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

1.1 Product identifier

Trade name : ARALDITE® 2012 HARDENER

Unique Formula Identifier (UFI) : JQH5-E002-5003-T8AC

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 : 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 : 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)

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 2	H411: Toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Warning

Hazard statements :
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:
P261 Avoid breathing mist or vapours.
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.
P391 Collect spillage.

Hazardous components which must be listed on the label:

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

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 01-2120768482-47	Acute Tox. 3; H301 Aquatic Acute 1; H400 Aquatic Chronic 1; H410 M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 1 Acute toxicity estimate Acute oral toxicity: 50,005 mg/kg	>= 2,5 - < 10
N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine	10563-29-8 234-148-4 01-2119970376-29	Acute Tox. 4; H302 Skin Corr. 1A; H314 Eye Dam. 1; H318 Skin Sens. 1B; H317	>= 1 - < 3
2,4,6-tris(dimethylaminomethyl)phenol	90-72-2 202-013-9 603-069-00-0 01-2119560597-27	Acute Tox. 4; H302 Skin Corr. 1C; H314 Eye Dam. 1; H318	>= 1 - < 3
N,N,4-trimethylpiperazine-1-ethylamine	104-19-8 203-183-7 01-2120785093-51	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 : Immediately flush eye(s) with plenty of water.
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.

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 : Carbon oxides
Nitrogen oxides (NOx)

5.3 Advice for firefighters

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

Specific extinguishing : Use extinguishing measures that are appropriate to local

methods		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.

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.
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	:	2 - 40 °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

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
n-butyl acetate	123-86-4	AGW	62 ppm 300 mg/m3	DE TRGS 900
Peak-limit: excursion factor (category)	2;(I)			
Further information	When there is compliance with the OEL and biological tolerance values, there is no risk of harming the unborn child			
		STEL	150 ppm 723 mg/m3	2019/1831/EU
Further information	Indicative			
		TWA	50 ppm 241 mg/m3	2019/1831/EU
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/m3
	Workers	Inhalation	Acute systemic	7,5 mg/m3

			effects	
	Workers	Inhalation	Long-term local effects	3,7 mg/m3
	Workers	Inhalation	Acute local effects	7,5 mg/m3
	Workers	Dermal	Long-term systemic effects	0,67 mg/kg
	Consumers	Inhalation	Long-term systemic effects	0,65 mg/m3
	Consumers	Inhalation	Long-term local effects	0,65 mg/m3
	Consumers	Oral	Long-term systemic effects	0,2 mg/kg
N,N,4-trimethylpiperazine-1-ethylamine	Workers	Inhalation	Long-term systemic effects	0,59 mg/m3
	Workers	Dermal	Long-term systemic effects	0,167 mg/kg
2,4,6-tris(dimethylaminomethyl)phenol	Workers	Inhalation	Long-term systemic effects	0,53 mg/m3
	Workers	Inhalation	Acute systemic effects	2,1 mg/m3
	Workers	Dermal	Long-term systemic effects	0,150 mg/kg
	Workers	Dermal	Acute systemic effects	0,600 mg/kg
	Consumers	Inhalation	Long-term systemic effects	0,130 mg/m3
	Consumers	Inhalation	Acute systemic effects	0,130 mg/m3
	Consumers	Dermal	Long-term systemic effects	0,075 mg/kg
	Consumers	Dermal	Acute systemic effects	0,075 mg/kg
	Consumers	Oral	Long-term systemic effects	0,075 mg/kg

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

Substance name	Environmental Compartment	Value
2,4,6-tris(dimethylaminomethyl)phenol	Fresh water	0,046 mg/l
	Marine water	0,005 mg/l
	Remarks:Assessment Factors	
	Sewage treatment plant	0,262 mg/l
	Remarks:Assessment Factors	
	Freshwater - intermittent	0,46 mg/l
	Soil	0,025 mg/kg
N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine	Fresh water	9,2 µg/l
	Remarks:Assessment Factors	
	Marine water	0,92 µg/l
	Remarks:Assessment Factors	
	Freshwater - intermittent	92 µg/l
	Remarks:Assessment Factors	

	Sewage treatment plant	18,1 mg/l
	Remarks:Assessment Factors	
	Fresh water sediment	0,0336 mg/kg dry weight (d.w.)
	Marine sediment	0,0034 mg/kg dry weight (d.w.)
	Soil	0,0013 mg/kg dry weight (d.w.)
N,N,4-trimethylpiperazine-1-ethylamine	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/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

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

Material : Nitrile rubber

Material : Neoprene gloves
Break through time : 10 - 480 min

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.

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	:	unpleasant
Odour Threshold	:	No data is available on the product itself.
pH	:	substance/mixture is non-soluble (in water)
Melting point/freezing point	:	No data is available on the product itself.
Boiling point	:	> 200 °C
Flash point	:	> 100 °C Method: Pensky-Martens closed cup, closed cup 102 °C Method: Cleveland open 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	:	< 0,01 hPa (20 °C)
Relative vapour density	:	No data is available on the product itself.
Relative density	:	No data is available on the product itself.
Density	:	1,165 g/cm3 (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.
Auto-ignition temperature	:	No data is available on the product itself.
Decomposition temperature	:	> 200 °C
Viscosity		

Viscosity, dynamic : 20 000 - 40 000 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

Hazardous decomposition products : carbon monoxide
carbon dioxide
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

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

Acute toxicity

Product:

Acute oral toxicity : LD50 (Rat, male and female): 2 631 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat, male and female): > 4 000 mg/kg
Method: OECD Test Guideline 402

Components:

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

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.

2,4,6-tris(dimethylaminomethyl)phenol:

Acute oral toxicity : LD50 (Rat, male and female): 2 169 mg/kg
Method: OECD Test Guideline 401
Assessment: The component/mixture is low toxic after single ingestion.

Acute dermal toxicity : LD50 (Rat, male): > 1 ml/kg
Assessment: The substance or mixture has no acute dermal toxicity

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:

Species	:	Rabbit
Result	:	No skin irritation
Remarks	:	Moderate skin irritation

Components:

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

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

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

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

2,4,6-tris(dimethylaminomethyl)phenol:

Species	:	Rabbit
Method	:	OECD Test Guideline 404
Result	:	Corrosive after 1 to 4 hours of exposure

Species	:	synthetic macromolecular bio-barrier
Method	:	OECD Test Guideline 435
Result	:	Corrosive after 1 to 4 hours of exposure

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:

Species	:	Rabbit
Result	:	Mild eye irritation
Remarks	:	Mild eye irritation

Components:

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

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

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

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

2,4,6-tris(dimethylaminomethyl)phenol:

Species	:	Rabbit
Assessment	:	Corrosive
Method	:	Other guidelines
Result	:	Corrosive

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.

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

Test Type	:	Maximisation Test
Exposure routes	:	Skin
Species	:	Guinea pig
Assessment	:	Probability or evidence of low to moderate skin sensitisation rate in humans
Method	:	OECD Test Guideline 406
Result	:	Probability or evidence of low to moderate skin sensitisation rate in humans
GLP	:	yes

2,4,6-tris(dimethylaminomethyl)phenol:

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

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

Product:

Genotoxicity in vitro : Concentration: 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Components:

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

Genotoxicity in vitro : Test Type: Ames test
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: 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: Chromosome aberration test in vitro
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
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

2,4,6-tris(dimethylaminomethyl)phenol:

Genotoxicity in vitro : Concentration: 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Concentration: 2500 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
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
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: Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test 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	:	Test Type: reproductive and developmental toxicity study 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 Developmental Toxicity: NOAEL: 15 mg/kg body weight Method: OECD Test Guideline 422 Result: Not classified GLP: yes Remarks: Information given is based on data obtained from similar substances.
Reproductive toxicity - Assessment	:	No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

2,4,6-tris(dimethylaminomethyl)phenol:

Effects on fertility	:	Species: Rat, male and female

Application Route: Oral
Method: OECD Test Guideline 422
Remarks: No significant adverse effects were reported

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

Effects on fertility : Test Type: Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test
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

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
	:	500 mg/m3
Application Route	:	Inhalation
Test atmosphere	:	vapour
Exposure time	:	21 d 6 h
Number of exposures	:	5 days/week
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	:	41 mg/kg
NOAEL	:	1 000 mg/l, ppm
Application Route	:	oral (feed)
Exposure time	:	20 months
Number of exposures	:	3 times/week
Dose	:	1000/7500/15000 ppm
Method	:	OECD Test Guideline 408

2,4,6-tris(dimethylaminomethyl)phenol:

Species	:	Rat, male and female
NOEL	:	15 mg/kg
Application Route	:	Ingestion
Exposure time	:	1 032 h
Number of exposures	:	7 d
Method	:	Subacute toxicity

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 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
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)): 9,2 mg/l
End point: Immobilization
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
Exposure time: 16 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: DIN 38 412 Part 8
GLP: no

2,4,6-tris(dimethylaminomethyl)phenol:

Toxicity to fish : LC50 (Cyprinus carpio (Carp)): 175 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates : LC50 (Palaeomonetes vulgaris (Grass shrimp)): 718 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Analytical monitoring: no

Test substance: Marine water

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 84 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Test substance: Fresh water
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 6,25 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: yes
Test substance: Fresh water
Method: OECD Test Guideline 201

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

Toxicity to algae/aquatic plants : EC50 (Pseudokirchneriella subcapitata (algae)): 29 mg/l
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 plants	:	EC50 (Desmodesmus subspicatus (green algae)): 674,7 mg/l Exposure time: 72 h
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 Test substance: Fresh water GLP: yes

2,4,6-tris(dimethylaminomethyl)phenol:

Biodegradability	:	Test Type: aerobic Inoculum: activated sludge, non-adapted Concentration: 2 mg/l Result: Not biodegradable Biodegradation: 4 % Exposure time: 28 d Method: OECD Test Guideline 301D

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

2,4,6-tris(dimethylaminomethyl)phenol:

Partition coefficient: n-octanol/water : Pow: >= 0,219 (21,5 °C)
log Pow: -0,66 (21,5 °C)
Method: OPPTS 830.7550

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

Partition coefficient: n-octanol/water : log Pow: -0,591 (21 °C)
pH: 9,6

n-butyl acetate:

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

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

14.2 UN proper shipping name

ADN	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (TRIETHYLENEGLYCOL-DIMERCAPTANE)
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)

		Class	Subsidiary risks
ADN	:	9	
ADR	:	9	
RID	:	9	
IMDG	:	9	
IATA	:	9	

14.4 Packing group

ADN

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

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

ADN

Environmentally hazardous	:	yes

ADR

Environmentally hazardous	:	yes

RID

Environmentally hazardous	:	yes

IMDG

Marine pollutant	:	yes

IATA (Passenger)

Environmentally hazardous	:	yes

IATA (Cargo)

Environmentally hazardous	:	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).
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, 3 If you intend to use this product as tattoo ink, please contact your vendor.

Seveso II - Directive 2003/105/EC amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances		Not applicable
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

Water hazard class (Germany)	:	WGK 1 slightly hazardous to water Classification according to AwSV, Annex 1 (5.2)
TA Luft List (Germany)	:	5.2.1: Total dust: Not applicable 5.2.2: Inorganic substances in powdered form: Not applicable 5.2.4: Inorganic substances in gaseous form: Not applicable 5.2.5: Organic Substances: Class 1: 1,54 % N,N,4-trimethylpiperazine-1-ethylamine 5.2.7.1.1: Carcinogenic substance: Not applicable 5.2.7.1.1: Quartz fine dust PM4:

Not applicable
5.2.7.1.1: Formaldehyde:
Not applicable
5.2.7.1.1: fibres:
Not applicable
5.2.7.1.2: Germ cell mutagens:
Not applicable
5.2.7.1.3: Substances toxic to reproduction:
Not applicable
5.2.7.2: Poorly degradable, easily enrichable and highly toxic organic substances:
Not applicable

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	:	All components are listed on the inventory, regulatory obligations/restrictions apply. Please contact your sales representative for more information before import into Australia
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
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), AIIC (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
DE TRGS 900	:	Germany. TRGS 900 - Occupational exposure limit values.
2019/1831/EU / TWA	:	Limit Value - eight hours
2019/1831/EU / STEL	:	Short term exposure limit
DE TRGS 900 / AGW	:	Time Weighted Average

Further information

Classification of the mixture:		**Classification procedure:**
Eye Irrit. 2	H319	Based on product data or assessment
Skin Sens. 1	H317	Calculation method
Aquatic Chronic 2	H411	Calculation method

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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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