

SAFETY DATA SHEET

According to REACH Regulation (EC) No 1907/2006, as amended by UK REACH Regulations SI 2019/758

HUNTSMAN

Enriching lives through innovation

ARALDITE® CRYSTAL HARDENER

Version 3.0 Revision Date: 25.02.2022 SDS Number: 400001021208 Date of last issue: 26.12.2020
Date of first issue: 25.07.2018

Print Date 13.05.2022

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

1.1 Product identifier

Trade name : ARALDITE® CRYSTAL HARDENER

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

Use of the Substance/Mixture : Hardener

1.3 Details of the supplier of the safety data sheet

Company : Huntsman Advanced Materials (Europe)BVBA
Address : Everslaan 45
3078 Everberg
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 number

Emergency telephone number : 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.
Skin sensitisation, Category 1 H317: May cause an allergic skin reaction.
Long-term (chronic) aquatic hazard, Category 2 H411: Toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

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Hazard pictograms : 

Signal word : Warning

Hazard statements : H302 Harmful if swallowed.
H317 May cause an allergic skin reaction.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P261 Avoid breathing mist or vapours.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves.
Response:
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P391 Collect spillage.

Hazardous components which must be listed on the label:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol)
N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine
N,N,4-trimethylpiperazine-1-ethylamine

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.

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 components

| Chemical name | CAS-No. EC-No. Index-No. Registration number | Classification | Concentration (% w/w) |
|---|---|---|--------------------------|
| 2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol) | 14970-87-7 239-044-2 | Acute Tox. 3; H301 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 | >= 2.5 - < 10 |

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| | | | |
|--|---------------------------------------|---|-----------------|
| | | M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 1 Acute toxicity estimate Acute oral toxicity: 50.005 mg/kg | |
| N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine | 10563-29-8 234-148-4 | Acute Tox. 4; H302 Skin Corr. 1A; H314 Eye Dam. 1; H318 Skin Sens. 1B; H317 | >= 3 - < 5 |
| N,N,4-trimethylpiperazine-1-ethylamine | 104-19-8 203-183-7 | Acute Tox. 3; H301 Acute Tox. 4; H312 Skin Corr. 1A; H314 Eye Dam. 1; H318 Aquatic Chronic 3; H412 | >= 1 - < 2.5 |
| n-butyl acetate | 123-86-4 204-658-1 607-025-00-1 | Flam. Liq. 3; H226 STOT SE 3; H336 (Central nervous system) EUH066 | >= 1 - < 10 |

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

- General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Treat symptomatically.
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
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.
- If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.
- In case of skin contact : If on skin, rinse well with water.
- In case of eye contact : Flush eyes with water as a precaution.
Remove contact lenses.

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Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Induce vomiting immediately and call a physician.
Keep respiratory tract clear.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

4.2 Most important symptoms and effects, both acute and delayed

None known.

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
Alcohol-resistant foam
Carbon dioxide (CO₂)
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 : No hazardous combustion products are known

5.3 Advice for firefighters

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary.

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.

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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.

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.

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.

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 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 application area.
Dispose of rinse water in accordance with local and national regulations.

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

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 labelled containers.

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

Recommended storage temperature : 2 - 40 °C

Further information on storage stability : Stable under normal conditions.

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

| Components | CAS-No. | Value type (Form of exposure) | Control parameters | Basis |
|---------------------|------------|-------------------------------|----------------------------------|------------------|
| n-butyl acetate | 123-86-4 | TWA | 150 ppm 724 mg/m ³ | GB EH40 |
| | | STEL | 200 ppm 966 mg/m ³ | GB EH40 |
| | | STEL | 150 ppm 723 mg/m ³ | 2019/1831/E U |
| Further information | Indicative | | | |
| | | TWA | 50 ppm 241 mg/m ³ | 2019/1831/E U |
| Further information | Indicative | | | |

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

| Substance name | End Use | Exposure routes | Potential health effects | Value |
|--|-----------|-----------------|----------------------------|------------------------|
| N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine | Workers | Inhalation | Long-term systemic effects | 3.7 mg/m ³ |
| | Workers | Inhalation | Acute systemic effects | 7.5 mg/m ³ |
| | Workers | Inhalation | Long-term local effects | 3.7 mg/m ³ |
| | Workers | Inhalation | Acute local effects | 7.5 mg/m ³ |
| | Workers | Dermal | Long-term systemic effects | 0.67 mg/kg |
| | Consumers | Inhalation | Long-term systemic effects | 0.65 mg/m ³ |
| N,N,4-trimethylpiperazine-1- | Consumers | Inhalation | Long-term local effects | 0.65 mg/m ³ |
| | Consumers | Oral | Long-term systemic effects | 0.2 mg/kg |
| | Workers | Inhalation | Long-term systemic effects | 0.59 mg/m ³ |

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| | | | | |
|------------|---------|--------|----------------------------|-------------|
| ethylamine | | | | |
| | Workers | Dermal | Long-term systemic effects | 0.167 mg/kg |

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

| Substance name | Environmental Compartment | Value |
|--|---------------------------|--------------------------------|
| N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine | Marine water | 0.92 µg/l |
| | Freshwater - intermittent | 92 µg/l |
| | Sewage treatment plant | 18.1 mg/l |
| | Fresh water sediment | 0.0336 mg/kg dry weight (d.w.) |
| | Marine sediment | 0.0034 mg/kg dry weight (d.w.) |
| N,N,4-trimethylpiperazine-1-ethylamine | Soil | 0.0013 mg/kg dry weight (d.w.) |
| | Fresh water | 0.029 mg/l |
| | Marine water | 0.0029 mg/l |
| | Fresh water sediment | 0.118 mg/kg dry weight (d.w.) |
| | Marine sediment | 0.012 mg/kg dry weight (d.w.) |
| | Sewage treatment plant | 100 mg/l |
| | Soil | 0.0066 mg/kg dry weight (d.w.) |

8.2 Exposure controls

Personal protective equipment

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles

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 : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. The suitability for a specific workplace should be discussed with the producers of the protective gloves. 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,

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and of special workplace conditions (mechanical strain, duration of contact).

- 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 : Organic vapour type (A)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

- Physical state : liquid
- Colour : light yellow
- Odour : slight
- Odour Threshold : No data is available on the product itself.
- pH : substance/mixture is non-soluble (in water)
- Melting point/freezing point : No data available
- Boiling point/boiling range : No data available
- Flash point : 110 °C
Method: Pensky-Martens closed cup
- Flammability (solid, gas) : 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 : No data is available on the product itself.
- Relative vapour density : No data is available on the product itself.
- Relative density : 1.16 (20 °C)
- Density : 1.16 g/cm³ (20 °C)
- Solubility(ies)
Water solubility : practically insoluble (20 °C)

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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 : No data is available on the product itself.

Decomposition temperature : No data is available on the product itself.

Viscosity
Viscosity, dynamic : 15 - 35 mPa.s (25 °C)

9.2 Other information

No data available

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.

10.6 Hazardous decomposition products

No decomposition if stored and applied as directed.

SECTION 11: Toxicological information

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

Acute toxicity

Product:

Acute oral toxicity : Acute toxicity estimate: 860.7 mg/kg
Method: Calculation method

Acute dermal toxicity : Acute toxicity estimate: > 2,000 mg/kg
Method: Calculation method

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

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Acute oral toxicity : LD50 (Rat, female): > 50 - 300 mg/kg
Method: OECD Test Guideline 423

Acute toxicity estimate: 50.005 mg/kg
Method: Calculation method

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

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Acute oral toxicity : LD50 (Rat, male and female): 1,669 mg/kg
Method: OECD Test Guideline 401
GLP: no
Assessment: The component/mixture is moderately toxic after single ingestion.

N,N,4-trimethylpiperazine-1-ethylamine:

Acute oral toxicity : LD50 (Rat, female): 200 - 2,000 mg/kg
Method: OECD Test Guideline 423
GLP: yes
Assessment: The component/mixture is toxic after single ingestion.

Acute dermal toxicity : LD50 (Rabbit, male): 0.51 mL/kg bw
Assessment: The component/mixture is moderately toxic after single contact with skin.

n-butyl acetate:

Acute oral toxicity : LD50 (Rat): > 8,800 mg/kg
LD50 (Mouse): 7,060 mg/kg
LD50 (Rabbit): 7,437 mg/kg
LD50 (Guinea pig): 4,700 mg/kg
LD50 (Rat, female): 10,760 mg/kg
Method: OECD Test Guideline 423

Acute dermal toxicity : LD50 (Rabbit): > 17,600 mg/kg
LD50 (Rabbit, male and female): 14,112 mg/kg

Skin corrosion/irritation

Product:

Assessment : No skin irritation

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

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Species : human skin
Method : OECD Test Guideline 439
Result : No skin irritation

N¹-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Species : Rabbit
Method : OECD Test Guideline 404
Result : Causes severe burns.
GLP : yes

N,N,4-trimethylpiperazine-1-ethylamine:

Species : Rabbit
Assessment : Causes severe burns.
Method : OECD Test Guideline 404
Result : Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation

Product:

Assessment : No eye irritation

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

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

N¹-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Assessment : Risk of serious damage to eyes.
Result : Risk of serious damage to eyes.
GLP : no

N,N,4-trimethylpiperazine-1-ethylamine:

Result : Corrosive

Respiratory or skin sensitisation

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Test Type : Maximisation Test
Exposure routes : Skin
Species : Guinea pig
Method : OECD Test Guideline 406
Result : Does not cause skin sensitisation.

N¹-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Test Type : Maximisation Test
Exposure routes : Skin
Species : Guinea pig

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Method : OECD Test Guideline 406
Result : The product is a skin sensitiser, sub-category 1B.
GLP : yes

N,N,4-trimethylpiperazine-1-ethylamine:

Result : Did not cause sensitisation on laboratory animals.

n-butyl acetate:

Exposure routes : Skin
Species : Guinea pig
Result : Does not cause skin sensitisation.

Germ cell mutagenicity

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Genotoxicity in vitro : Test Type: Ames test
Test system: Salmonella typhimurium and E. coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Test Type: gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 490
Result: negative

Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Genotoxicity in vitro : Test Type: in vitro assay
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative
GLP: yes

Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation

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Method: OECD Test Guideline 476

Result: negative

GLP: yes

Test Type: reverse mutation assay

Test system: Salmonella tryphimurium and E. coli

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

N,N,4-trimethylpiperazine-1-ethylamine:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes

Test Type: reverse mutation assay

Test system: Salmonella tryphimurium and E. coli

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

GLP: yes

Test Type: Chromosome aberration test in vitro

Test system: Chinese hamster ovary cells

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473

Result: negative

GLP: yes

Metabolic activation: with and without metabolic activation

Result: negative

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Dose: 175/350/560 mg/kg bw /day
Result: negative
Remarks: Information given is based on data obtained from similar substances.

Carcinogenicity

Components:

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Species : Mouse, male
Application Route : Dermal
Exposure time : 20 month(s)
Dose : 1.25/56.3 mg/animal
Frequency of Treatment : 3 daily
NOAEL : >= 56.3 mg/kg body weight

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

Reproductive toxicity

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Effects on fertility : Species: Rat, male and female
Dose: 50, 100, 150 mg/kg
General Toxicity - Parent: NOAEL: 50 mg/kg body weight
General Toxicity F1: NOAEL: 50 mg/kg body weight
Method: OECD Test Guideline 421

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Effects on fertility : Test Type: OECD Test Guideline 422
Species: Rat, male and female
Application Route: Oral
Dose: 5, 15 and 50 mg/kg bw/d
General Toxicity - Parent: NOAEL: 15 mg/kg body weight
General Toxicity F1: NOAEL: 15 mg/kg body weight
Method: OECD Test Guideline 422
Result: Animal testing did not show any effects on fertility.
GLP: yes

Effects on foetal development : Species: Rat, male and female
Application Route: Oral
Dose: 5, 15 and 50 mg/kg bw/d
General Toxicity Maternal: NOAEL: 15 mg/kg body weight
Method: OECD Test Guideline 422
Result: Not classified
GLP: yes

Reproductive toxicity - Assessment : No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

N,N,4-trimethylpiperazine-1-ethylamine:

Effects on fertility : Test Type: OECD Test Guideline 422
Species: Rat, male and female
Dose: 0, 10, 25, 50 mg/kg
Frequency of Treatment: 7 days/week
General Toxicity - Parent: NOAEL: 50 mg/kg body weight
General Toxicity F1: NOAEL: 50 mg/kg body weight
Fertility: NOAEL: 50 mg/kg body weight
Method: OECD Test Guideline 422
Result: negative

n-butyl acetate:

Effects on fertility : Species: Rat, male and female
Fertility: NOAEC Mating/Fertility: 2,000 ppm
Method: OECD Test Guideline 416

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Effects on foetal development : Species: Rat, male and female
Strain: Sprague-Dawley
Application Route: Inhalation
Developmental Toxicity: NOAEC Parent: 1,500 ppm
Method: OECD Test Guideline 414
Result: No effects on fertility and early embryonic development were detected.

STOT - single exposure

Components:

n-butyl acetate:

Exposure routes : Inhalation
Target Organs : Narcotic effects
Assessment : May cause drowsiness or dizziness.

STOT - repeated exposure

No data available

Repeated dose toxicity

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Species : Rat, male and female
NOAEL : 60 mg/kg
Application Route : Oral
Dose : 20, 60, 180 mg/kg
Method : OECD Test Guideline 407

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Species : Rat, male and female
NOEC : 550 mg/m³
Application Route : Inhalation
Test atmosphere : vapour
Exposure time : 3 w 6 h
Number of exposures : 5 d/w
Dose : 550 mg/m³
Method : Subchronic toxicity
Remarks : Based on data from similar materials

Species : Mouse, male
NOAEL : >= 56.3 mg/kg/d
Application Route : Skin contact
Number of exposures : 3 d
Method : Chronic toxicity
Remarks : Based on data from similar materials

Species : Rat, male and female
NOAEL : 1000 ppm
Application Route : Oral
Exposure time : 90 d
Method : OECD Test Guideline 408
Remarks : Based on data from similar materials

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N,N,4-trimethylpiperazine-1-ethylamine:

Species : Rat, male and female
NOAEL : 50 mg/kg
Application Route : Oral
Exposure time : 6 - 10 weeks
Number of exposures : 7 days/week
Dose : 0, 10, 25, 50mg/kg bw/day
Method : OECD Test Guideline 422
GLP : yes

n-butyl acetate:

Species : Rat, male and female
NOAEL : 2.4 mg/l
Application Route : Inhalation
Test atmosphere : vapour

Aspiration toxicity

No data available

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.

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

12.1 Toxicity

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 5.7 mg/l
Exposure time: 96 h
Test Type: semi-static test

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Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.76 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (green algae)): 3.11 mg/l
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 201
GLP: yes

M-Factor (Acute aquatic toxicity) : 1

M-Factor (Chronic aquatic toxicity) : 1

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Toxicity to fish : LC50 (Brachydanio rerio (zebrafish)): > 100 mg/l
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)): 9.2 mg/l
Exposure time: 48 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Selenastrum capricornutum (green algae)): 21 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 (Selenastrum capricornutum (green algae)): 5.7 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): 181 mg/l

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Exposure time: 16 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: DIN 38 412 Part 8
GLP: no

N,N,4-trimethylpiperazine-1-ethylamine:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): > 29 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 66 mg/l
aquatic invertebrates : Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202

Toxicity to algae/aquatic : EC50 (Pseudokirchneriella subcapitata (algae)): 29 mg/l
plants : Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (algae)): 3.2 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 209
GLP: yes

Ecotoxicology Assessment

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

n-butyl acetate:

Toxicity to fish : EC50 (Menidia beryllina (Silverside)): 185 mg/l
Exposure time: 96 h

LC50 (Pimephales promelas (fathead minnow)): 18 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 : 205 mg/l
aquatic invertebrates : Exposure time: 24 h

EC50 : 44 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae/aquatic : EC50 (Desmodesmus subspicatus (green algae)): 674.7 mg/l
plants : Exposure time: 72 h

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Toxicity to microorganisms : IC0 : 1,200 mg/l
Exposure time: 24 h

12.2 Persistence and degradability

Components:

2,2'-[1,2-ethanediylbis(oxy)]bis(ethanethiol):

Biodegradability : Test Type: aerobic
Inoculum: activated sludge
Concentration: 38.2 mg/l
Result: Not biodegradable
Biodegradation: < 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Biodegradability : Test Type: aerobic
Result: Readily biodegradable.
Biodegradation: 100 %
Related to: Dissolved organic carbon (DOC)
Exposure time: 28 d
Method: OECD Test Guideline 301A
GLP: yes

N,N,4-trimethylpiperazine-1-ethylamine:

Biodegradability : Test Type: aerobic
Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

n-butyl acetate:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 98 %
Exposure time: 28 d

12.3 Bioaccumulative potential

Components:

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

Partition coefficient: n-octanol/water : log Pow: -0.56 (25 °C)
pH: 11.6
Method: OECD Test Guideline 107

N,N,4-trimethylpiperazine-1-ethylamine:

Partition coefficient: n-octanol/water : log Pow: -0.591 (21 °C)
pH: 9.6

n-butyl acetate:

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Bioaccumulation : Bioconcentration factor (BCF): 4 - 14

12.4 Mobility in soil

No data available

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.
Toxic 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

ADR : UN 3082
RID : UN 3082
IMDG : UN 3082
IATA : UN 3082

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14.2 UN proper shipping name

ADR : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TRIETHYLENEGLYCOL-DIMERCAPTANE)
RID : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TRIETHYLENEGLYCOL-DIMERCAPTANE)
IMDG : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TRIETHYLENEGLYCOL-DIMERCAPTANE)
IATA : Environmentally hazardous substance, liquid, n.o.s. (TRIETHYLENEGLYCOL-DIMERCAPTANE)

14.3 Transport hazard class(es)

ADR : 9
RID : 9
IMDG : 9
IATA : 9

14.4 Packing group

ADR
Packing group : III
Classification Code : M6
Hazard Identification Number : 90
Labels : 9
Tunnel restriction code : (-)

RID
Packing group : III
Classification Code : M6
Hazard Identification Number : 90
Labels : 9

IMDG
Packing group : III
Labels : 9
EmS Code : F-A, S-F

IATA (Cargo)
Packing instruction (cargo aircraft) : 964
Packing instruction (LQ) : Y964
Packing group : III
Labels : Miscellaneous

IATA (Passenger)
Packing instruction (passenger aircraft) : 964
Packing instruction (LQ) : Y964
Packing group : III
Labels : Miscellaneous

14.5 Environmental hazards

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ADR

Environmentally hazardous : yes

RID

Environmentally hazardous : yes

IMDG

Marine pollutant : yes

14.6 Special precautions for user

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.

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 Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

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

E2 ENVIRONMENTAL HAZARDS

Other regulations:

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

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.

AIIC : On the inventory, or in compliance with the inventory

NZIoC : Not in compliance with the inventory

ENCS : On the inventory, or in compliance with the inventory

KECI : On the inventory, or in compliance with the inventory

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PICCS : Not 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 : On or in compliance with the active portion of the TSCA inventory

Inventories

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

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

H226 : Flammable liquid and vapour.
H301 : Toxic if swallowed.
H302 : Harmful if swallowed.
H312 : Harmful in contact with skin.
H314 : Causes severe skin burns and eye damage.
H317 : May cause an allergic skin reaction.
H318 : Causes serious eye damage.
H336 : May cause drowsiness or dizziness.
H400 : Very toxic to aquatic life.
H410 : Very toxic to aquatic life with long lasting effects.
H412 : Harmful to aquatic life with long lasting effects.
EUH066 : Repeated exposure may cause skin dryness or cracking.

Full text of other abbreviations

Acute Tox. : Acute toxicity
Aquatic Acute : Short-term (acute) aquatic hazard
Aquatic Chronic : Long-term (chronic) aquatic hazard
Eye Dam. : Serious eye damage
Flam. Liq. : Flammable liquids
Skin Corr. : Skin corrosion
Skin Sens. : Skin sensitisation
STOT SE : Specific target organ toxicity - single exposure
2019/1831/EU : Europe. Commission Directive 2019/1831/EU establishing a fifth list of indicative occupational exposure limit values
GB EH40 : UK. EH40 WEL - Workplace Exposure Limits

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| | | |
|---------------------|---|--|
| 2019/1831/EU / TWA | : | Limit Value - eight hours |
| 2019/1831/EU / STEL | : | Short term exposure limit |
| GB EH40 / TWA | : | Long-term exposure limit (8-hour TWA reference period) |
| GB EH40 / STEL | : | Short-term exposure limit (15-minute reference period) |

Further information

Classification of the mixture:

| | |
|-------------------|------|
| Acute Tox. 4 | H302 |
| Skin Sens. 1 | H317 |
| Aquatic Chronic 2 | H411 |

Classification procedure:

| |
|--------------------|
| 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.

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