applicable
  - **Storage:** Not applicable
  - **Disposal:** Not applicable

2.3 Other hazard information not included in hazard classification
(National Fire Protection Association; NFPA)
- **Health:** 0
- **Flammability:** 1
- **Reactivity:** Not available



3. Composition/information on ingredients

Component	Common name and synonyms	CAS No.	Conc. / %
Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate	1,4-bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate; Bis(2-ethylhexyl)cyclohexan-1,4-dicarboxylat;	84731-70-4	≥ 98
1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester	Bis(2-ethylhexyl)terephthalate	6422-86-2	0.1 ~ < 1
Other Cyclohexane ester	-	-	0.1 ~ < 1

4. First aid measures

4.1 Description of first aid measures

Eye contact

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

Skin contact

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
- Remove and isolate contaminated clothing and shoes.
- Wash contaminated clothing and shoes before reuse.

Inhalation

- Specific medical treatment is urgent.
- Move victim to fresh air.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

Ingestion

- Do not let him/her eat anything, if unconscious.
- Get immediate medical advice/attention.

4.2 Most important symptoms and effects, both acute and delayed acute effects

- Not known

4.3. Indication of immediate medical attention and notes for physician

- 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 extinguishing media: Dry sand, dry chemical, water spray, regular foam, CO_2
- Unsuitable extinguishing media: High pressure water streams

5.2 Specific hazards arising from the chemical

- May be ignited by heat, sparks or flames.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Fire will produce irritating, and/or toxic gases.
- If inhaled, may be harmful.

5.3 Special protective equipment and precautions for fire-fighters

- Move containers from fire area if you can do it without risk.
- Some may be transported hot.
- Runoff from fire control may cause pollution.
- Contact with substance may cause severe burns to skin and eyes.

- Dike fire-control water for later disposal; do not scatter the material.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Ventilate the area.
- Do not touch or walk through spilled material.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

6.3 Methods and materials for containment and cleaning up

- Small Spill; Flush area with flooding quantities of water. And take up with sand or other non-combustible absorbent material and place into containers for later disposal.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

7. Handling and storage

7.1 Precautions for safe handling

- Wash thoroughly after handling.
- Please work with reference to engineering controls and personal protective equipment.
- Be careful to high temperature.

7.2 Conditions for safe storage, including any incompatibilities

- Store in a closed container.
- Store in cool and dry place.

8. Exposure controls/personal protection

8.1 Occupational Exposure limits

- **ACGIH regulation**: Not available
- **OSHA regulation**: Not available
- **NIOSH regulation**: Not available
- **Biological exposure index**: Not available
- **EU regulation**: Not available
- **Other**: Not available

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.

Individual protection measures, such as personal protective equipment

Respiratory protection

- Wear NIOSH approved full or half face piece (with goggles) respiratory protective equipment when necessary.

Eye protection

- Wear facepiece with goggles to protect.
- Wear breathable safety goggles to protect from particulate material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection

- Wear chemically resistant gloves impervious to the chemical substance.

Body protection
- Wear appropriate 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, transparent
Odor:	Odorless
Odor threshold:	Not available
pH:	6.19 at 25.5 °C (CIPAC MT 75.3)
Melting point/freezing point:	-40.7 °C (OECD TG 102)
Initial boiling point and boiling range:	406.4 °C ± 0.5 °C at 101.72 kPa (OECD TG 103)
Flash point:	212 °C (Cleveland open cup, ASTM D92-18)
Evaporation rate:	Not available
Flammability (solid, gas):	Not applicable
Upper/lower flammability or explosive limits:	Not available
Vapor pressure:	< 1.5mmHg at 50 °C (OECD TG 104)
Vapor density:	Not available
Relative density	0.956±0.003 at 20 °C (JIS K 6751)
Solubility:	0.047 mg/L at 20 °C (OECD TG 105)
Solubility in organic solvents:	Not available
Partition coefficient: n-octanol/water:	Log Kow ≥ 6.2 (OECD TG 117), 8.84 (QSAR Modeling)
Auto ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	30-45 mPa.s at 20 °C (HSC internal method)
Molecular weight:	396.6 g/mol
Particle Size (Polymer compound)	Not applicable
Self-accelerated decomposition temperature (Polymer compound)	Not applicable

"NOTE: The physical data presented above are typical values and should not be construed as a specification"

10. Stability and reactivity

10.1 Reactivity/Chemical stability/Possibility of hazardous reactions:
- Fire may produce irritating and/or toxic gases.
- If inhaled, may be harmful.

10.2 Conditions to avoid:
- Keep away from heat/sparks/open flames/hot surfaces. – No smoking

10.3 Incompatible materials:
- Combustibles

10.4 Hazardous decomposition products:
- Irritating and/or toxic gases

11. Toxicological information

Information on toxicological effects	
(a) Acute toxicity	
Oral	Not classified (ATE_{mix} > 5,000 mg/kg bw)
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Rat(female), LD_{50} > 2,000 mg/kg bw (OECD TG 423, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · Rat (male/female), LD_{50} > 5,000 mg/kg bw, no deaths (TSCA FHSA Regulations, GLP)
Dermal	Not classified (ATE_{mix} > 5,000 mg/kg bw)
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Rat (male/female), LD_{50} > 2,000 mg/kg bw (OECD TG 402, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · Guinea pig, LD_{50} > 19,670 mg/kg bw
Inhalation	Not available
(b) Skin Corrosion/ Irritation	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · The test substance was assessed for skin irritation according to OECD Guideline 404. The test substance induced no dermal irritation when applied to male New Zealand white rabbits and was therefore considered a non-irritant. In addition, there was no mortality and no treatment-related clinical signs were observed (OECD TG 404, GLP). - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · The test substance was assessed for skin irritation according to OECD Guideline 404. The test substance induced no dermal irritation when applied to male New Zealand white rabbits and was therefore considered a non-irritant. (OECD TG 404, GLP) · For 48-72 hours after applying the patch to human skin, the distribution of individual and total irritation scores showed mild erythema symptoms of 0-1. This is a mild irritation and is not classified as it does not appear in a concentration dependent manner. (GLP)
(c) Serious Eye Damage/ Irritation	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · The test substance was assessed for eye irritation in three healthy New Zealand white rabbits. No clinical sings, body weight changes, body weight changes, dead animals or abnormal eye reaction considered to be due to test item were observed. The test item was considered to be non-irritating to eyes. (OECD TG 405, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · The test substance was assessed for eye irritation in three healthy New Zealand white rabbits. It may cause slight transient ocular irritation and presents a low toxicity hazard. (OECD TG 405, GLP)
(d) Respiratory sensitization	Not available
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · No data are available for respiratory sensitisation, although this is not a concern given the very low vapour pressure and the lack of sensitisation shown in a dermal sensitisation study.
(e) Skin Sensitization	Not classified

	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · In a guinea pig maximisation test to OECD guideline 406, the substance was found not to be sensitising to skin. (OECD TG 406, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · Under the conditions of this study, di (2-ethylhexyl) terephthalate was found to be non-irritating. Only slight erythema was observed for one to seven subjects at any given time during the induction phase of the study and for only one subject during the challenge phase of the study.
(f) Carcinogenicity	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · IARC, NTP, OSHA, ACGIH, EU CLP 1272/2008: not listed - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · IARC, NTP, OSHA, ACGIH, EU CLP 1272/2008: not listed · In a 2-year chronic toxicity study, di (2-ethylhexyl) terephthalate was administered to 50 F344 rats/sex/dose ad libitum via the diet, at dose concentrations of 0, 1,500, 6,000, or 12,000 ppm for 104 weeks. There was no effect on tumor incidence caused by the test substance at any dose level tested. NOEL=12,000 ppm (EPA OPPTS 870.4200, GLP)
(g) Mutagenicity	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · *In vitro Bacterial Reverse Mutation Assay* : negative with/without metabolic activation (OECD TG 471, GLP) · *In vitro Mammalian Chromosome Aberration Test* : negative with/without metabolic activation (OECD TG 473, GLP) · *In vitro Mammalian Erythrocyte Micronucleus Test* : negative (OECD TG 474, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · *In vitro Bacterial Reverse Mutation Assay* : negative with/without metabolic activation (OECD TG 471, GLP) · *In vitro Mammalian Chromosome Aberration Test (with CHO):* negative with/without metabolic activation (OECD TG 473, GLP)
(h) Reproductive toxicity	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Under the conditions of the two-generation reproduction toxicity study in rats (dose: 0 ~ 1,000 mg/kg bw/day), the No Observed Adverse Effect Level (NOAEL) for parental toxicity to males and females, for exposure to the test item by gavage, is considered to be 1000 mg/kg.d. The NOAEL for reproductive toxic effects to parental males and females, for exposure to the test item by gavage, is considered to be 1,000 mg/kg.d. The NOAEL for developmental toxic effects to pups, after parental exposure to the test item by gavage, is considered to be 1,000 mg/kg.d (OECD TG 416, GLP) · In teratogenicity studies in rats (0, 100, 300, 1,000 mg/kg bw/day), oral administration of the test substance did not result in any toxicologically significant effects at any dose level. The NOEL was therefore considered to be 1,000 mg/kg bw/day. No toxicologically significant changes were detected in the offspring parameters measured. The NOEL for reproductive and developmental toxicity was therefore considered to be 1,000 mg/kg bw/day. The NOAEL was considered to be greater than 1000 mg/kg bw/day. (OECD TG 414) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · As a result of two-generation reproductive toxicity tests with rats, no serious effects on mating, infertility, or reproductive organs were found. (reproductive toxicity: 10,000 ppm, parental toxicity: 3,000 ppm, neonatal toxicity: 3,000 ppm) (OECD TG 416, GLP) · In a teratology study in which groups of pregnant CD-1 mice were exposed to 0,

	1,000, 3,000, and 7,000 ppm di (2-ethylhexyl) terephthalate ad libitum via the diet from gestation days 0-18, intrauterine growth and survival was unaffected at all dose levels and there was no evidence of teratogenicity or fetotoxicity, even at maternally toxic doses. (OECD TG 414, GLP)
(i) Specific target organ toxicity (single exposure)	Not classified
	- 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · In acute oral study with rats(male/female), clinical signs of toxicity were limited to oily, unkempt inguinal hair for all animals on Days 1 and 2 of the study, and yellow discolored inguinal hair for two female rats on Day 1. No other clinical abnormalities were noted throughout the study. (TSCA FHSA Regulations, GLP)
(j) Specific target organ toxicity (repeat exposure)	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · In a study performed according to OECD 422(0, 100, 300 and 1000 mg/kg/day), resulted in treatment-related effects in animals of either sex treated with 1000 and 300 mg/kg/day. The effects detected in the liver of females treated with 300 mg/kg/day was considered to be adaptive in nature and not to represent an adverse effect of treatment. (NOEL(female)= 100 mg/kg/day, NOAEL(female)= 300 mg/kg/day) (OECD TG 422, GLP) · Moreover, In a 90-day repeated dose toxicity study by oral(0, 10, 100 and 1000 mg/kg bw/day), there were no toxicologically significant effects detected throughout the study period. (NOAEL≥ 1000 mg/kg bw/day) (OECD TG 408, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · When di (2-ethylhexyl) terephthalate was administered to rats via the diet at concentrations of 0, 0.1, 0.5, and 1% for 90 days, the NOEL for systemic toxicity was determined to be 0.5% (equivalent to 277 and 309 mg/kg bw/day for males and females, respectively) based on minor effects on red blood cell formation, and enlargement of the liver in both sexes at a dose concentration of 1.0%. There were no deaths, no functional changes in any organ system, and no significant adverse effects on clinical chemistry parameters, hematology or urinalysis during the course of the study. (EPA guideline 799.9310, GLP)
(k) Aspiration Hazard	Not classified
	· The viscosity of this product : 30-45 mPa.s (20 ˚C) (HSC internal method)

12. Ecological information

12.1 Toxicity	
Acute toxicity	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Fish: 96h-LC_{50} (*Oryzias latipes*) > 0.05 mg/L (measured, semi-static, freshwater) (OECD TG 203, GLP) · Invertebrate: 48h-EC_{50} (*Daphnia magna*) > 0.17 mg/L (measured, freshwater) (OECD TG 202, GLP) · Algae: 72h-ErC_{50} (*Pseudokirchneriella subcapitata*) > 0.27 mg/L (measured, static) (OECD TG 201, GLP) * No toxicity was observed in a solution at the limit of water solubility. The nominal concentration of 100 mg/L produced a mean measured concentration of 0.05 mg/L, which is consistent with the experimentally determined water solubility limit of 0.047 mg/L. Acute toxicity to fish is therefore not of concern. - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester :

	· Fish: 96h-LC_{50} (*Pimephales promelas*) > 984 mg/L (OECD TG 203) · Invertebrate: 48h-EC_{50} (*Daphnia magna*) > 0.0014 mg/L (OECD TG 202, GLP) · Algae: 72h-ErC_{50} (*Selenastrum capricornutum*) > 0.86 mg/L (OECD TG 201, GLP) * Acute toxicity was not reported at levels up to the water solubility (0.0004 mg/L; 22.5°C) due to being insoluble in water.
Chronic toxicity	Not classified
	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Fish: 28d-NOEC (*Danio rerio*) = 10 mg/L (measured, semi-static, freshwater) (OECD TG 215, GLP) · Invertebrate: 21d-NOEC (*Daphnia magna*) = 10 mg/L (measured, freshwater) (OECD TG 211, GLP) · Algae: 72h-ErC_{10} (*Pseudokirchneriella subcapitata*) > 0.27 mg/L (measured, static) (OECD TG 201, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · Fish: 60d-NOEC (*Oncorhynchus mykiss*) ≥ 0.280 mg/L (US EPA, GLP) · Invertebrate: 21d-NOEC (*Daphnia magna*) ≥ 0.00076 mg/L (OECD TG 211, GLP) · Algae: 72h-NOErC (*Selenastrum capricornutum*) ≥ 0.86 mg/L (OECD TG 201, GLP) * Chronic toxicity was not reported at levels up to the water solubility (0.0004 mg/L; 22.5°C) due to being insoluble in water.
12.2 Persistence and degradability	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · 80.5% biodegradation was observed after 28 days.; inherently biodegradable (OECD TG 302C) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · The atmospheric photodegradation half-life is 0.487days (5.84 daylight hours). · 73.05% biodegradation was observed after 28 days.; readily biodegradable (OECD TG 301B, GLP)
12.3 Bio-accumulative potential	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · log Kow = 8.84 (OECD TG 117) · BCF = 161 (OECD TG 305, GLP) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · log Kow = 8.39 (estimated) · BCF = 393 (EPA OPPTS 850.1710, GLP)
12.4 Mobility in soil	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · Koc = 427,000 (20 °C) - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · Koc = 2,000 (estimated)
12.5 Results of PBT and vPvB assessment	- Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate : · The substance is not PBT / vPvB. - 1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester : · 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 Disposal method

- Waste must be disposed of in accordance with federal, state and local environmental control regulations.

13.2 Disposal precaution

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

14. Transport information

14.1 UN No.: Not applicable

14.2 UN Proper shipping name: Not applicable

14.3 Transport Hazard class:

- ADR: Not applicable
- IMDG: Not applicable
- ICAO/IATA: Not applicable
- RID: Not applicable

14.4 Packing group: Not applicable

14.5 Environmental hazards: Not applicable

14.6 Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code): Not applicable

14.7 Special precautions for user

in case of fire: Not applicable

in case of leakage: Not applicable

15. Regulatory information

15.1 Safety, health and environmental regulation/legislation specific for the substance or mixture
USA Regulatory Information

<Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate>

TSCA (Toxic Substances Control Act): Based on EPA's assessment that includes analogue data, this substance may cause specific target organ toxicity. This substance is subject to a Significant New Use Rule (SNUR).
TSCA 12(b) notification: Required by exporter.
TSCA 8(b) inventory status: listed [Significant New Use Rules on Certain Chemical Substances(SNUR) 21-3.5e]
Proposition 65: Not regulated
OSHA Regulation: Not regulated
CERCLA Regulation: Not regulated
SARA 302 Regulation: Not regulated
SARA 304 Regulation: Not regulated
SARA 313 Regulation: Not regulated

Foreign Regulatory Information
Substance of Rotterdam] Protocol: Not regulated
Substance of Stockholm Protocol: Not regulated
Substance of Montreal Protocol: Not regulated

Foreign Inventory Status
- Korea management information: Existing Chemical Substance (2013-3-5632)
- European Inventory of Existing Commercial chemical Substances (EINECS): Present (283-829-2)
- Canada management information: Domestic Substances List (DSL): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Not listed (Completed new substance regular Level4 notification,C-20007, March 6, 2020)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((3)-2435)

<1,4-Benzenedicarboxylic acid bis(2-ethylhexyl) ester>

TSCA (Toxic Substances Control Act): Section8 (b) inventory: Present (ACTIVE)
Proposition 65: Not regulated
OSHA Regulation: Regulated
CERCLA Regulation: Not regulated
SARA 302 Regulation: Not regulated
SARA 304 Regulation: Not regulated
SARA 313 Regulation: Not regulated

Foreign Regulatory Information
Substance of Rotterdam] Protocol: Not regulated
Substance of Stockholm Protocol: Not regulated
Substance of Montreal Protocol: Not regulated

Foreign Inventory Status
- Korea management information: Existing Chemical Substance (KE-02197)
- European Inventory of Existing Commercial chemical Substances (EINECS): Present (229-176-9)
- Canada management information: Domestic Substances List (DSL): Present
- Australia management information: Inventory of Industrial Chemicals (AIIC): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (01783)
- Japan management information: Existing and New Chemical Substances (ENCS): Present ((3)-4053)
- New Zealand management information: Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.
- Philippines management information: Inventory of Chemicals and Chemical Substances (PICCS): Present
- Taiwan management information: Taiwan Chemical Substance Inventory (TCSI): Present

16. OTHER INFORMATION

16.1 Indication of changes:
Preparation date: October 24, 2016
Version: 11
Revision date: March 15, 2023

16.2 Key literature reference and sources for data:
- TSCA; http://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/searchbylist/search.do
- EU Regulation 1272/2008
- TOMES;LOLI ; http://csi.micromedex.com/fraMain.asp?Mnu=0
- UN Recommendations on the transport of dangerous goods 17th
- IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; http://monographs.iarc.fr
- ECHA CHEM; http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances
- CHEMICAL SAFETY REPORT : Bis(2-ethylhexyl) cyclohexane-1,4-dicarboxylate (CAS No. 84731-70-4)
- OECD SIDS; http://webnet.oecd.org/
- HSDB; https://pubchem.ncbi.nlm.nih.gov/
- EPA; http://www.epa.gov/iris
- EPISUITE Program ver.4.1
- NIOSH(The National Institute for Occupational Safety and Health)
- ACGIH(American Conference of Governmental Industrial Hygienists)
- National chemicals information systems; http://ncis.nier.go.kr
- National Emergency Management Agency-Korea dangerous material inventory management system; http://hazmat.mpss.kfi.or.kr/material.do

16.3 Abbreviations
ACGIH: American Conference of Governmental Industrial hygienists
NIOSH: The National Institute for Occupational Safety and Health
OSHA: Occupational Safety & Health Administration
IARC: International Agency for Research on Cancer
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Dangerous Goods
ICAO/IATA: International Civil Aviation Organization/ International Air Transport Association

RID: Regulations Concerning the International Transport of Dangerous Goods by Rail

16.4 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.