

ARALDITE® 2014-2 RESIN

Version	Revision Date:	SDS Number:	Date of last issue:
4.1	01/30/2023	400001015910	09/23/2020
			Date of first issue: 01/16/2018

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SECTION 1. IDENTIFICATION

Product name : ARALDITE® 2014-2 RESIN

Manufacturer or supplier's details

Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America (USA)
Telephone : Non-Emergency: (800) 257-5547
E-mail address : Global_Product_EHS_AdMat@huntsman.com
Emergency telephone number : Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use

Recommended use : Epoxy constituents

SECTION 2. HAZARDS IDENTIFICATION**GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)**

Skin irritation : Category 2
Serious eye damage : Category 1
Skin sensitisation : Category 1
Short-term (acute) aquatic hazard : Category 2
Long-term (chronic) aquatic hazard : Category 2

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**

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P261 Avoid breathing mist or vapours.
 P264 Wash skin thoroughly after handling.
 P272 Contaminated work clothing must not be allowed out of the workplace.
 P273 Avoid release to the environment.
 P280 Wear protective gloves/ eye protection/ face protection.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
 P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

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

P362 Take off contaminated clothing and wash before reuse.

P391 Collect spillage.

Storage:

Not available

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane	1675-54-3	30 - 50
barium sulfate	7727-43-7	30 - 50
Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol	9003-36-5	10 - 20
1,4-bis(2,3-epoxypropoxy)butane	2425-79-8	1 - 5
bis(2,3-epoxypropyl) terephthalate	7195-44-0	1 - 5
tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate	7237-83-4	0.1 - 1

The specific chemical identity and/or exact percentage (concentration) of composition may be withheld as a trade secret.

Both 25068-38-6 and 1675-54-3 can be used to describe the epoxy resin which is produced through the reaction of bisphenol A and epichlorohydrin

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SECTION 4. FIRST AID MEASURES

- General advice : Move out of dangerous area.
Consult a physician.
Show this safety data sheet to the doctor in attendance.
Treat symptomatically.
Get medical attention if symptoms occur.
- If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.
- In case of skin contact : If skin irritation persists, call a physician.
If on skin, rinse well with water.
If on clothes, remove clothes.
- In case of eye contact : Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Continue rinsing eyes during transport to hospital.
Remove contact lenses.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.
- If swallowed : Keep respiratory tract clear.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.
- Most important symptoms and effects, both acute and delayed : None known.
- Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Avoid inhalation, ingestion and contact with skin and eyes.
No action shall be taken involving any personal risk or without suitable training.
It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical

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|---|---|---|
| Unsuitable extinguishing media | : | Exercise caution when using a high volume water jet as it may scatter and spread fire |
| Specific hazards during firefighting | : | Do not allow run-off from fire fighting to enter drains or water courses. |
| Hazardous combustion products | : | Carbon oxides
Halogenated compounds
Carbon dioxide (CO ₂)
Carbon monoxide |
| Specific extinguishing methods | : | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Further information | : | Collect contaminated fire extinguishing water separately. This must not be discharged into drains.
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. |
| Special protective equipment for firefighters | : | Wear self-contained breathing apparatus for firefighting if necessary. |

SECTION 6. ACCIDENTAL RELEASE MEASURES

- | | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Use personal protective equipment.
Refer to protective measures listed in sections 7 and 8. |
| Environmental precautions | : | Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities. |
| Methods and materials for containment and cleaning up | : | Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal. |

SECTION 7. HANDLING AND STORAGE

- | | | |
|---|---|--|
| Advice on protection against fire and explosion | : | Normal measures for preventive fire protection. |
| Advice on safe handling | : | Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitisation of susceptible persons.
Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product.
Do not breathe vapours/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the |

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application area.

To avoid spills during handling keep bottle on a metal tray.
Dispose of rinse water in accordance with local and national regulations.

- Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in properly labelled containers.
- Materials to avoid : For incompatible materials please refer to Section 10 of this SDS.
- Recommended storage temperature : 36 - 104 °F / 2 - 40 °C
- Further information on storage stability : Stable under normal conditions.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
barium sulfate	7727-43-7	TWA (total dust)	15 mg/m ³	OSHA Z-1
		TWA (respirable fraction)	5 mg/m ³	OSHA Z-1
		TWA (Inhalable particulate matter)	5 mg/m ³	ACGIH
		TWA (Respirable)	5 mg/m ³	NIOSH REL
		TWA (total)	10 mg/m ³	NIOSH REL
		TWA (Total dust)	10 mg/m ³	OSHA P0
		TWA (respirable dust fraction)	5 mg/m ³	OSHA P0

Personal protective equipment

- Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air

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supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : butyl-rubber
Break through time : > 8 h

Material : Nitrile rubber
Break through time : 10 - 480 min

Material : Ethyl Vinyl Alcohol Laminate (EVAL)
Break through time : > 8 h

Remarks

: The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.
Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

Eye protection

: Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection

: Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures

: When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : beige

Odour : slight

Odour Threshold : No data is available on the product itself.

pH : ca. 7 (68 °F / 20 °C)
Concentration: 500 g/l

Melting point/freezing point : No data available

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Boiling point/boiling range	: > 392 °F / > 200 °C
Flash point	: > 212 °F / > 100 °C Method: closed cup
Evaporation rate	: No data is available on the product itself.
Flammability (solid, gas)	: No data is available on the product itself.
Flammability (liquids)	: No data is available on the product itself.
Upper explosion limit / Upper flammability limit	: No data is available on the product itself.
Lower explosion limit / Lower flammability limit	: No data is available on the product itself.
Vapour pressure	: < 1.33 hPa (68 °F / 20 °C)
Relative vapour density	: No data is available on the product itself.
Relative density	: No data is available on the product itself.
Density	: 1.6 g/cm ³ (77 °F / 25 °C)
Solubility(ies)	
Water solubility	: practically insoluble (68 °F / 20 °C)
Solubility in other solvents	: No data is available on the product itself.
Partition coefficient: n-octanol/water	: No data is available on the product itself.
Auto-ignition temperature	: does not ignite
Decomposition temperature	: > 392 °F / > 200 °C
Self-Accelerating decomposition temperature (SADT)	: No data is available on the product itself.
Viscosity	
Viscosity, dynamic	: 92,800 mPa.s (77 °F / 25 °C) Method: Other guidelines
Explosive properties	: No data is available on the product itself.
Oxidizing properties	: No data is available on the product itself.
Particle size	: No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No dangerous reaction known under conditions of normal use.
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Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No hazards to be specially mentioned.
Conditions to avoid	:	None known.
Incompatible materials	:	Strong acids and strong bases Strong oxidizing agents
Hazardous decomposition products	:	No decomposition if stored and applied as directed.
Hazardous decomposition products	:	carbon dioxide carbon monoxide Halogenated compounds

SECTION 11. TOXICOLOGICAL INFORMATION**Acute toxicity****Product:**

Acute oral toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 53.74 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:**2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Acute oral toxicity	:	LD50 (Rat, female): > 2,000 mg/kg Method: OECD Test Guideline 420 Assessment: The substance or mixture has no acute oral toxicity Remarks: No mortality observed at this dose.
Acute dermal toxicity	:	LD50 (Rat, male and female): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Acute oral toxicity	:	LD50 (Rat, male and female): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat, male and female): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

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1,4-bis(2,3-epoxypropoxy)butane:

Acute oral toxicity : LD50 (Rat, male and female): 1,163 mg/kg
Method: OECD Test Guideline 401
GLP: yes
Assessment: The component/mixture is moderately toxic after single ingestion.

Acute inhalation toxicity : LC50 (Rat): > 2.068 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Test atmosphere: dust/mist
Method: Expert judgement
Assessment: The component/mixture is moderately toxic after short term inhalation.

Acute dermal toxicity : Acute toxicity estimate: 1,100 mg/kg
Method: Converted acute toxicity point estimate

Assessment: The component/mixture is moderately toxic after single contact with skin.

bis(2,3-epoxypropyl) terephthalate:

Acute oral toxicity : LD50 (Rat, male and female): > 2,500 mg/kg
Method: OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Acute dermal toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Acute oral toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Acute dermal toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Species : Rabbit
Exposure time : 4 h
Assessment : Irritating to skin.
Method : OECD Test Guideline 404

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Result : Irritating to skin.

barium sulfate:

Species	: human skin
Assessment	: No skin irritation
Result	: No skin irritation

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: Irritating to skin.

1,4-bis(2,3-epoxypropoxy)butane:

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: Skin irritation
GLP	: yes

bis(2,3-epoxypropyl) terephthalate:

Species	: Rabbit
Result	: Skin irritation

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Species	: Rabbit
Assessment	: No skin irritation
Method	: OECD Test Guideline 404
Result	: No skin irritation

Serious eye damage/eye irritation**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Species	: Rabbit
Result	: Irritating to eyes.
Assessment	: Irritating to eyes.
Method	: OECD Test Guideline 405

barium sulfate:

Species	: Rabbit
Result	: No eye irritation
Assessment	: No eye irritation
Method	: OECD Test Guideline 405

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Species	: Rabbit
Result	: No eye irritation
Method	: OECD Test Guideline 405

1,4-bis(2,3-epoxypropoxy)butane:

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Species	:	Rabbit
Assessment	:	Risk of serious damage to eyes.
Method	:	OECD Test Guideline 405
GLP	:	yes

bis(2,3-epoxypropyl) terephthalate:

Species	:	Rabbit
Result	:	Irreversible effects on the eye
Assessment	:	Corrosive

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Species	:	Rabbit
Result	:	Eye irritation
Method	:	OECD Test Guideline 405

Respiratory or skin sensitisation**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Test Type	:	Local lymph node assay (LLNA)
Exposure routes	:	Skin
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	The product is a skin sensitizer, sub-category 1B.

barium sulfate:

Exposure routes	:	Skin
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	Does not cause skin sensitisation.

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Exposure routes	:	Skin
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	May cause sensitisation by skin contact.

1,4-bis(2,3-epoxypropoxy)butane:

Exposure routes	:	Skin
Species	:	Guinea pig
Method	:	OECD Test Guideline 406
Result	:	May cause sensitisation by skin contact.
GLP	:	yes

Assessment	:	Harmful if inhaled.
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bis(2,3-epoxypropyl) terephthalate:

Exposure routes	:	Skin
Species	:	Guinea pig
Assessment	:	May cause sensitisation by skin contact.
Method	:	OECD Test Guideline 406

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Result : May cause sensitisation by skin contact.

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Exposure routes	: Skin
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: May cause sensitisation by skin contact.

Germ cell mutagenicity**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Genotoxicity in vitro	: Test Type: In vitro mammalian cell gene mutation test Test system: mouse lymphoma cells Metabolic activation: without metabolic activation Result: positive
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Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
Result: negative

Genotoxicity in vivo	: Test Type: in vivo assay Species: Mouse (male) Cell type: Germ Application Route: Oral Dose: 3333, 10000 mg/kg Result: negative
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Test Type: gene mutation test
Species: Rat (male)
Cell type: Somatic
Application Route: Oral
Dose: 50,250,500,1000 mg/kg bw/day
Method: OECD Test Guideline 488
Result: negative

barium sulfate:

Genotoxicity in vitro	: Metabolic activation: with and without metabolic activation Method: OECD Test Guideline 476 Result: negative
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Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

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Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Genotoxicity in vivo : Cell type: Somatic
Application Route: Oral
Exposure time: 48 h
Dose: 2000 mg/kg
Method: OECD Test Guideline 474
Result: negative

Cell type: Somatic
Application Route: Oral
Dose: 2000 mg/kg
Method: OECD Test Guideline 486
Result: negative

1,4-bis(2,3-epoxypropoxy)butane:

Genotoxicity in vitro : Test Type: reverse mutation assay
Concentration: 10 - 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive
GLP: yes
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster lung cells
Concentration: 1 - 100 µg/L
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: positive
GLP: yes
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive
GLP: no
Remarks: Not classified due to data which are conclusive although insufficient for classification.

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male)

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Cell type: Somatic
Application Route: Oral
Exposure time: 4 d
Dose: 187.5 - 750 mg/kg
Method: OECD Test Guideline 474
Result: negative
GLP: yes

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen., Animal testing did not show any mutagenic effects.

bis(2,3-epoxypropyl) terephthalate:

Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

Genotoxicity in vivo : Application Route: Oral
Method: OECD Test Guideline 483
Result: negative

Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

Genotoxicity in vivo : Application Route: Oral
Method: OECD Test Guideline 483
Result: negative

Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

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Carcinogenicity**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Species	: Rat, male
Application Route	: Oral
Exposure time	: 24 month(s)
Dose	: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment	: 7 days/week
NOAEL	: 15 mg/kg bw/day
Method	: OECD Test Guideline 453
Result	: negative
Target Organs	: Digestive organs

Species	: Mouse, male
Application Route	: Dermal
Exposure time	: 24 month(s)
Dose	: 0, 0.1, 10, 100 mg/kg bw/day
Frequency of Treatment	: 3 days/week
NOEL	: 0.1 mg/kg body weight
Method	: OECD Test Guideline 453
Result	: negative
Target Organs	: Digestive organs

Species	: Rat, female
Application Route	: Dermal
Exposure time	: 24 month(s)
Dose	: 0.1, 100, 1000 mg/kg bw/day
Frequency of Treatment	: 5 days/week
NOEL	: 100 mg/kg body weight
Method	: OECD Test Guideline 453
Result	: negative

Species	: Rat, female
Application Route	: Oral
Exposure time	: 24 month(s)
Dose	: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment	: 7 days/week
NOAEL	: 100 mg/kg bw/day
Method	: OECD Test Guideline 453
Result	: negative
Target Organs	: Digestive organs

Species	: Rat, females
Application Route	: Oral
Exposure time	: 24 month(s)
Dose	: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment	: 7 days/week
NOEL	: 2 mg/kg bw/day
Method	: OECD Test Guideline 453
Result	: negative
Target Organs	: Digestive organs

barium sulfate:

Species	: Rat, male and female
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Application Route : Oral
 Exposure time : 104 weeks
 Dose : 60 - 75 mg/kg
 Method : OPPTS 870.4200
 Result : negative

Species : Mouse, male and female
 Application Route : Oral
 Dose : 160 - 200 mg/kg
 Method : OPPTS 870.4200
 Result : negative

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Effects on fertility : Test Type: Two-generation study
 Species: Rat, male and female
 Application Route: Oral
 Dose: 0, 50, 180, 540 or 750 milligram per kilogram
 Duration of Single Treatment: 238 d
 Frequency of Treatment: 1 daily
 General Toxicity - Parent: NOEL: 540 mg/kg body weight
 General Toxicity F1: NOEL: 750 mg/kg body weight
 Symptoms: No adverse effects
 Method: OECD Test Guideline 416
 Result: No effects on fertility and early embryonic development were detected.

Effects on foetal development : Species: Rabbit, female
 Application Route: Dermal
 Dose: 0, 30, 100 or 300 milligram per kilogram
 Duration of Single Treatment: 28 d
 Frequency of Treatment: 1 daily
 General Toxicity Maternal: NOAEL: 30 mg/kg body weight
 Developmental Toxicity: NOAEL: 300 mg/kg body weight
 Method: Other guidelines
 Result: No teratogenic effects

Test Type: Pre-natal
 Species: Rabbit, female
 Application Route: Oral
 Dose: 0, 20, 60 or 180 milligram per kilogram
 Duration of Single Treatment: 13 d
 Frequency of Treatment: 1 daily
 General Toxicity Maternal: NOAEL: 60 mg/kg body weight

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Developmental Toxicity: NOAEL: 180 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0, 60, 180 and 540 milligram per kilogram
Duration of Single Treatment: 10 d
Frequency of Treatment: 1 daily
General Toxicity Maternal: NOAEL: 180 mg/kg body weight
Developmental Toxicity: NOAEL: > 540 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Effects on fertility : Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

Effects on foetal development : Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: NOAEL: 30 mg/kg body weight
Result: No teratogenic effects

1,4-bis(2,3-epoxypropoxy)butane:

Effects on foetal development : Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0/30/100/300 mg/kg bw/day
Duration of Single Treatment: 17 d
General Toxicity Maternal: NOAEL: 300 mg/kg body weight
Developmental Toxicity: NOAEL: 300 mg/kg body weight
Method: OECD Test Guideline 414
GLP: yes
Remarks: Information given is based on data obtained from similar substances.

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Repeated dose toxicity**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Species : Rat, male and female
NOAEL : 50 mg/kg
Application Route : oral (gavage)
Exposure time : 14 Weeks

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Number of exposures : 7 d
 Dose : 0, 50, 250, 1000 mg/kg/day
 Method : OECD Test Guideline 408

Species : Rat, male and female
 NOAEL : ≥ 10 mg/kg
 Application Route : Skin contact
 Exposure time : 13 Weeks
 Number of exposures : 5 d
 Dose : 0, 10, 100, 1000 mg/kg/day
 Method : OECD Test Guideline 411

Species : Mouse, male
 NOAEL : 100 mg/kg
 Application Route : Skin contact
 Exposure time : 13 Weeks
 Number of exposures : 3 d
 Dose : 0, 1, 10, 100 mg/kg/day
 Method : OECD Test Guideline 411

barium sulfate:

Species : Rat
 LOEC : ≥ 104 mg/kg, 40 mg/m³
 Application Route : Ingestion
 Test atmosphere : dust/mist
 Exposure time : 5 h
 Number of exposures : 5 d
 Method : Subchronic toxicity

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Species : Rat, male and female
 NOAEL : 250 mg/kg
 Application Route : Ingestion
 Exposure time : 13 Weeks
 Number of exposures : 7 d
 Method : Subchronic toxicity

1,4-bis(2,3-epoxypropoxy)butane:

Species : Rat, male and female
 NOAEL : 200 mg/kg
 Application Route : Oral
 Exposure time : 28 d
 Number of exposures : daily
 Dose : 25, 100, 200, 400 mg/kg
 Method : Subacute toxicity

Species : Rat, male and female
 NOAEL : 263 mg/kg
 Application Route : Oral
 Exposure time : 90 h
 Number of exposures : daily
 Dose : 0,30,100,300 mg/kg bw/day
 Method : OECD Test Guideline 408
 GLP : yes

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Remarks : Information given is based on data obtained from similar substances.

Repeated dose toxicity - Assessment : Harmful if inhaled.

bis(2,3-epoxypropyl) terephthalate:

Species	: Rat, male and female
NOAEL	: > 240 mg/kg
Application Route	: Ingestion
Exposure time	: 672 h
Number of exposures	: 7 d
Method	: Subacute toxicity

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Species	: Rat, male
NOAEL	: 150 mg/kg/d
Application Route	: Ingestion
Exposure time	: 672 h
Number of exposures	: 7 d
Method	: Subacute toxicity

Species	: Rat, female
NOAEL	: >= 500 mg/kg/d
Application Route	: Ingestion
Exposure time	: 672 h
Number of exposures	: 7 d
Method	: Subacute toxicity

Aspiration toxicity

No data available

Experience with human exposure

No data available

Toxicology, Metabolism, Distribution

No data available

Neurological effects

No data available

Further information

No data available

SECTION 12. ECOLOGICAL INFORMATION**Ecotoxicity****Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Toxicity to fish	: LC50 (Oncorhynchus mykiss (rainbow trout)): 2 mg/l
	Exposure time: 96 h
	Method: OECD Test Guideline 203

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Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1.8 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50: 11 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: EPA-660/3-75-009

NOEC: 4.2 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: EPA-660/3-75-009

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.3 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

Toxicity to microorganisms : IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water

Ecotoxicology Assessment

Chronic aquatic toxicity : Toxic to aquatic life with long lasting effects.

barium sulfate:

Toxicity to fish : LC50 : 174 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 14.5 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50: > 100 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

NOEC: > 1.15 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water

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Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 5.8 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Toxicity to fish : LC50 (Fish): 2.54 mg/l
Exposure time: 96 h
Method: Calculation method

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 2.55 mg/l
Exposure time: 48 h
Method: Calculation method

Toxicity to algae/aquatic plants : EC50 (Selenastrum capricornutum (green algae)): 1.8 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.3 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211
Remarks: Information given is based on data obtained from similar substances.

Toxicity to microorganisms : IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water

1,4-bis(2,3-epoxypropoxy)butane:

Toxicity to fish : LC50 (Brachydanio rerio (zebrafish)): 24 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: OECD Test Guideline 203
GLP: no

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 75 mg/l
End point: Immobilization
Exposure time: 24 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: OECD Test Guideline 202
GLP: no

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Toxicity to algae/aquatic plants : EL50 (*Pseudokirchneriella subcapitata* (green algae)): > 160 mg/l
 Exposure time: 72 h
 Test Type: static test
 Analytical monitoring: yes
 Test substance: Fresh water
 Method: OECD Test Guideline 201
 GLP: yes

NOELR (*Pseudokirchneriella subcapitata* (green algae)): 40 mg/l
 Exposure time: 72 h
 Test Type: static test
 Analytical monitoring: yes
 Test substance: Fresh water
 Method: OECD Test Guideline 201
 GLP: yes

Toxicity to microorganisms : IC50 (activated sludge): > 100 mg/l
 Exposure time: 3 h
 Test Type: static test
 Analytical monitoring: no
 Test substance: Fresh water
 Method: OECD Test Guideline 209
 GLP: no

bis(2,3-epoxypropyl) terephthalate:

Toxicity to fish : LC50 : 8.8 mg/l
 Exposure time: 96 h
 Test Type: static test
 Test substance: Fresh water
 Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 81 mg/l
 Exposure time: 48 h
 Test Type: static test
 Test substance: Fresh water
 Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : ErC50 (*Selenastrum capricornutum* (green algae)): 2.94 mg/l
 Exposure time: 72 h
 Test Type: static test
 Test substance: Fresh water
 Method: OECD Test Guideline 201

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Toxicity to fish : LC50 (*Oncorhynchus mykiss* (rainbow trout)): > 6.7 mg/l
 Exposure time: 96 h
 Test Type: semi-static test
 Test substance: Fresh water
 Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 21.7 mg/l
 Exposure time: 48 h
 Test Type: semi-static test

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Test substance: Fresh water
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Selenastrum capricornutum (green algae)): 27.45 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

NOEC (Selenastrum capricornutum (green algae)): 0.6 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 3 h
Test substance: brackish water
Method: OECD Test Guideline 209

Persistence and degradability**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Stability in water : Degradation half life (DT50): 4.83 d (25 °C) pH: 4
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 7.1 d (25 °C) pH: 9
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 3.58 d (25 °C) pH: 7
Method: OECD Test Guideline 111
Remarks: Fresh water

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Biodegradability : Inoculum: activated sludge
Concentration: 3 mg/l
Result: Not biodegradable
Biodegradation: ca. 0 %
Exposure time: 28 d
Method: Directive 67/548/EEC Annex V, C.4.E.

1,4-bis(2,3-epoxypropoxy)butane:

Biodegradability : aerobic

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Inoculum: activated sludge
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 43 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
GLP: yes

aerobic
Inoculum: Sewage (STP effluent)
Concentration: 20 mg/l
Dissolved organic carbon (DOC)
Result: Not readily biodegradable.
Biodegradation: 38 %
Exposure time: 28 d
Method: OECD Test Guideline 301E
GLP: no

bis(2,3-epoxypropyl) terephthalate:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 83 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Stability in water : Degradation half life (DT50): 118.26 hrs (20 °C) pH: 7
Method: OECD Test Guideline 111
GLP: yes
Remarks: Fresh water

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Biodegradability : Inoculum: Fresh water
Result: Not biodegradable
Biodegradation: 59 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Stability in water : Degradation half life (DT50): 101.91 hrs (20 °C) pH: 4
Method: OECD Test Guideline 111
GLP: yes
Remarks: Fresh water

Bioaccumulative potential**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Bioaccumulation : Bioconcentration factor (BCF): 31
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water : log Pow: 3.242 (77 °F / 25 °C)
pH: 7.1
Method: OECD Test Guideline 117

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

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Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): 150
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water : log Pow: 2.7 - 3.6
Method: OECD Test Guideline 117

1,4-bis(2,3-epoxypropoxy)butane:

Partition coefficient: n-octanol/water : log Pow: -0.269 (77 °F / 25 °C)
pH: 6.7
Method: OECD Test Guideline 117
GLP: yes

bis(2,3-epoxypropyl) terephthalate:

Partition coefficient: n-octanol/water : log Pow: 1.7 (77 °F / 25 °C)
Method: OECD Test Guideline 117
GLP: yes

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Partition coefficient: n-octanol/water : log Pow: 0.9 (77 °F / 25 °C)
Method: OECD Test Guideline 117

Mobility in soil**Components:****2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

Distribution among environmental compartments : Koc: 445

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:

Distribution among environmental compartments : Koc: 4460
Method: OECD Test Guideline 121

1,4-bis(2,3-epoxypropoxy)butane:

Distribution among environmental compartments : Koc: 12.59
Method: OECD Test Guideline 121

bis(2,3-epoxypropyl) terephthalate:

Distribution among environmental compartments : Koc: 2
Method: OECD Test Guideline 121

tris(oxiranylmethyl) benzene-1,2,4-tricarboxylate:

Distribution among environmental compartments : Koc: 251
Method: OECD Test Guideline 121

Other adverse effects**Product:**

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82
Protection of Stratospheric Ozone - CAA Section 602 Class I

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Substances

Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

SECTION 13. DISPOSAL CONSIDERATIONS**Disposal methods**

Waste from residues : Dispose of contents and container in accordance with all local, regional, national and international regulations.
Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with chemical or used container.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION**International Regulations****IATA-DGR**

UN/ID No. : UN 3082
Proper shipping name : Environmentally hazardous substance, liquid, n.o.s.
(BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)
Class : 9
Packing group : III
Labels : Miscellaneous
Packing instruction (cargo aircraft) : 964
Packing instruction (passenger aircraft) : 964
Environmentally hazardous : yes

IMDG-Code

UN number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)
Class : 9
Packing group : III
Labels : 9
EmS Code : F-A, S-F
Marine pollutant : yes

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Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations**49 CFR**

UN/ID/NA number	: UN 3082
Proper shipping name	: Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)
Class	: 9
Packing group	: III
Labels	: CLASS 9
ERG Code	: 171
Marine pollutant	: yes
Remarks	: Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

Special precautions for user

Remarks	: Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO. 49CFR: no dangerous good in non-bulk packaging
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The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION**CERCLA Reportable Quantity**

Listed substances in the product are at low enough levels to not be expected to exceed the RQ

SARA 311/312 Hazards	: Respiratory or skin sensitisation Skin corrosion or irritation Serious eye damage or eye irritation
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SARA 313	: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
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This product does not contain any hazardous air pollutants (HAP) $\geq 0.1\%$, as defined by the U.S. Clean Air Act Section 112 (40 CFR 61)

California Prop. 65

WARNING: This product can expose you to chemicals including methanol, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The components of this product are reported in the following inventories:

DSL	: This product contains one or several components that are not on the Canadian DSL nor NDSL.
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AIIC	: Not in compliance with the inventory
ENCS	: Notified. Allowed to be imported / manufactured only by the notifiers. Please contact your Huntsman sales representative for more information.
KECI	: Not in compliance with the inventory
PICCS	: Not in compliance with the inventory
IECSC	: Notified. Allowed to be imported / manufactured only by the notifiers. Please contact your Huntsman sales representative for more information.
TCSI	: On the inventory, or in compliance with the inventory
TSCA	: On or in compliance with the active portion of the TSCA inventory

Inventories

AIIC (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TECI (Thailand), TSCA (USA)

TSCA - 5(a) Significant New Use Rule List of Chemicals

The following substance(s) is/are subject to a Significant New Use Rule:

bis(2,3-epoxypropyl)	7195-44-0	See 40 CFR § 721.2950
terephthalate		
tris(oxiranylmethyl) benzene-	7237-83-4	See 40 CFR § 721.2950
1,2,4-tricarboxylate		

US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)

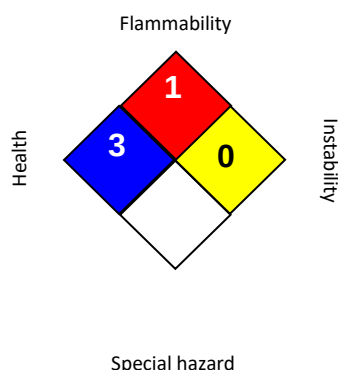
The following substance(s) is/are subject to TSCA 12(b) export notification requirements:

bis(2,3-epoxypropyl) terephthalate	7195-44-0
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SECTION 16. OTHER INFORMATION**Further information****NFPA 704:****HMIS® IV:**

HEALTH		3
FLAMMABILITY		1
PHYSICAL HAZARD		0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard

Revision Date : 01/30/2023

ACGIH : USA. ACGIH Threshold Limit Values (TLV)

NIOSH REL : USA. NIOSH Recommended Exposure Limits

OSHA P0 : USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)

OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

ACGIH / TWA : 8-hour, time-weighted average

NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek

OSHA P0 / TWA : 8-hour time weighted average

OSHA Z-1 / TWA : 8-hour time weighted average

The information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

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