

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006, as amended

**HUNTSMAN**

Enriching lives through innovation

## ARALDITE® 2020-1 A

Version	Revision Date:	SDS Number:	Date of last issue: -
1.0	23.08.2024	400000015398	Date of first issue: 23.08.2024

Print Date 19.06.2025

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

Trade name : ARALDITE® 2020-1 A

Unique Formula Identifier (UFI) : 435S-50RQ-X006-A157

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

Use of the Substance/Mixture : Adhesives

#### 1.3 Details of the supplier of the safety data sheet

Company : Huntsman Advanced Materials (Europe) BV

Address : Grijpenlaan 18  
3300 Tienen  
Belgium

Telephone : +41 61 299 20 41

Telefax : +41 61 299 20 40

E-mail address of person responsible for the SDS : Global\_Product\_EHS\_AdMat@huntsman.com

#### 1.4 Emergency telephone

Emergency telephone : Berlin: 0049 30 19 24 0 & 0049 30 30 68 6 7 11  
Bonn: 0049 228 19 27 0 & 0049 228 28 7 3 32 11  
Erfurt: 0049 361 73 07 30  
Freiburg: 0049 761 16 24 0  
Göttingen: 0049 51 19 24 0 & 0049 551 38 31 80  
Homburg: 0049 6841 19 24 0  
Mainz: 0049 6131 19 24 0 & 0049 6131 23 24 66  
München: 0049 89 19 24 0  
Nürnberg: 0049 911 39 8 2 45 1  
EUROPE: +32 35 75 1234  
France ORFILA: +33(0)145425959  
ASIA: +65 6336-6011  
China: +86 20 39377888  
+86 532 83889090  
India: + 91 22 42 87 5333  
Australia: 1800 786 152  
New Zealand: 0800 767 437  
USA: +1 800-424-9300

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

**Classification (REGULATION (EC) No 1272/2008)**

Acute toxicity, Category 4

H302: Harmful if swallowed.

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Skin irritation, Category 2	H315: Causes skin irritation.
Eye irritation, Category 2	H319: Causes serious eye irritation.
Skin sensitisation, Category 1	H317: May cause an allergic skin reaction.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

### 2.2 Label elements

#### Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal Word : Warning

Hazard Statements :

H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H412	Harmful to aquatic life with long lasting effects.

Precautionary Statements :

**Prevention:**

P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.

**Response:**

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

P337 + P313 If eye irritation persists: Get medical advice/ attention.

#### Hazardous ingredients which must be listed on the label:

1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane  
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane

### 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

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Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

#### Hazardous ingredients

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane	14228-73-0 238-098-4 01-2120068066-56	Acute Tox. 4; H302 Skin Irrit. 2; H315 Skin Sens. 1; H317 Aquatic Chronic 3; H412	>= 70 - < 90
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane	1675-54-3 216-823-5 603-073-00-2	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317 Aquatic Chronic 2; H411  specific concentration limit Skin Irrit. 2; H315 >= 5 % Eye Irrit. 2; H319 >= 5 %	>= 20 - < 25

For explanation of abbreviations see section 16.

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

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

- |                            |   |
|----------------------------|---|
| General advice             | : Move out of dangerous area.<br>Show this material safety data sheet to the doctor in attendance.<br>Treat symptomatically.<br>Get medical attention if symptoms occur.  |
| Protection of first-aiders | : First Aid responders should pay attention to self-protection and use the recommended protective clothing<br>If potential for exposure exists refer to Section 8 for specific personal protective equipment.<br>Avoid inhalation, ingestion and contact with skin and eyes.<br>No action shall be taken involving any personal risk or without suitable training.<br>It may be dangerous to the person providing aid to give |

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mouth-to-mouth resuscitation.

- |                         |   |  |
|-------------------------|---|--|
| If inhaled              | : | If inhaled, remove to fresh air.<br>Get medical attention if symptoms occur.   |
| In case of skin contact | : | If skin irritation persists, call a physician.<br>If on skin, rinse well with water.<br>If on clothes, remove clothes.   |
| In case of eye contact  | : | Immediately flush eye(s) with plenty of water.<br>Remove contact lenses.<br>Keep eye wide open while rinsing.<br>If eye irritation persists, consult a specialist.                     |
| If swallowed            | : | Induce vomiting immediately and call a physician.<br>Keep respiratory tract clear.<br>Never give anything by mouth to an unconscious person.<br>If symptoms persist, call a physician. |

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

- |       |   |  |
|-------|---|--|
| Risks | : | Harmful if swallowed.<br>Causes skin irritation.<br>May cause an allergic skin reaction.<br>Causes serious eye irritation. |
|-------|---|--|

### 4.3 Indication of any immediate medical attention and special treatment needed

- |           |   |                        |
|-----------|---|------------------------|
| Treatment | : | Treat symptomatically. |
|-----------|---|------------------------|

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

- |                                |   |   |
|--------------------------------|---|---|
| Suitable extinguishing media   | : | Water spray<br>Alcohol-resistant foam<br>Carbon dioxide (CO2)<br>Dry chemical         |
| Unsuitable extinguishing media | : | Exercise caution when using a high volume water jet as it may scatter and spread fire |

### 5.2 Special hazards arising from the substance or mixture

- |                                      |   |   |
|--------------------------------------|---|---|
| Specific hazards during firefighting | : | Do not allow run-off from fire fighting to enter drains or water courses. |
| Hazardous combustion products        | : | Carbon oxides<br>Phenolics  |

### 5.3 Advice for firefighters

- |  |   |  |
|--|---|--|
| Special protective equipment for fire-fighters | : | Wear self-contained breathing apparatus for firefighting if necessary. |
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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.

### SECTION 6: Accidental release measures

#### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Refer to protective measures listed in sections 7 and 8.
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#### 6.2 Environmental precautions

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.
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#### 6.3 Methods and material for containment and cleaning up

Methods for 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.
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#### 6.4 Reference to other sections

For disposal considerations see section 13., See Section 1 for emergency contact information., For personal protection see section 8.

### SECTION 7: Handling and storage

#### 7.1 Precautions for safe handling

Advice on safe handling	:	Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitization of susceptible persons. Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product. Do not breathe vapors/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 application area. Dispose of rinse water in accordance with local and national regulations.
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Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
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Hygiene measures : When using do not eat or drink. When using do not smoke.  
Wash hands before breaks and at the end of workday.

### 7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : 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 labeled containers.

Advice on common storage : For incompatible materials please refer to Section 10 of this SDS.

Storage class (TRGS 510) : 10

Further information on storage stability : Stable under normal conditions.

Recommended storage temperature : 5 - 25 °C

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Contains no substances with occupational exposure limit values.

#### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane	Workers	Inhalation	Long-term systemic effects	4,93 mg/m3
	Workers	Dermal	Long-term systemic effects	0,75 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	0,87 mg/m3
	Consumers	Dermal	Long-term systemic effects	0,0893 mg/kg bw/day
1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane	Consumers	Oral	Long-term systemic effects	0,5 mg/kg bw/day
	Workers	Inhalation	Long-term systemic effects	3,52 mg/m3

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	Workers	Dermal	Long-term systemic effects	1 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	0,86 mg/m3
	Consumers	Dermal	Long-term systemic effects	0,5 mg/kg bw/day
	Consumers	Oral	Long-term systemic effects	0,5 mg/kg bw/day

### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane	Fresh water	0,006 mg/l
	Sea water	0,001 mg/l
	Fresh water sediment	0,341 mg/kg dry weight (d.w.)
	Sea sediment	0,034 mg/kg dry weight (d.w.)
	Soil	0,065 mg/kg dry weight (d.w.)
	Sewage treatment plant	10 mg/l
	Secondary Poisoning	11 mg/kg
1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane	Fresh water	0,117 mg/l
	Remarks:Assessment Factors	
	Sea water	0,012 mg/l
	Remarks:Assessment Factors	
	Sewage treatment plant	0,6 mg/l
	Remarks:Assessment Factors	
	Fresh water sediment	0,47 mg/kg dry weight (d.w.)
	Sea sediment	0,047 mg/kg dry weight (d.w.)
	Soil	0,24 mg/kg dry weight (d.w.)
	Oral	1 mg/kg

## 8.2 Exposure controls

### Personal protective equipment

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

### 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)

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Break through time : > 8 h

Remarks : 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). The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

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

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines  
Equipment should conform to EN 14387

Filter type : Combined particulates and organic vapor type (A-P)

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Physical state : liquid

Color : Clear, light blue

Odor : slight

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

Melting point/freezing point : No data is available on the product itself.

Boiling point : No data is available on the product itself.

Flammability (solid, gas) : No data is available on the product itself.

Lower explosion limit / Lower flammability limit : No data is available on the product itself.

Upper explosion limit / Upper flammability limit : No data is available on the product itself.

Flash point : 140 °C  
Method: estimated, closed cup



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Autoignition temperature	: No data is available on the product itself.
Decomposition temperature	: No data is available on the product itself.
pH	: substance/mixture is non-soluble (in water)
Viscosity	
Viscosity, dynamic	: 170 mPa.s (25 °C)
Solubility(ies)	
Water solubility	: practically insoluble (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.
Vapor pressure	: No data is available on the product itself.
Density	: 1,12 g/cm <sup>3</sup> (25 °C)
Relative density	: No data is available on the product itself.
Relative vapor density	: No data is available on the product itself.
Particle characteristics	: No data is available on the product itself.

### 9.2 Other information

No data is available on the product itself.

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : No hazards to be specially mentioned.

### 10.4 Conditions to avoid

Conditions to avoid : None known.

### 10.5 Incompatible materials

Materials to avoid : None known.

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### 10.6 Hazardous decomposition products

No hazardous decomposition products are known.

## SECTION 11: Toxicological information

### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

#### Acute toxicity

Harmful if swallowed.

#### Product:

Acute oral toxicity : Acute toxicity estimate: 1 464 mg/kg  
Method: Calculation method

#### Components:

##### **1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:**

Acute oral toxicity : LD50 (Rat, female): 1 098 mg/kg  
Method: OECD Test Guideline 425  
GLP: yes  
Assessment: The component/mixture is moderately toxic after single ingestion.

Acute inhalation toxicity : LC50 (Rat, male and female): Test atmosphere: dust/mist  
Method: OECD Test Guideline 403  
GLP: yes  
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rabbit, females): > 2 000 mg/kg  
Method: OECD Test Guideline 402  
GLP: yes  
Assessment: The substance or mixture has no acute dermal toxicity

##### **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

#### **Skin corrosion/irritation**

Causes skin irritation.

#### Components:

##### **1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:**

Species : reconstructed human epidermis (RhE)

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Assessment : Irritating to skin.  
Method : OECD Test Guideline 439  
Result : Skin irritation  
GLP : yes

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

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

### Serious eye damage/eye irritation

Causes serious eye irritation.

#### Components:

#### 1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

Species : Bovine cornea  
Assessment : No eye irritation  
Method : OECD Test Guideline 437  
Result : No eye irritation  
GLP : yes

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

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

### Respiratory or skin sensitisation

#### Skin sensitisation

May cause an allergic skin reaction.

#### Respiratory sensitisation

Not classified due to lack of data.

#### Components:

#### 1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

Test Type : Local lymph node assay (LLNA)  
Species : Mouse  
Assessment : May cause sensitisation by skin contact.  
Method : OECD Test Guideline 429  
Result : May cause sensitisation by skin contact.  
GLP : yes

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

Test Type : Local lymph node assay (LLNA)  
Exposure routes : Skin  
Species : Mouse

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Method : OECD Test Guideline 429  
Result : The product is a skin sensitiser, sub-category 1B.

### Germ cell mutagenicity

Not classified due to lack of data.

### Components:

#### 1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

Genotoxicity in vitro : Test Type: reverse mutation assay  
Test system: Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: positive  
GLP: yes

Test Type: unscheduled DNA synthesis assay  
Test system: rat hepatocytes  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 482  
Result: negative  
GLP: yes

Test Type: reverse mutation assay  
Test system: Salmonella typhimurium and E. coli  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: positive  
GLP: yes

Test Type: gene mutation test  
Test system: mouse lymphoma cells  
Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 476  
Result: positive  
GLP: yes

Genotoxicity in vivo : Test Type: In vivo micronucleus test  
Species: Mouse (male)  
Application Route: Oral  
Dose: 0/375/750/1500 mg/kg bw/day  
Method: OECD Test Guideline 474  
Result: negative  
GLP: yes

Test Type: In vivo micronucleus test  
Species: Rat (male)  
Cell type: Bone marrow  
Application Route: Oral  
Dose: 187.5/375/750 mg/kg bw/day  
Method: OECD Test Guideline 474  
Result: negative  
GLP: yes

Test Type: comet assay

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Species: Rat (male)  
Cell type: Liver cells  
Application Route: Oral  
Dose: 150/300/600 mg/kg bw/day  
Result: negative  
GLP: yes

### 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

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

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

### Carcinogenicity

Not classified due to lack of data.

### 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)

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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

### Reproductive toxicity

Not classified due to lack of data.

### Components:

#### 1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

Effects on fertility : Test Type: Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test  
Species: Rat, male and female  
Application Route: Oral  
Dose: 10/60/300 mg/kg bw/day  
Frequency of Treatment: 7 days/week  
General Toxicity Parent: NOAEL: 300 mg/kg body weight  
General Toxicity F1: NOEL: 300 mg/kg body weight  
Method: OECD Test Guideline 422  
Result: negative  
GLP: yes

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

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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 fetal 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  
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

### STOT-single exposure

Not classified due to lack of data.

### STOT-repeated exposure

Not classified due to lack of data.

### Repeated dose toxicity

#### Components:

**1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:**

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Species	: Rat, male and female
NOAEL	: 300 mg/kg
Application Route	: Oral
Number of exposures	: daily
Dose	: 10/60/300 mg/kg bw/day
Method	: OECD Test Guideline 422
GLP	: yes

### 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
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

### Aspiration toxicity

Not classified due to lack of data.

## 11.2 Information on other hazards

### Endocrine disrupting properties

#### Product:

Assessment	: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher
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### Experience with human exposure

No data available

### Toxicology, Metabolism, Distribution

No data available

### Neurological effects

No data available



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### Further information

No data available

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

#### **1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:**

Toxicity to fish	: LC50 (Oncorhynchus mykiss (rainbow trout)): 10,1 mg/l End point: mortality Exposure time: 96 h Test Type: static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 203 GLP: yes
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 16,3 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	: EC50 (Pseudokirchneriella subcapitata (green algae)): 36,6 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 201 GLP: yes  NOEC (Pseudokirchneriella subcapitata (green algae)): 25 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	: EC50 (Pseudomonas putida): 10 264 mg/l Exposure time: 18 h Test Type: static test Test substance: Fresh water Method: DIN 38 412 Part 8 GLP: no
Toxicity to daphnia and other aquatic invertebrates	: Lowest Observed Effect Concentration: > 11,7 mg/l Exposure time: 21 d

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(Chronic toxicity)

Species: Daphnia magna (Water flea)  
Test Type: semi-static test  
Analytical monitoring: yes  
Test substance: Fresh water  
Method: OECD Test Guideline 211  
GLP: yes

### Ecotoxicology Assessment

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

#### 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

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

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 0,3 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
Test Type: semi-static test  
Test substance: Fresh water  
Method: OECD Test Guideline 211

### Ecotoxicology Assessment

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

## 12.2 Persistence and degradability

### Components:

1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

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Biodegradability : Test Type: aerobic  
Inoculum: activated sludge, non-adapted  
Concentration: 111 mg/l  
Result: Partially biodegradable.  
Biodegradation: 16,6 %  
Related to: Dissolved organic carbon (DOC)  
Exposure time: 34 d  
Method: OECD Test Guideline 301F  
GLP: yes

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

Biodegradability : Test Type: 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

## 12.3 Bioaccumulative potential

### Components:

#### 1,4-bis[(2,3-epoxypropoxy)methyl]cyclohexane:

Partition coefficient: n-octanol/water : log Pow: ca. 2,29 (30 °C)  
Method: OECD Test Guideline 117  
GLP: yes

#### 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 (25 °C)  
pH: 7,1  
Method: OECD Test Guideline 117

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### 12.4 Mobility in soil

#### Components:

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

Distribution among : Koc: 445  
environmental compartments

### 12.5 Results of PBT and vPvB assessment

#### Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### 12.6 Endocrine disrupting properties

#### Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

### 12.7 Other adverse effects

#### Product:

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

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : 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

### 14.1 UN number or ID number

ADN : Not regulated as dangerous goods  
ADR : Not regulated as dangerous goods

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**RID** : Not regulated as dangerous goods

**IMDG** : Not regulated as dangerous goods

**IATA** : Not regulated as dangerous goods

### 14.2 UN proper shipping name

**ADN** : Not regulated as dangerous goods

**ADR** : Not regulated as dangerous goods

**RID** : Not regulated as dangerous goods

**IMDG** : Not regulated as dangerous goods

**IATA** : Not regulated as dangerous goods

### 14.3 Transport hazard class(es)

**ADN** : Not regulated as dangerous goods

**ADR** : Not regulated as dangerous goods

**RID** : Not regulated as dangerous goods

**IMDG** : Not regulated as dangerous goods

**IATA** : Not regulated as dangerous goods

### 14.4 Packing group

**ADN** : Not regulated as dangerous goods

**ADR** : Not regulated as dangerous goods

**RID** : Not regulated as dangerous goods

**IMDG** : Not regulated as dangerous goods

**IATA (Cargo)** : Not regulated as dangerous goods

**IATA (Passenger)** : Not regulated as dangerous goods

### 14.5 Environmental hazards

Not regulated as dangerous goods

### 14.6 Special precautions for user

Remarks : Not classified as dangerous in the meaning of transport regulations.

### 14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

## SECTION 15: Regulatory information

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

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

REACH - Candidate List of Substances of Very High : This product does not contain

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Concern for Authorization (Article 59).

substances of very high concern.

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII)

: Conditions of restriction for the following entries should be considered:  
Number on list 75: If you intend to use this product as tattoo ink, please contact your vendor.

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

Not applicable

Water hazard class  
(Germany)

: WGK 2 obviously hazardous to water  
Classification according to AwSV, Annex 1 (5.2)

### Other regulations:

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

### The ingredients of this product are reported in the following inventories:

DSL	: All components of this product are on the Canadian DSL
AIIC	: On the inventory, or in compliance with the inventory
ENCS	: Not in compliance with the inventory
KECI	: On the inventory, or in compliance with the inventory
PICCS	: On the inventory, or in compliance with the inventory
IECSC	: On the inventory, or in compliance with the inventory
TCSI	: On the inventory, or in compliance with the inventory
TSCA	: Product contains substance(s) not active on TSCA inventory.

### Inventories

AICS (Australia), AIIC (Australia), DSL (Canada), IECSC (China), ENCS (Japan), KECI (Korea), NZIOC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (United States of America (USA))

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### 15.2 Chemical Safety Assessment

Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.

## SECTION 16: Other information

### Full text of H-Statements

H302	: Harmful if swallowed.
H315	: Causes skin irritation.
H317	: May cause an allergic skin reaction.
H319	: Causes serious eye irritation.
H411	: Toxic to aquatic life with long lasting effects.
H412	: Harmful to aquatic life with long lasting effects.

### Full text of other abbreviations

Acute Tox.	: Acute toxicity
Aquatic Chronic	: Long-term (chronic) aquatic hazard
Eye Irrit.	: Eye irritation
Skin Irrit.	: Skin irritation
Skin Sens.	: Skin sensitisation

### Further information

#### Classification of the mixture:

Acute Tox. 4	H302
Skin Irrit. 2	H315
Eye Irrit. 2	H319
Skin Sens. 1	H317
Aquatic Chronic 3	H412

#### Classification procedure:

Calculation method
Calculation method
Calculation method
Calculation method
Calculation method

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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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