SAFETY DATA SHEET

Date Printed: March 8, 2018
Version: 6
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: ECH
1.1.2 Other means of identification: Epichlorohydrin

1.2 Recommended use of the chemical and restrictions on use
1.2.1 Recommended use: It is used for the base material of epoxy resin, solvent, stabilizer, pesticide, medicine uses.
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: Yeosu plant, Hanwha Solutions Co, Ltd., 117(Wolha-dong), Yeosusandan 3-ro, Yeosu-si, Jeollanam-do, Korea
Prepared by: ECH Production Team
Contact Telephone: +82-61-688-1864
1.3.2 Supplier & Distributor
Company name: Hanwha Solutions Co, Ltd.
Address: Hanwha Bldg., 86 (Janggyo-dong), Cheonggyecheon-ro, Jung-gu, Seoul, Korea
Prepared by: CA Applied Chemical Sales Team
Contact Telephone: +82-10-3110-0852

1.4 Emergency phone number
Emergency phone: +82-10-3110-0852

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
Flammable liquid: Category 3

Health Hazards:
Acute toxicity (oral): Category 3
Acute toxicity (dermal): Category 3
Acute toxicity (inhalation: vapors): Category 2
Skin corrosion/irritation: Category 1
Serious eye damage/eye irritation: Category 1
Skin sensitization: Category 1
Germ cell mutagenicity: Category 2
Carcinogenicity: Category 1B

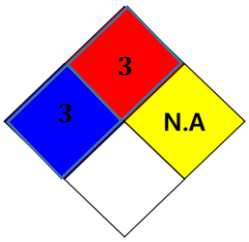
Environmental Hazards:
Hazardous to the aquatic environment – acute hazard: Category 2

2.2 Label elements, including precautionary statements
o Pictogram and symbol:

o Signal word: Danger
o Hazard statements:
H226 Flammable liquid and vapor
H301 Toxic if swallowed
H311 Toxic in contact with skin
H314 Causes severe skin burns and eye damage
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage
H330 Fatal if inhaled.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H401 Toxic to aquatic life.
o Precautionary statements:
- Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling the treated area.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P281 Use personal protective equipment as required.
P284 Wear respiratory protection.
- Treatment:
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302+P352 IF ON SKIN: Wash with plenty water.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304+P340 IF INHALED: Remove person to fresh air and keep 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 CENTRE/doctor if you feel unwell.
P320 Specific treatment is urgent. (See information on this label.)
P321 Specific treatment. (See information on this label.)
P322 Specific measures. (See information on this label.)
P330 Rinse mouth.
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
P361 Remove/Take off immediately all contaminated clothing.

P363 Wash contaminated clothing before reuse.
P370+P378 In case of fire: Use Suitable extinguishing media for extinction.
- Storage:
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
- Disposal:
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazard information not included in hazard classification (National Fire Protection Association; NFPA)



o Health: 3
o Flammability: 3
o Reactivity: Not available

3. Composition/information on ingredients

Component	Common name and synonyms	CAS No.	Conc. / %
1-chloro-2,3-epoxypropane	Epichlorohydrin	106-89-8	100

4. First aid measures

4.1 Description of first aid measures

Eye contact

- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Call 911 or emergency medical service.

Skin contact

- If on skin (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If skin irritation occurs: Get medical advice/ attention.
- Wash contaminated clothing before reuse.
- Call emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- For minor skin contact, avoid spreading material on unaffected skin.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Wash skin with soap and water.

Inhalation

- 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.
- IF breathing is difficult, remove person to fresh air and keep comfortable for breathing.
- 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 other proper respiratory medical device.

Ingestion

- If swallowed: Immediately call a poison center or doctor/physician.
- If swallowed: Rinse mouth. Do not induce vomiting.
- 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 other proper respiratory medical device.

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

- Inhalation: Fatal if inhaled.
- Skin contact: Causes severe skin burns and eye damage
- Eye contact: Causes serious eye damage

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.
- If exposed or concerned: Get medical advice/ attention.
- Keep victim warm and quiet.
- Symptoms resulting from contact/inhalation may be delayed.

5. Fire-fighting measures

5.1 Extinguishing media

- Suitable extinguishing media: alcohol foam, carbon dioxide, or water spray
- Use dry sand or earth to smother fire.
- Small Fire: dry chemical, carbon dioxide, water spray, or alcohol-resistant foam
- Large Fire: water spray/fog, or alcohol-resistant foam
- Unsuitable extinguishing media: Large Fire: straight streams

5.2 Specific hazards arising from the chemical

- Flammable liquid and vapor
- May violently polymerize and result in fire and explosion
- Vapors may travel to a source of ignition and ignite.
- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
-. Inhalation or contact with material may irritate or burn skin and eyes.
- Vapors may cause dizziness or asphyxiation without warning.
- Runoff from fire control may cause pollution.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas.
- Runoff to sewer may create fire or explosion hazard.

5.3 Special protective equipment and precautions for fire-fighters

- Wear positive pressure self-contained breathing apparatus.
- Wear chemical protective clothing specially recommended by the manufacturer.
- Fire protective clothing is limited to fire only and is not effective in spill situations where it may come into contact with the material.

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Many liquids are lighter than water.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas.
- Substance may be transported hot.
- Substance may be transported in a molten form.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.
- Fire involving tanks, cars, trailers; 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.
- Fire involving Tanks; For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Fire involving tanks, railways, vehicles, tank trucks; Isolate 800 meters ahead.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- Avoid breathing dust/fume/gas/mist/vapors/spray.
- The very fine particles may cause a fire or explosion, eliminate all ignition sources.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Isolate hazard area.
- Keep unnecessary and unprotected personnel from entering.
- Eliminate all ignition sources.
- 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.
- Cover with plastic sheet to prevent spreading.
- Please note that there are materials and conditions to avoid.
- For spills and leaks without fire, wear fully sealed vapor protective clothing.
- As an immediate precaution, isolate spill or leaked area at least 50 m (150 feet) in all directions.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas.
- Position upwind from the wind.
- Do not allow material to enter drains.

6.2 Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.
- Avoid release to the environment.

6.3 Methods and materials for containment and cleaning up

- Dike and collect water used to fight fire.
- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Reduce airborne dust and prevent scattering by moistening with water.
- Absorb the liquid and scrub the area with detergent and water.
- Use clean non-sparking tools to collect absorbed material.
- A vapor suppressing foam may be used to reduce vapors.
- Small Liquid Spill; Filter the contaminated air using a HEPA (high-efficiency particulate arrestor) filter or an activated carbon filter, and put the used filter in a plastic bag, seal and incinerate.
- Small Liquid Spill; Absorb with paper and incinerate. Use a non-combustible material like vermiculite or sand to soak up the product and place into a container for later disposal and put on the plastic sheet to minimize spreading or contact with rain.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- Large Liquid Spill; make a pit or pond to collect it in one place, or build an embankment with soil,

sandbags, or formed concrete to prevent the spillage from spreading to the surface.
- Water sprays reduce vapors, but cannot prevent ignition in confined spaces.

7. Handling and storage

7.1 Precautions for safe handling

- Obtain instruction manual before use.
- Do not handle until all safety precautions have been read and understood.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Wash thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
- Follow all SDS/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.
- Please note that there are materials and conditions to avoid.
- Be careful to heat.
- You need measurement of air concentration and ventilation in low, closed and confined areas due to lack of oxygen.
- Wear protective gloves/protective clothing/eye protection/face protection.

7.2 Conditions for safe storage, including any incompatibilities

- Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- Store in a well-ventilated place. Keep container tightly closed.
- Store in a well-ventilated place. Keep cool.
- Empty drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner, or properly disposed of.
- Keep away from food and drinking water.

8. Exposure controls/personal protection

8.1 Occupational Exposure limits

o ACGIH regulation: TWA 0.5 ppm
o OSHA regulation: TWA 5 ppm (19 mg/m^3) (Final PELs), TWA 2 ppm (8 mg/m^3) (Vacated PELs)
o NIOSH regulation: IDLH 75 ppm
o Biological exposure index: Not available
o EU regulation: TWA 1.9 mg/m^3
o Other:
- Korea : TWA 0.5 ppm
- China : TWA 1 mg/m^3, STEL 2 mg/m^3
- Australia : TWA 2 ppm (7.6 mg/m^3)
- Denmark : TWA 0.05 ppm (0.19 mg/m^3)

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

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

Eye protection

- Wear the protective glasses or breathable safety goggles to protect from vaporous state organic material causing eye irritation or other disorder.
- An eyewash 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 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 (20, 1,013 hPa)
Color:	Colorless
Odor:	Sweet, pungent or chloroform-like
Odor threshold:	10 ppm
pH:	Not available
Melting point/freezing point:	-57 ℃
Initial boiling point and boiling range:	116-117 ℃ (1 atm)
Flash point:	31 ℃ (Closed Cup)
Evaporation rate:	Not applicable
Flammability (solid, gas):	Not available
Upper/lower flammability or explosive limits:	21/3.8 %
Vapor pressure:	22.7 hPa (25 ℃)
Vapor density:	Not available
Relative density	Not available
Solubility:	Very soluble(>10,000 mg/L)
Solubility in organic solvents:	Not available
Partition coefficient: n-octanol/water:	$\log K_{ow}$=0.45
Auto ignition temperature:	385 ℃
Decomposition temperature:	Not available
Viscosity:	1.073 mPas (dynamic, 298.15K)
Molecular weight:	92.5245 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:

- Flammable liquid and vapor

- May decompose at high temperatures into forming toxic gases.
- May violently polymerize and result in fire and explosion.
- May form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- Spilled material may create fire or explosion hazard.
- May cause vapor explosion hazard indoors, outdoors or in sewers.
- Some of these materials may burn, but none ignite readily.
- Vapors may form explosive mixtures with air.

10.2 Conditions to avoid:

- Keep away from heat/sparks/open flames/hot surfaces. – No smoking

10.3 Incompatible materials:

- Combustibles, reducing agents
- Acids, alkalis, salts, water and oxidizing agents

10.4 Hazardous decomposition products:

- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning.
- Corrosive and/or toxic fume

11. Toxicological information

Information on toxicological effects	
(a) Acute toxicity	
Oral	Category 3
	· Korea - MOE - Classification according to the designation notice of toxic substances : Category 3 · LD_{50} (rat, male/female) = 175 mg/kg bw (F), 282 mg/kg bw (M) (EPA OPP 81-1)
Dermal	Category 3
	· Korea - MOE - Classification according to the designation notice of toxic substances: Category 3 · LD_{50} (rabbit, male/female) = 200~500 mg/kg bw
Inhalation	Category 2
	· Korea - MOE - Classification according to the designation notice of toxic substances: Category 2 · inhalation: vapor, LC_{50} (rat, male/female) = 2,165 ppm /1h (female: 8.227 mg/L air/1h) (4-hour exposure convention value : 4.057 mg/L air/4h) (DOT guidelines)
(b) Skin Corrosion/ Irritation	Category 1
	· Korea - MOE - Classification according to the designation notice of toxic substances: Category 1 · As a result of skin corrosion/irritation test, the test material was corrosive to the skin of rabbits.
(c) Serious Eye	Category 1

Damage/ Irritation	· As a result of serious eye damage/irritation test, in the rabbit eye, 0.1% solution in water caused necrosis.
(d) Respiratory sensitization	Not available
(e) Skin Sensitization	Category 1
	· Korea - MOE - Classification according to the designation notice of toxic substances: Category 1 · Epichlorohydrin was positive in the guinea pig maximization test with sixty percent (9 of 15) of the guinea pigs showing a positive response. (OECD TG 406)
(f) Carcinogenicity	Category 1B
	· Korea - MOE - Classification according to the designation notice of toxic substances: Category 1 · Korea-ISHL: Cat. 1B (skin) · IARC : Group 2A (Probably Carcinogenic to Humans) · NTP : R (Reasonably Anticipated To Be A Human Carcinogen) · OSHA : applicable · US EPA IRIS : B2 (Probable human carcinogen) · ACGIH : A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans) · EU CLP 1272/2008: Carc. 1B · As a result of a carcinogenicity study by oral route in rats (male/female), it was confirmed as positive. In particular, at pathological examination a high incidence (100% for females, 81% for males) of squamous cell carcinomas of low-grade malignancy was observed in the forestomach of animals at risk from the 10 mg/kg group. (OECD TG 451) · It is not a mouse-skin carcinogen but induces a significant number of local malignant tumors through sc injection. · Epichlorohydrin was positive in carcingenicity study by inhalation. Among 100 rats, lifetime exposure to 30 ppm yielded 1 malignant squamous carcinoma of the nasal cavity plus 1 nasal papilloma. No nasal or respiratory tract tumors were prodeced in rats exposed to 10 ppm. In the 140 rats exposed to 100 ppm for 30 exposures and held for a lifetime, 15 squamous carcinomas were observed. NOEC = 10 ppm (OECD TG 451)
(g) Mutagenicity	Category 2
	· *In vitro*: Bacterial Reverse Mutation Assay : positive with and without metabolic activation (OECD TG 471) · *In vitro*: Mammalian cell gene mutation assay : positive without metabolic activation (OECD TG 476) · *In vivo*: Rodent Dominant Lethal Test : negative (IARC)
(h) Reproductive toxicity	Not classified
	· As a result of screening tests for reproductive and developmental toxicity at concentrations of 0, 5, 25, and 50 ppm in rats (male/female), in the case of males, the effect on the implantation site was not confirmed during the observation period after exposure. No effects were observed on reproduction or fertility of exposed females. NOAEL (reproduction/ fertility) = 5 ppm (male), 50 ppm (female). · As a result of a developmental toxicity test using rabbits (females) at concentrations of 0, 2.5, and 25 ppm, no harmful effects were observed such as malformations and embryotoxicity during the major organogenesis period. NOAEC (maternal toxicity and teratogenicity) > 25 ppm (OECD TG 414)
(i) Specific target	Not classified

organ toxicity (single exposure)	· As a result of an acute oral toxicity test using rats (male/female), specific and minor changes were observed in body weight, feed consumption, hematology, clinical biochemistry, and general appearance of organ weight. LD_{50} = 175 mg/kg bw(F), 282 mg/kg bw (M) (EPA OPP 81-1) · As a result of an acute inhalation toxicity using rats (male/female) for 6 minutes, nasal irritation and respiratory disturbance were observed during the exposure period.
(j) Specific target organ toxicity (repeat exposure)	Not classified
	· As a result of a sub-chronic toxicity using rats (male/female) for 90 days at the concentration of 0, 1, 5, and 25 mg/kg bw/day, significant decreases in body weight gain, food and water consumption, erythrocyte count and changes in liver and kidney weight were observed at the two high-dose level. Histopathological examination identified the forestomach as the primary target organ for both sexes and in both studies with significant dose-related increases in mucosal hyperplasla (acanthosis) and hyperkeratosis. NOAEL = 1 mg/kg bw/d was set, but this was not considered to have caused significant toxic effects in humans. (OECD TG 408)
(k) Aspiration Hazard	Not classified
	· Viscosity of product : 1.073 mPas (dynamic, 298.15K)

12. Ecological information

12.1 Toxicity	
Acute toxicity	Category 2
	· Fish: 96h-LC_{50} (*Pimephales promelas*) = 10.6 mg/L (ASTM Standard E 729-80, GLP) · Invertebrate: 48h-EC_{50} (*Daphnia magna*) = 23.9 mg/L (ASTM Standard E 729-80, GLP) · Algae: 72h-EC_{50} (*Pseudokirchneriella subcapitata*) = 7.1 mg/L (OECD TG 201, GLP)
Chronic toxicity	Not classified
	· Fish: Not available · Invertebrate: Not available · Algae: 72h-NOEC (*Pseudokirchneriella subcapitata*) = 1.7 mg/L (OECD TG 201, GLP)
12.2 Persistence and degradability	· It is easily hydrolyzed. (half-life: 3.9~7.3 d; 20 ℃) · 92.5 % biodegradable after 14days; readily biodegradable (OECD TG 301C)
12.3 Bio-accumulative potential	· log K_{ow} = 0.45 · BCF = 3.162 (estimated) (EPISUITE)
12.4 Mobility in soil	· K_{oc} = 4.48 (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 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.: 2023

14.2 UN Proper shipping name: EPICHLOROHYDRIN

14.3 Transport Hazard class:

- ADR: 6.1 (3)
- IMDG: 6.1 (3)
- ICAO/IATA: 6.1 (3)
- RID: 6.1 (3)

14.4 Packing group: II

14.5 Environmental hazards: Applicable (P)

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

14.7 Special precautions for user

in case of fire: F-E

in case of leakage: S-D

15. Regulatory information

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

USA Regulatory Information

TSCA (Toxic Substances Control Act): Section8 (b) inventory: Present (ACTIVE)
Proposition 65: Regulated
OSHA Regulation: Regulated
CERCLA Regulation: 100 lb final RQ; 45.4 kg final RQ
SARA 302 Regulation: 100 lb EPCRA RQ, 1000 lb TPQ
SARA 304 Regulation: Not regulated
SARA 313 Regulation: 0.1 % de minimis concentration

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: Phase-in substance (KE-05647),
  Toxic substance (97-1-192; Epichlorohydrin and mixture containing 0.1% or more thereof)
  Phase-in substance subject to registration (508)
  Substance subject to intensive control (1-54; CMR)
- European Inventory of Existing Commercial chemical Substances (EINECS): Present (203-439-8)
- Canada management information: Domestic Substances List (DSL): Present (CEPA, subsection 81(3) applies)
- Australia management information: Inventory of Industrial Chemicals (AIIC): Present
- China management information: Inventory of Existing Chemical Substances (IECSC): Present (14880)

- Japan management information: Existing and New Chemical Substances (ENCS): Present ((2)-275)
- New Zealand management information: Inventory of Chemicals (NZIoC): Present (HSNO Approval: HSR000977)
- 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: March 8, 2018
Version: 6
Revision date: March 03, 2022

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
- 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
- K-REACH; K-REACH/registration-dossier: Epichlorohydrin
- Designation notice of toxic substances: National Institute of Environmental Research Notice No. 2021-17

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.