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

1.1 Product identifier

Trade name : EPOCAST® 52 A US

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

Use of the Substance/Mixture : Epoxy constituents

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

Supplied by:
Sil-Mid Limited
Roman Park, Roman Way
Coleshill, West Midlands
B46 1HG. UK
T: 01675 432850
E: info@silmid.com

Emergency Telephone No. +44 (0)1675 432850
(Monday to Friday, 08:00 – 17:30 – GMT)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Skin sensitisation, Category 1	H317: May cause an allergic skin reaction.
Germ cell mutagenicity, Category 2	H341: Suspected of causing genetic defects.
Specific target organ toxicity - repeated exposure, Category 2	H373: May cause damage to organs through prolonged or repeated exposure.
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.
H341	Suspected of causing genetic defects.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P201	Obtain special instructions before use.
P260	Do not breathe mist or vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

Response:

P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.

Hazardous components which must be listed on the label:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]
p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline

Additional Labelling:

EUH204 Contains isocyanates. May produce an allergic reaction.

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.	Classification	Concentration

	Index-No. Registration number		(% w/w)
4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]	28768-32-3 249-204-3	Skin Sens. 1; H317 Aquatic Chronic 2; H411	>= 30 - < 50
p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline	5026-74-4 225-716-2	Acute Tox. 4; H302 Skin Sens. 1A; H317 Muta. 2; H341 STOT RE 2; H373 (Gastrointestinal tract, female reproductive organs, Stomach) Aquatic Chronic 3; H412 M-Factor (Acute aquatic toxicity): 1 M-Factor (Chronic aquatic toxicity): 1	>= 30 - < 50

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.
Consult a physician.
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.
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.
Take victim immediately to hospital.

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)
Carbon dioxide (CO2)
Carbon monoxide

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.

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

Technical measures : Ensure that eyewash stations and safety showers are close to the workstation location.

Local/Total ventilation : Ensure adequate ventilation.

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. Observe label precautions. Keep in properly labelled containers.

Advice on common storage	:	For incompatible materials please refer to Section 10 of this SDS.
Storage period	:	12 Months
Recommended storage temperature	:	2 - 8 °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

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
4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]	Workers	Inhalation	Long-term systemic effects	3.5 mg/m3
	Workers	Dermal	Long-term systemic effects	0.5 mg/kg bw/day
p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline	Workers	Inhalation	Long-term systemic effects	0.35 mg/m3
	Workers	Dermal	Long-term systemic effects	0.1 mg/kg bw/day
	Workers	Dermal	Long-term local effects	

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

Substance name	Environmental Compartment	Value
4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]	Fresh water	0.005 mg/l
	Remarks:Assessment Factors	
	Marine water	0 mg/l
	Remarks:Assessment Factors	
	Freshwater - intermittent	0.047 mg/l
	Remarks:Assessment Factors	
	Sewage treatment plant	1000 mg/l
	Remarks:Assessment Factors	
	Fresh water sediment	0.017 mg/kg
	Remarks:Equilibrium method	
	Marine sediment	0.002 mg/kg

	Remarks:Equilibrium method	
	Soil	0.011 mg/kg
	Remarks:Equilibrium method	
p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline	Fresh water	0.008 mg/l
	Remarks:Assessment Factors	
	Marine water	0.001 mg/l
	Remarks:Assessment Factors	
	Freshwater - intermittent	0.042 mg/l
	Remarks:Assessment Factors	
	Sewage treatment plant	10 mg/l
	Remarks:Assessment Factors	
	Fresh water sediment	0.101 mg/kg
	Remarks:Equilibrium method	
	Marine sediment	0.01 mg/kg
	Remarks:Equilibrium method	
	Soil	0.015 mg/kg
	Remarks:Equilibrium method	

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.

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 : In the case of vapour formation use a respirator with an approved filter.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : liquid

Colour	:	blue
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	:	> 200 °C
Flash point	:	> 100 °C Method: estimated, 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	:	1.2
Density	:	1.2 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	:	ca. 5,000 mPa.s (25 °C)

9.2 Other information

Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.
Burning rate	:	No data is available on the product itself.

Evaporation rate	:	No data is available on the product itself.
Molecular weight	:	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	:	Strong acids Strong bases Strong oxidizing agents

10.6 Hazardous decomposition products

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

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: > 2,000 mg/kg Method: Calculation method

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Acute oral toxicity	:	LD50 (Rat, male and female): > 5,000 mg/kg Method: OECD Test Guideline 401 GLP: no Assessment: The substance or mixture has no acute oral toxicity Remarks: Information given is based on data obtained from similar substances.

Acute inhalation toxicity : LC50 (Rat, male and female): > 30 mg/m3
Exposure time: 4 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: Information given is based on data obtained from similar substances.

Acute dermal toxicity : LD50 (Rabbit, male and female): > 3,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity
Remarks: Information given is based on data obtained from similar substances.

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Acute oral toxicity : LD50 (Rat, male and female): 1,037 mg/kg
Method: OECD Test Guideline 401
Assessment: The component/mixture is moderately toxic after single ingestion.

Acute dermal toxicity : LD50 (Rat, male and female): > 4,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

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

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

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

Serious eye damage/eye irritation

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

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

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Species	:	Rabbit
Assessment	:	No eye irritation
Method	:	Other guidelines
Result	:	slight irritation

Respiratory or skin sensitisation

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

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

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Test Type	:	Local lymph node assay (LLNA)
Species	:	Mouse
Assessment	:	Probability or evidence of high skin sensitisation rate in humans
Method	:	OECD Test Guideline 429
Result	:	Probability or evidence of high skin sensitisation rate in humans
Remarks	:	Information given is based on data obtained from similar substances.

Germ cell mutagenicity

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: Information given is based on data obtained from similar substances.

Test Type: reverse mutation assay
Test system: Salmonella tryphimurium and E. coli
Metabolic activation: with and without metabolic activation
Result: positive
Remarks: Information given is based on data obtained from similar substances.

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male)
Cell type: Bone marrow
Application Route: Oral
Dose: 0, 50, 1000, 2000 mg/kg
Method: OECD Test Guideline 474
Result: negative
GLP: yes

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

Cell type: Germ
Application Route: Oral
Exposure time: 5 d
Method: OECD Test Guideline 483
Result: negative
GLP: yes

Test Type: Transgenic rodent germ cell gene mutation assay
Species: Rat (male)
Cell type: Germ
Application Route: Oral
Dose: 10/100/300/1000 mg/kg bw/day
Method: OECD Test Guideline 488
Result: positive
GLP: yes

Test Type: In vivo mammalian alkaline comet assay
Species: Rat (male)
Cell type: Somatic
Dose: 500/1000/2000 mg/kg bw /day
Method: OECD Test Guideline 489
Result: positive
GLP: yes
Remarks: Information given is based on data obtained from similar substances.

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

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 473
Result: positive

Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Method: OECD Test Guideline 471
Result: positive

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: positive

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male)
Application Route: Oral
Dose: 438, 875, 1750mg/kg bw
Method: OECD Test Guideline 474
Result: negative
Remarks: Information given is based on data obtained from

similar substances.

Germ cell mutagenicity-Assessment : In vitro tests showed mutagenic effects

Carcinogenicity

No data available

Reproductive toxicity

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Effects on foetal development : Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 30, 90 and 270 mg/kg/day
Duration of Single Treatment: 15 d
General Toxicity Maternal: NOAEL: 90 mg/kg body weight
Developmental Toxicity: NOAEL: 90 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects
GLP: yes

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Effects on fertility : Test Type: Two-generation study
Species: Rat, male and female
Application Route: Oral
Dose: 5/15/25 mg/kg bw/d
General Toxicity - Parent: NOAEL: 25 mg/kg body weight
General Toxicity F1: NOAEL: 25 mg/kg body weight
Method: OECD Test Guideline 416

Effects on foetal development : Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0/5/15/40 mg/kg bw/d
Duration of Single Treatment: 15 d
Frequency of Treatment: 7 days/week
General Toxicity Maternal: NOEL: 15 mg/kg body weight
Developmental Toxicity: NOEL: 15 mg/kg body weight
Method: OECD Test Guideline 414

STOT - single exposure

No data available

STOT - repeated exposure

Components:

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Exposure routes : Ingestion
Target Organs : Gastrointestinal tract, female reproductive organs
Assessment : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Repeated dose toxicity

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Species	:	Rat, male and female
NOAEL	:	50 mg/kg
Application Route	:	Oral
Exposure time	:	13 Weeks
Number of exposures	:	7 d
Dose	:	10, 50 and 200 mg/kg/day
Method	:	OECD Test Guideline 408
GLP	:	yes

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Species	:	Rat, male and female
NOAEL	:	15 mg/kg bw/d
Application Route	:	Oral
Exposure time	:	90 d
Number of exposures	:	one daily
Dose	:	1.5, 5 or 15 mg/kg bw/day
Method	:	OECD Test Guideline 408
GLP	:	yes

Species	:	Rat, male and female
NOAEL	:	50 mg/kg bw/day
Application Route	:	Oral
Exposure time	:	28 d
Number of exposures	:	Once daily
Dose	:	0, 50, 150, 450 mg/kg bw/day
Target Organs	:	Gastrointestinal tract, female reproductive organs, Stomach
Assessment	:	The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.
Remarks	:	Information given is based on data obtained from similar substances.

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:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Toxicity to fish	:	LC50 (Cyprinus carpio (Carp)): 7 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 203 GLP: no Remarks: Information given is based on data obtained from similar substances.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): ca. 6.7 mg/l Exposure time: 48 h Test Type: semi-static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae/aquatic plants	:	NOEC (Pseudokirchneriella subcapitata (green algae)): 0.19 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 201 GLP: yes EC50 (Pseudokirchneriella subcapitata (green algae)): ca. 4.8 mg/l Exposure time: 72 h Test Type: static test Analytical monitoring: yes Test substance: Fresh water Method: OECD Test Guideline 201 GLP: yes
Toxicity to microorganisms	:	IC50 (Pseudomonas putida): > 10,000 mg/l Exposure time: 24 h Test Type: static test Analytical monitoring: no Test substance: Fresh water

Method: DIN 38 412 Part 8
GLP: no
Remarks: Information given is based on data obtained from similar substances.

Ecotoxicology Assessment

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

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Toxicity to fish : LC50 (Cyprinus carpio (Carp)): 4.2 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 18 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 (Pseudokirchneriella subcapitata (algae)): 13 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 0.42 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

M-Factor (Acute aquatic toxicity) : 1

Toxicity to microorganisms : EC50 (Pseudomonas putida): > 10 mg/l, mg
Exposure time: 16 h
Test Type: static test
Test substance: Fresh water
Method: DIN 38 412 Part 8

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 0.42 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
Remarks: Information given is based on data obtained from similar substances.

M-Factor (Chronic aquatic toxicity) : 1

Ecotoxicology Assessment

Acute aquatic toxicity : This product has no known ecotoxicological effects.

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

12.2 Persistence and degradability

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Biodegradability : Test Type: aerobic
Inoculum: activated sludge, non-adapted
Concentration: 20 mg/l
Result: Readily biodegradable, failing 10-d window
Biodegradation: ca. 48 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
GLP: yes

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Biodegradability : Inoculum: activated sludge
Concentration: 3.2 mg/l
Result: Not readily biodegradable.
Biodegradation: 3.4 %
Exposure time: 29 d
Method: OECD Test Guideline 301B

Stability in water : Degradation half life (DT50): 4.3 hrs (50 °C)
pH: 7
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 4.1 d (20 °C)
pH: 7
Method: OECD Test Guideline 111

Degradation half life (DT50): 3.9 hrs (50 °C)
pH: 4
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 10 h (40 °C)
pH: 7
Method: OECD Test Guideline 111

Degradation half life (DT50): 2.2 d (25 °C)
pH: 4
Method: OECD Test Guideline 111
GLP: No information available.
Remarks: Fresh water

Degradation half life (DT50): 4.3 h (50 °C)
pH: 7

Method: OECD Test Guideline 111

Degradation half life (DT50): 2.3 d (25 °C)
pH: 7
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 2.6 d (25 °C)
pH: 9
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 5.7 hrs (50 °C)
pH: 9
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 10.8 d (12 °C)
GLP: yes

12.3 Bioaccumulative potential

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Partition coefficient: n-octanol/water	:	log Pow: ca. 2.12 (22 °C) pH: 6.7 Method: OECD Test Guideline 107 GLP: yes

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Partition coefficient: n-octanol/water	:	log Pow: 0.871 (25 °C) pH: 7

12.4 Mobility in soil

Components:

4,4'-methylenebis[N,N-bis(2,3-epoxypropyl)aniline]:

Distribution among environmental compartments	:	Koc: < 18 Method: OECD Test Guideline 121

p-(2,3-epoxypropoxy)-N,N-bis(2,3-epoxypropyl)aniline:

Distribution among environmental compartments	:	Koc: 84 Method: OECD Test Guideline 121

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

14.2 UN proper shipping name

ADR : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(TETRAGLYCIDYL METHYLENEDIANILINE)

RID : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(TETRAGLYCIDYL METHYLENEDIANILINE)

IMDG : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

(TETRAGLYCIDYL METHYLENEDIANILINE)

IATA : Environmentally hazardous substance, liquid, n.o.s. (TETRAGLYCIDYL METHYLENEDIANILINE)

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

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).

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 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

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 listed in the Canadian NDSL.

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

NZIoC : Not in compliance with the inventory

ENCS : Not 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	:	All substances listed as active on 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

H302	:	Harmful if swallowed.
H317	:	May cause an allergic skin reaction.
H341	:	Suspected of causing genetic defects.
H373	:	May cause damage to organs through prolonged or repeated exposure if swallowed.
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
Muta.	:	Germ cell mutagenicity
Skin Sens.	:	Skin sensitisation
STOT RE	:	Specific target organ toxicity - repeated exposure

Further information

Classification of the mixture:		**Classification procedure:**
Skin Sens. 1	H317	Calculation method
Muta. 2	H341	Calculation method
STOT RE 2	H373	Calculation method
Aquatic Chronic 2	H411	Calculation method

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

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

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

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

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.

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

1.1 Product identifier

Trade name : EPOCAST® 52 B US

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

Supplied by:
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B46 1HG. UK
T: 01675 432850
E: info@silmid.com

Emergency Telephone No. +44 (0)1675 432850
(Monday to Friday, 08:00 – 17:30 – GMT)

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 corrosion, Sub-category 1B	H314: Causes severe skin burns and eye damage.
Serious eye damage, Category 1	H318: Causes serious eye damage.
Skin sensitisation, Category 1	H317: May cause an allergic skin reaction.
Specific target organ toxicity - repeated exposure, Category 2	H373: May cause damage to organs through prolonged or repeated exposure.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

Hazard statements :

H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

Supplemental Hazard Statements : EUH071 Corrosive to the respiratory tract.

Precautionary statements :

Prevention:

P260	Do not breathe mist or vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

Response:

P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.

Hazardous components which must be listed on the label:
4,4'-Methylenebis(cyclohexylamine)

Formaldehyde, polymer with benzenamine, hydrogenated

Amines, polyethylenepoly-, triethylenetetramine fraction

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated

2-piperazin-1-ylethylamine

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

Chemical nature : Amines

Hazardous components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
Formaldehyde, polymer with benzenamine, hydrogenated	135108-88-2 -	Acute Tox. 3; H301 Skin Corr. 1C; H314 Eye Dam. 1; H318 Skin Sens. 1; H317 STOT RE 2; H373 (Kidney, Liver, Adrenal gland, spleen) Aquatic Chronic 3; H412	>= 30 - < 50
4,4'-Methylenebis(cyclohexylamine)	1761-71-3 217-168-8	Acute Tox. 4; H302 Skin Corr. 1B; H314 Skin Sens. 1; H317 STOT RE 2; H373 (Liver)	>= 30 - < 50
Amines, polyethylenepoly-, triethylenetetramine fraction	90640-67-8 292-588-2	Acute Tox. 4; H302 Acute Tox. 4; H312 Skin Corr. 1B; H314 Eye Dam. 1; H318 Skin Sens. 1; H317 Aquatic Chronic 3; H412 EUH071	>= 5 - < 10
2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated	68683-29-4 Polymer	Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317	>= 1 - < 10
Reaction products of di-, tri- and	-	Skin Corr. 1C; H314	>= 3 - <

tetra-propoxylated propane-1,2-diol with ammonia	-	Eye Dam. 1; H318 Aquatic Chronic 3; H412	5
2-piperazin-1-ylethylamine	140-31-8 205-411-0 612-105-00-4	Acute Tox. 4; H302 Acute Tox. 3; H311 Skin Corr. 1B; H314 Eye Dam. 1; H318 Skin Sens. 1; H317 Repr. 2; H361 STOT RE 1; H372 (Respiratory Tract) Aquatic Chronic 3; H412	>= 0.25 - < 1

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.
Consult a physician.
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 : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Continue rinsing eyes during transport to hospital.
Remove contact lenses.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear.

Do NOT induce vomiting.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

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)
Formaldehyde

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.

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.
To avoid spills during handling keep bottle on a metal tray.
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. Observe label precautions. Keep in properly labelled containers.

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

Storage period : 12 Months

Recommended storage temperature : 2 - 8 °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

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
Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia	Workers	Inhalation	Long-term systemic effects	5.29 mg/m3
	Workers	Dermal	Long-term systemic effects	2.5 mg/kg bw/day
4,4'-Methylenebis(cyclohexylamine)	Workers	Dermal	Acute systemic effects	0.63 mg/kg
	Workers	Inhalation	Acute systemic effects	1.5 mg/m3
	Workers	Inhalation	Systemic effects	1.5 mg/m3
	Workers	Dermal	Long-term systemic effects	0.21 mg/kg
	Workers	Inhalation	Long-term systemic effects	0.5 mg/m3
	Workers	Inhalation	Systemic effects	0.5 mg/m3
	Consumers	Oral	Long-term systemic effects	0.125 mg/kg
	Consumers	Dermal	Long-term systemic effects	0.125 mg/kg
Formaldehyde, polymer with benzenamine, hydrogenated	Workers	Inhalation	Long-term systemic effects	0.2 mg/m3
	Workers	Inhalation	Acute systemic effects	2 mg/m3
	Workers	Dermal	Long-term systemic effects	2 mg/kg
	Workers	Dermal	Acute systemic	6 mg/kg

			effects	
Amines, polyethylenepoly-, triethylenetetramine fraction	Workers	Inhalation	Long-term systemic effects	0.54 mg/m3
	Consumers	Inhalation	Long-term systemic effects	0.096 mg/m3
	Consumers	Oral	Long-term systemic effects	14 mg/kg bw/day
2-piperazin-1-ylethylamine	Workers	Inhalation	Long-term systemic effects	10.6 mg/m3
	Workers	Inhalation	Acute systemic effects	10.6 mg/m3
	Workers	Inhalation	Long-term local effects	0.015 mg/m3
	Workers	Inhalation	Acute local effects	80 mg/m3
	Workers	Dermal	Long-term systemic effects	3.33 mg/kg bw/day

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

Substance name	Environmental Compartment	Value
Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia	Fresh water	0.015 mg/l
Remarks:	Assessment Factors	
	Marine water	0.014 mg/l
	Assessment Factors	
	Fresh water sediment	0.132 mg/kg dry weight (d.w.)
	Equilibrium method	
	Marine sediment	0.125 mg/kg dry weight (d.w.)
	Equilibrium method	
	Sewage treatment plant	7.5 mg/l
	Assessment Factors	
	Secondary Poisoning	6.93 mg/kg
	Assessment Factors	
	Freshwater - intermittent	0.15 mg/l
	Assessment Factors	
	Soil	0.018 mg/kg dry weight (d.w.)
	Equilibrium method	
4,4'-Methylenebis(cyclohexylamine)	Fresh water	0.008 mg/l

	Marine water	0.0008 mg/l
	Freshwater - intermittent	0.08 mg/l
	Sewage treatment plant	80 mg/l
	Fresh water sediment	0.39 mg/kg
	Marine sediment	0.039 mg/kg
	Soil	0.072 mg/kg
Formaldehyde, polymer with benzenamine, hydrogenated	Fresh water	0.015 mg/l
	Marine water	0.002 mg/l
	Freshwater - intermittent	0.15 mg/l
	Sewage treatment plant	1.9 mg/l
	Fresh water sediment	15 mg/kg
	Marine sediment	1.5 mg/kg
	Soil	1.8 mg/kg
Amines, polyethylenepoly-, triethylenetetramine fraction	Fresh water	0.027 mg/l
	Marine water	0.003 mg/l
	Sewage treatment plant	0.13 mg/l
	Fresh water sediment	8.572 mg/kg dry weight (d.w.)
	Marine sediment	0.857 mg/kg dry weight (d.w.)
	Soil	1.25 mg/kg dry weight (d.w.)
2-piperazin-1-ylethylamine	Fresh water	0.058 mg/l
	Marine water	0.006 mg/l
	Freshwater - intermittent	0.58 mg/l
	Fresh water sediment	215 mg/kg dry weight (d.w.)
	Marine sediment	21.51 mg/kg dry weight (d.w.)
	Sewage treatment plant	250 mg/l
	Soil	1 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
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)
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, 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 : No personal respiratory protective equipment normally required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state : liquid

Colour : brown

Odour : amine-like

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 : > 200 °C

Flash point : > 100 °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	:	< 0.1 hPa (38 °C)
Relative vapour density	:	No data is available on the product itself.
Relative density	:	1
Density	:	1 g/cm3 (25 °C)
Solubility(ies)		
Water solubility	:	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	:	ca. 3,000 mPa.s (25 °C)

9.2 Other information

Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.
Burning rate	:	No data is available on the product itself.
Evaporation rate	:	No data is available on the product itself.
Molecular weight	:	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

Acute oral toxicity - Product : Acute toxicity estimate : 389.28 mg/kg
Method: Calculation method

Components:

4,4'-Methylenebis(cyclohexylamine):
Acute inhalation toxicity : LC50 (Rat, male): >0.4%
Exposure time: 6 h
Test atmosphere: vapour

Amines, polyethylenepoly-, triethylenetetramine fraction:
Acute inhalation toxicity : (Rat, male and female): Exposure time: 8 h
Test atmosphere: vapour
Method: OECD Test Guideline 403

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia:
Acute inhalation toxicity : LC50 (Rat, male and female): > 0.74 mg/l
Exposure time: 8 h
Test atmosphere: vapour
Method: OECD Test Guideline 403

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

Acute toxicity (other routes of administration) : No data available

Skin corrosion/irritation

Components:

Formaldehyde, polymer with benzenamine, hydrogenated:
Species: reconstructed human epidermis (RhE)
Method: OECD Test Guideline 435

GLP: yes

Species: Rabbit
Exposure time: 24 h
Method: Other guidelines
Result: Corrosive after 1 to 4 hours of exposure
GLP: no
Remarks: Information given is based on data obtained from similar substances.

4,4'-Methylenebis(cyclohexylamine)**:**
Species: Rabbit
Result: Corrosive after 3 minutes to 1 hour of exposure

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Species: reconstructed human epidermis (RhE)
Method: OECD Test Guideline 435
Result: Corrosive after 3 minutes to 1 hour of exposure

Species: Rabbit
Method: OECD Test Guideline 404
Result: Corrosive after 3 minutes to 1 hour of exposure

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated**:**
Species: Rabbit
Assessment: Moderate skin irritant
Result: Irritating to skin.

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**
Species: Rabbit
Assessment: Corrosive, category 1C - where responses occur after exposures between 1 hour and 4 hours and observations up to 14 days.
Method: OECD Test Guideline 404
Result: Corrosive after 1 to 4 hours of exposure

2-piperazin-1-ylethylamine**:**
Species: Rabbit
Result: Causes burns.

Serious eye damage/eye irritation

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Result: Corrosive

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Species: Rabbit
Method: OECD Test Guideline 405
Result: Irreversible effects on the eye

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated**:**
Species: Rabbit
Assessment: Mild eye irritant
Result: slight irritation

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**
Species: Rabbit
Assessment: Risk of serious damage to eyes.
Method: OECD Test Guideline 405
Result: Irreversible effects on the eye

2-piperazin-1-ylethylamine**:**
Species: Rabbit
Assessment: Risk of serious damage to eyes.
Result: Irreversible effects on the eye

Respiratory or skin sensitisation

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Test Type: Buehler Test
Exposure routes: Dermal
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

4,4'-Methylenebis(cyclohexylamine)**:**
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Exposure routes: Skin
Species: Humans
Assessment: Probability or evidence of skin sensitisation in humans
Result: Probability or evidence of skin sensitisation in humans

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated**:**
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

2-piperazin-1-ylethylamine**:**
Exposure routes: Skin
Species: Guinea pig
Assessment: The product is a skin sensitiser, sub-category 1B.
Method: OECD Test Guideline 406
Result: Probability or evidence of low to moderate skin sensitisation rate in humans

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Assessment: Causes severe skin burns and eye damage.
May cause sensitisation by skin contact.

Germ cell mutagenicity

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
GLP: yes

: 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: 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

4,4'-Methylenebis(cyclohexylamine)**:**

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

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

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

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

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: positive

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Genotoxicity in vitro : 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

: 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

: Test Type: gene mutation test
Result: negative
GLP: yes

2-piperazin-1-ylethylamine**:**
Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative

: Test Type: gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: negative

: Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: negative
Result: negative

Components:

4,4'-Methylenebis(cyclohexylamine)**:**
Genotoxicity in vivo : Cell type: Somatic
Application Route: Intraperitoneal injection
Dose: 50 mg/kg
Method: OECD Test Guideline 474
Result: negative

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Genotoxicity in vivo : Test Type: In vivo micronucleus test
Test species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Dose: 0 - 600 mg/kg
Method: OECD Test Guideline 474
Result: negative

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Test species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Oral
Dose: 125/250/500 mg/kg bw/day
Method: OECD Test Guideline 474
Result: negative

2-piperazin-1-ylethylamine**:**

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Test species: Mouse (male and female)
Application Route: Intraperitoneal injection
Dose: 175 - 560 mg/kg
Method: OECD Test Guideline 474
Result: negative

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Germ cell mutagenicity-Assessment : In vitro tests did not show mutagenic effects

Carcinogenicity

Components:

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Species: Mouse, male
Dose: 42 mg/kg
Frequency of Treatment: 3 daily
No observed adverse effect level: >= 50 mg/kg bw/day
Method: OECD Test Guideline 451
Result: negative

Species: Mouse, male
Application Route: Dermal
Exposure time: 104 weeks
Dose: 16.8 mg/kg
Frequency of Treatment: 3 daily
No observed adverse effect level: >= 20 mg/kg bw/day
Method: OECD Test Guideline 451

Carcinogenicity - Assessment : No data available

Reproductive toxicity

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Effects on fertility : Test Type: reproductive and developmental toxicity study
Species: Rat, male and female

Application Route: Oral
Dose: 0, 70, 140 and 280 mg/kg
Frequency of Treatment: 7 days/week
General Toxicity - Parent: No observed adverse effect level: 280 mg/kg body weight
General Toxicity F1: No observed adverse effect level: > 280 mg/kg body weight
Method: OECD Test Guideline 421
Result: Animal testing did not show any effects on fertility.
GLP: yes

4,4'-Methylenebis(cyclohexylamine)**:**

Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 422
Result: positive

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Test Type: OECD Test Guideline 421
Species: Rat, male and female
Application Route: Dermal
Dose: 3/10/30 milligram per kilogram
General Toxicity - Parent: No observed adverse effect level: 30 mg/kg body weight
General Toxicity F1: No observed adverse effect level: 30 mg/kg body weight
Method: OECD Test Guideline 421
Result: Animal testing did not show any effects on fertility.

Species: Rat, male and female
Application Route: Oral
Dose: 0/50/150/450 milligram per kilogram
General Toxicity - Parent: No observed adverse effect level: 150 mg/kg body weight
General Toxicity F1: No observed adverse effect level: 150 mg/kg body weight
Method: OECD Test Guideline 443

Test Type: OECD Test Guideline 421
Species: Rat, male and female
Application Route: Oral
Dose: 0/75/150/300/600 mg/kg bw/d
General Toxicity - Parent: No observed adverse effect level: 150 mg/kg body weight
General Toxicity F1: No observed adverse effect level: 600 mg/kg body weight
Method: OECD Test Guideline 421

2-piperazin-1-ylethylamine**:**

Test Type: OECD Test Guideline 422
Species: Rat, male and female
Application Route: Oral
Dose: 500/2000/8000 ppm
Duration of Single Treatment: 28 d
General Toxicity - Parent: No observed adverse effect

concentration: 8,000 ppm
General Toxicity F1: No-observed-effect level: 8,000 ppm
Method: OECD Test Guideline 422

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Effects on foetal development : Test Type: Pre-natal
Species: Rat
Application Route: Oral
Dose: 0/70/140/280 milligram per kilogram
Duration of Single Treatment: 15 d
Frequency of Treatment: 7 days/week
General Toxicity Maternal: No observed adverse effect level: > 280 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: > 280 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects
GLP: yes

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Test Type: Pre-natal
Species: Rat
Application Route: Oral
Dose: 75/325/750 mg/kg bw/day
Duration of Single Treatment: 10 d
General Toxicity Maternal: No observed adverse effect level: >= 750 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: >= 750 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Test Type: Pre-natal
Species: Rabbit
Application Route: Dermal
Dose: 5/50/125 mg/kg bw/day
Duration of Single Treatment: 13 d
General Toxicity Maternal: No observed adverse effect level: 50 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: >= 125 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Test Type: Pre-natal
Species: Rabbit, female
Application Route: Oral
Dose: 15/50/115 milligram per kilogram
Duration of Single Treatment: 23 d
General Toxicity Maternal: No observed adverse effect level: 50 mg/kg body weight
Developmental Toxicity: No observed adverse effect level:

115 mg/kg body weight
Method: OECD Test Guideline 414

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0/40/125/350 milligram per kilogram
Duration of Single Treatment: 13 d
General Toxicity Maternal: No observed adverse effect level: 350 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 350 mg/kg body weight
Method: OECD Test Guideline 414

2-piperazin-1-ylethylamine**:**

Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: Lowest observed adverse effect concentration: 8,000 g/m3
Developmental Toxicity: No-observed-effect level: 8,000 ppm
Method: OECD Test Guideline 422

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Duration of Single Treatment: 14 d
General Toxicity Maternal: No observed adverse effect level: 1,000 mg/kg body weight
Developmental Toxicity: No-observed-effect level: 1,000 mg/kg body weight
Method: OECD Test Guideline 414

Test Type: Pre-natal
Species: Rabbit, female
Application Route: Oral
Duration of Single Treatment: 23 d
General Toxicity Maternal: No observed adverse effect level: 75 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 75 mg/kg body weight
Method: OECD Test Guideline 414

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

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

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Reproductive toxicity - Assessment : The reprotoxic effects of Triethylenetetramine (TETA) are under further evaluation as part of the EU REACH program due in part to the aminoethyl ethanolamine (AEEA) content.

2-piperazin-1-ylethylamine**:**

Reproductive toxicity - Assessment	:	Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

STOT - single exposure

No data available

STOT - repeated exposure

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Exposure routes: Ingestion
Target Organs: Kidney, Liver, spleen, Adrenal gland
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

4,4'-Methylenebis(cyclohexylamine)**:**
Exposure routes: Ingestion
Target Organs: Liver
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

2-piperazin-1-ylethylamine**:**
Exposure routes: Inhalation
Target Organs: Respiratory Tract
Assessment: Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Species: Rat, male and female
NOEL: 15 mg/kg
Application Route: oral (gavage)
Number of exposures: once daily
Dose: 15, 150 and 300 mg/kg
Method: OECD Test Guideline 407
GLP: yes
Target Organs: Kidney, Liver, Adrenal gland, spleen
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

4,4'-Methylenebis(cyclohexylamine)**:**
Species: Rat, male and female
NOEC: 15 mg/kg, 12.2
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 864 hNumber of exposures: 7 d
Method: OECD Test Guideline 413

Amines, polyethylenepoly-, triethylenetetramine fraction**:**
Species: Rat, male and female
NOAEL: 350 mg/kg
Application Route: Oral
Exposure time: 28 d Number of exposures: 7 d

Dose: 100/350/1000 mg/kg bw/day
Method: OECD Test Guideline 407
Target Organs: Lungs
Remarks: Information given is based on data obtained from similar substances.

Species: Dog, male and female
NOAEL: 125 mg/kg
Application Route: Oral
Remarks: Information given is based on data obtained from similar substances.

Species: Dog, male and female
NOAEL: 50 mg/kg
Application Route: Oral
Method: Subchronic toxicity
Remarks: Information given is based on data obtained from similar substances.

Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Oral
Exposure time: 26 weeks Dose: 50/175/600 mg/kg bw/day
Method: OECD Test Guideline 408
Target Organs: Lungs
Remarks: Information given is based on data obtained from similar substances.

Species: Mouse, male and female
NOAEL: 92 mg/kg, 600 ppm
Application Route: Oral
Exposure time: 120/600/3000 ppm Method: OECD Test Guideline 408
Remarks: Information given is based on data obtained from similar substances.

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**
Species: Rat, male and female
NOAEL: >= 250
Application Route: Dermal
Exposure time: 90 days 6 hNumber of exposures: 5 days/week
Dose: 0/50/80/250 mg/kg bw/day
Method: OECD Test Guideline 411

2-piperazin-1-ylethylamine**:**
Species: Rat, male and female
NOAEL: 152
Application Route: oral (drinking water)
Exposure time: 28 dMethod: OECD Test Guideline 422

Species: Rat, male and female
NOAEL: > 1000
Application Route: Dermal
Exposure time: 29 dNumber of exposures: 6h/d, 5d/w
Method: OECD Test Guideline 410

Species: Rat, male and female
NOEC: 0.2
Application Route: Inhalation
Exposure time: 90 dNumber of exposures: 6h/d, 5d/w
Method: OECD Test Guideline 413

Target Organs: Respiratory Tract
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.

Species: Rat, male and female
NOEC: 53.3
Application Route: Inhalation
Exposure time: 90 dNumber of exposures: 6h/d, 5d/w
Method: OECD Test Guideline 413

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**
Repeated dose toxicity - Assessment : Causes severe skin burns and eye damage.

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

General Information: No data available

Inhalation: No data available

Skin contact: No data available

Eye contact: No data available

Ingestion: No data available

Toxicology, Metabolism, Distribution

No data available

Neurological effects

No data available

Further information

Ingestion: No data available

SECTION 12: Ecological information

12.1 Toxicity

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Toxicity to fish : LC50 (Poecilia reticulata (guppy)): 63 mg/l
Exposure time: 96 h
Test Type: static test
Analytical monitoring: yes
Method: OECD Test Guideline 203
GLP: yes

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 15.4 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Desmodesmus subspicatus (green algae)): 43.94 mg/l
Exposure time: 72 h
Test Type: static test
Method: Directive 67/548/EEC, Annex V, C.3.
GLP: yes

ErC10 (Desmodesmus subspicatus (green algae)): 1.2 mg/l
Exposure time: 72 h
Test Type: static test
Method: Directive 67/548/EEC, Annex V, C.3.
GLP: yes

NOECr (Desmodesmus subspicatus (green algae)): < 4 mg/l
Exposure time: 72 h
Test Type: static test
Method: Directive 67/548/EEC, Annex V, C.3.
GLP: yes

Toxicity to microorganisms : EC50 (activated sludge): 186.7 mg/l
Exposure time: 180 min
Test Type: static test
Analytical monitoring: no
Method: Directive 67/548/EEC, Annex V, C.11
GLP: yes

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

4,4'-Methylenebis(cyclohexylamine)**:**

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 68 mg/l Exposure time: 96 h Test Type: static test Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 : 6.84 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): 140 - 200 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: DIN 38412
Toxicity to microorganisms	:	EC50 (Pseudomonas putida): ca. 156 mg/l Exposure time: 0.5 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 4 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Test Type: semi-static test Method: OECD Test Guideline 211
Ecotoxicology Assessment Chronic aquatic toxicity	:	This product has no known ecotoxicological effects.

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 330 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water Method: EPA OTS 797.1400
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 31.1 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae/aquatic plants	:	ErC50 (Selenastrum capricornutum (green algae)): 20 mg/l Exposure time: 72 h Test Type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 201 EC10 (Selenastrum capricornutum (green algae)): 1.34 mg/l Exposure time: 72 h Test Type: semi-static test Test substance: Fresh water

Method: OECD Test Guideline 201

Toxicity to microorganisms : NOEC (Bacteria): >= 100 mg/l
Exposure time: 28 d
Method: OECD Test Guideline 216

EC50 (Bacteria): > 100 mg/l
Exposure time: 28 h
Method: OECD Test Guideline 216

EC50 (Bacteria): 15.7 mg/l
Exposure time: 2 h
Test Type: static test
Test substance: Fresh water

NOEC (Bacteria): 1.3 mg/l
Exposure time: 2 h
Test Type: static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10: 1.9 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 202

Toxicity to soil dwelling organisms : NOEC: ca. 1,000 mg/kg
Exposure time: 56 d
Species: Eisenia fetida (earthworms)
Method: OECD Test Guideline 222

EC50: > 1,000 mg/kg
Exposure time: 56 d
Species: Eisenia fetida (earthworms)
Method: OECD Test Guideline 222

Ecotoxicology Assessment
Acute aquatic toxicity : This product has no known ecotoxicological effects.

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

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated**:**

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1,000 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : EC50 (No information available.): > 1,000 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Toxicity to fish : EC50 (Oncorhynchus mykiss (rainbow trout)): > 15 mg/l
End point: mortality

Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 80 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

EC50 (Acartia tonsa): 418.34 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Marine water

Toxicity to algae/aquatic plants : ErC50 (Selenastrum capricornutum (green algae)): 15 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

NOECr (Selenastrum capricornutum (green algae)): 0.32 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

IC50 (Skeletonema costatum (marine diatom)): 141.72 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Marine water
Method: ISO 10253

ErC10 (Skeletonema costatum (marine diatom)): 33.34 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Marine water
Method: ISO 10253

Toxicity to microorganisms : EC50 (activated sludge): 750 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209

Ecotoxicology Assessment
Acute aquatic toxicity : Harmful to aquatic life.

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

2-piperazin-1-ylethylamine**:**
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 2,190 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test

Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 58 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202 Remarks: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Toxicity to algae/aquatic plants	:	EC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l Exposure time: 72 h Test substance: Fresh water Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50 (Bacteria): > 100 mg/l, mg/kg Exposure time: 28 d Method: OECD Test Guideline 216 EC50 (activated sludge): 511 mg/l Exposure time: 2 h Test Type: static test Test substance: Fresh water Method: ISO
Toxicity to soil dwelling organisms	:	LC50: 712 mg/kg Exposure time: 56 d Species: Eisenia fetida (earthworms) Method: OECD Test Guideline 222 NOEC: 500 mg/kg Exposure time: 56 d Species: Eisenia fetida (earthworms) Method: OECD Test Guideline 222

12.2 Persistence and degradability

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Biodegradability	:	Inoculum: activated sludge Concentration: 100 mg/l Result: Not biodegradable Biodegradation: 0 % Exposure time: 28 d Method: Other guidelines

4,4'-Methylenebis(cyclohexylamine)**:**

Biodegradability	:	Inoculum: activated sludge Result: Not readily biodegradable. Biodegradation: < 10 % Exposure time: 28 d Method: OECD Test Guideline 302B

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Biodegradability : Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 162 d
Method: OECD Test Guideline 301D

Test Type: aerobic
Inoculum: activated sludge
Result: Not inherently biodegradable.
Biodegradation: 20 %
Related to: Dissolved organic carbon (DOC)
Exposure time: 84 d
Method: OECD Test Guideline 302A

Chemical Oxygen Demand (COD) : 1,940 mg/g

2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperazinyl)ethyl]amino]butyl-terminated**:**

Biodegradability : Result: Not readily biodegradable.

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

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

Stability in water : Degradation half life (DT50): 12 Months (25 °C)
pH: 6.5
Method: No information available.
Remarks: Fresh water

2-piperazin-1-ylethylamine**:**

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

Biochemical Oxygen Demand (BOD) : 5 mg/l
Incubation time: 5 d

Chemical Oxygen Demand (COD) : 560 mg/l

Photodegradation : Test Type: Air
Degradation (direct photolysis): 50 %

12.3 Bioaccumulative potential

Components:

Formaldehyde, polymer with benzenamine, hydrogenated**:**

Bioaccumulation : Species: Cyprinus carpio (Carp)
Exposure time: 8 Weeks
Temperature: 25 °C
Bioconcentration factor (BCF): > 18 - < 219
Method: OECD Test Guideline 305C
GLP: yes
Remarks: No bioaccumulation is to be expected (log Pow <= 4).

Partition coefficient: n-octanol/water : log Pow: 2.68 (21 °C)
pH: 12.5
Method: Partition coefficient
GLP: yes

4,4'-Methylenebis(cyclohexylamine)**:**

Bioaccumulation : Bioconcentration factor (BCF): 10.15

Partition coefficient: n-octanol/water : log Pow: 2.03 (25 °C)
Method: OECD Test Guideline 107

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Partition coefficient: n-octanol/water : log Pow: -2.08 - 2.90 (20 °C)
Method: QSAR

Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia**:**

Partition coefficient: n-octanol/water : Pow: 22.09 (25 °C)
log Pow: 1.34 (25 °C)

2-piperazin-1-ylethylamine**:**

Bioaccumulation : Species: Fish
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water : log Pow: -1.48 (20 °C)

12.4 Mobility in soil

Components:

4,4'-Methylenebis(cyclohexylamine)**:**

Distribution among environmental compartments : Koc: 446

Amines, polyethylenepoly-, triethylenetetramine fraction**:**

Distribution among environmental compartments : Koc: 1584.9 - 5012
Method: OECD Test Guideline 106

2-piperazin-1-ylethylamine**:**

Distribution among environmental compartments : Koc: ca. 37000

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

ADR : UN 2735

RID : UN 2735

IMDG : UN 2735

IATA : UN 2735

14.2 UN proper shipping name

ADR : AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBISCYCLOHEXYLAMINE, TRIETHYLENE TETRAMINE)

RID : AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBISCYCLOHEXYLAMINE, TRIETHYLENE TETRAMINE)

IMDG : AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBISCYCLOHEXYLAMINE, TRIETHYLENE TETRAMINE)

IATA	:	Amines, liquid, corrosive, n.o.s. (4,4'-METHYLENEBISCYCLOHEXYLAMINE, TRIETHYLENE TETRAMINE)

14.3 Transport hazard class(es)

ADR	:	8
RID	:	8
IMDG	:	8
IATA	:	8

14.4 Packing group

ADR

Packing group	:	II
Classification Code	:	C7
Hazard Identification Number	:	80
Labels	:	8
Tunnel restriction code	:	(E)

RID

Packing group	:	II
Classification Code	:	C7
Hazard Identification Number	:	80
Labels	:	8

IMDG

Packing group	:	II
Labels	:	8
EmS Code	:	F-A, S-B

IATA (Cargo)

Packing instruction (cargo aircraft)	:	855
Packing instruction (LQ)	:	Y840
Packing group	:	II
Labels	:	Corrosive

IATA (Passenger)

Packing instruction (passenger aircraft)	:	851
Packing instruction (LQ)	:	Y840
Packing group	:	II
Labels	:	Corrosive

14.5 Environmental hazards

ADR

Environmentally hazardous	:	no

RID

Environmentally hazardous	:	no

IMDG

Marine pollutant	:	no

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.
Not applicable

Other regulations:
Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

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	:	All components of this product are on the Canadian DSL
AIIC	:	On the inventory, or in compliance with the inventory
NZIoC	:	On the inventory, or 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
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	:	All substances listed as active on 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

H301	:	Toxic if swallowed.
H302	:	Harmful if swallowed.
H311	:	Toxic in contact with skin.
H312	:	Harmful in contact with skin.
H314	:	Causes severe skin burns and eye damage.
H315	:	Causes skin irritation.
H317	:	May cause an allergic skin reaction.
H318	:	Causes serious eye damage.
H319	:	Causes serious eye irritation.
H361	:	Suspected of damaging fertility or the unborn child.
H372	:	Causes damage to organs through prolonged or repeated exposure if inhaled.
H373	:	May cause damage to organs through prolonged or repeated exposure if swallowed.
H373	:	May cause damage to organs through prolonged or repeated exposure.
H412	:	Harmful to aquatic life with long lasting effects.
EUH071	:	Corrosive to the respiratory tract.

Full text of other abbreviations

Acute Tox.	:	Acute toxicity
Aquatic Chronic	:	Long-term (chronic) aquatic hazard
Eye Dam.	:	Serious eye damage
Eye Irrit.	:	Eye irritation
Repr.	:	Reproductive toxicity
Skin Corr.	:	Skin corrosion
Skin Irrit.	:	Skin irritation
Skin Sens.	:	Skin sensitisation
STOT RE	:	Specific target organ toxicity - repeated exposure

Further information

Classification of the mixture: **Classification procedure:**

Acute Tox. 4	H302	Calculation method
Skin Corr. 1B	H314	Calculation method
Eye Dam. 1	H318	Calculation method
Skin Sens. 1	H317	Calculation method
STOT RE 2	H373	Calculation method
Aquatic Chronic 3	H412	Calculation method

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

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

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

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

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.