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

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.

Specific target organ toxicity - repeated exposure, Category 2, Kidney, Liver, spleen, Adrenal gland	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.

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.

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

Trientine

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.

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)
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	>= 30 - < 50
Formaldehyde, polymer with benzenamine, hydrogenated	135108-88-2 -	Acute Tox. 4; H302 Skin Corr. 1C; H314 Skin Sens. 1; H317 STOT RE 2; H373 Aquatic Chronic 3; H412	>= 30 - < 50
Trientine	112-24-3 203-950-6 612-059-00-5	Acute Tox. 4; H302 Acute Tox. 4; H312 Skin Corr. 1B; H314 Skin Sens. 1; H317 Aquatic Chronic 3; H412	>= 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 tetra-propoxylated propane-1,2-diol with ammonia	- -	Skin Corr. 1C; H314 Eye Dam. 1; H318 Aquatic Chronic 3; H412	>= 3 - < 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 Skin Sens. 1; H317 Repr. 2; H361 STOT RE 1; H372 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.

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 : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media : High volume water jet

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 methods	:	No data is available on the product itself.
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	:	Do not breathe vapours or spray mist. 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. Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.
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.
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

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
Trientine	Workers	Inhalation	Systemic effects, Short-term exposure	5380 mg/m3

	Workers	Dermal	Systemic effects, Long-term exposure	0.57 mg/kg bw/day
	Workers	Inhalation	Systemic effects, Long-term exposure	1 mg/m3
	Workers	Dermal	Local effects, Long-term exposure	0.028 mg/m3
	Consumers	Dermal	Systemic effects, Short-term exposure	8 mg/kg bw/day
	Consumers	Inhalation	Systemic effects, Short-term exposure	1600 mg/m3
	Consumers	Oral	Systemic effects, Short-term exposure	20 mg/kg bw/day
	Consumers	Dermal	Local effects, Short-term exposure	1 mg/cm2
	Consumers	Dermal	Local effects, Short-term exposure	0.25 mg/kg bw/day
	Consumers	Inhalation	Systemic effects, Long-term exposure	0.29 mg/m3
	Consumers	Oral	Systemic effects, Long-term exposure	0.41 mg/kg bw/day
	Consumers	Dermal	Local effects, Long-term exposure	0.43 mg/cm2
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 effects	6 mg/kg
Reaction products of di-, tri- and tetra-	Workers	Dermal	Long-term systemic	2.5 mg/kg

propoxylated propane-1,2-diol with ammonia (pH adjusted with acetic acid)			effects	
	Consumers	Dermal	Long-term systemic effects	1.25 mg/kg
	Workers	Dermal	Long-term local effects	0.623 mg/cm2
	Consumers	Oral	Long-term systemic effects	0.04 mg/kg
	Consumers	Dermal	Long-term local effects	0.311 mg/cm2
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
Trientine	Fresh water	190 µg/l
Remarks:	Assessment Factors	
	Fresh water sediment	95.9 mg/kg
	Equilibrium method	
	Marine water	38 µg/l
	Assessment Factors	
	Freshwater - intermittent	200 µg/l
	Assessment Factors	
	Marine sediment	19.2 mg/kg
	Equilibrium method	
	Soil	19.1 mg/kg
	Equilibrium method	
	Sewage treatment plant	4.25 mg/l
	Assessment Factors	
	Secondary Poisoning	0.18 mg/kg
	Assessment Factors	
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
Reaction products of di-, tri- and tetra-propoxylated propane-1,2-diol with ammonia (pH adjusted with acetic acid)	Secondary Poisoning	6.93 mg/kg
	Assessment Factors	
	Fresh water	0.015 mg/l
	Assessment Factors	
	Marine sediment	0.125 mg/kg
	Equilibrium method	
	Fresh water sediment	0.132 mg/kg
	Equilibrium method	
	Freshwater - intermittent	0.15 mg/l
	Assessment Factors	
	Marine water	0.0143 mg/l
	Assessment Factors	
	Soil	0.0176 mg/kg
	Equilibrium method	
	Sewage treatment plant	7.5 mg/l
	Assessment Factors	
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	

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 : 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). 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 : No personal respiratory protective equipment normally required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance : liquid

Colour : brown

Odour : amine-like

Odour Threshold	:	No data is available on the product itself.
pH	:	No data is available on the product itself.
Melting point/freezing point	:	No data available
Boiling point	:	> 200 °C
Flash point	:	> 100 °C Method: Pensky-Martens closed cup
Evaporation rate	:	No data is available on the product itself.
Flammability (solid, gas)	:	No data is available on the product itself.
Burning rate	:	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)
Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.

9.2 Other information

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

Hazardous decomposition products : carbon dioxide
carbon monoxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity - Product : Acute toxicity estimate : 499.39 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

Diaminopolypropylene glycol:
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:

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

polymeric cycloaliphatic amines**:**
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 435
Result: Corrosive after 1 to 4 hours of exposure
Remarks: Causes skin burns.

3,6-diazaoctanethylenediamin**:**
Species: Rabbit
Assessment: Causes burns.
Method: OECD Test Guideline 404
Result: Causes burns.

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.

Diaminopolypropylene glycol**:**
Species: Rabbit
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:

polymeric cycloaliphatic amines**:**
Remarks: Risk of serious damage to eyes.

3,6-diazaoctanethylenediamin**:**
Species: Rabbit
Assessment: Corrosive
Method: OECD Test Guideline 405
Result: Corrosive

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

Diaminopolypropylene glycol**:**
Species: Rabbit
Assessment: Corrosive
Method: OECD Test Guideline 405
Result: Irreversible effects on the eye

2-piperazin-1-ylethylamine**:**
Species: Rabbit
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation

Components:

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

polymeric cycloaliphatic amines**:**
Test Type: Buehler Test
Exposure routes: Dermal
Species: Guinea pig
Assessment: May cause sensitisation by skin contact.
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

3,6-diazaoctanethylenediamin**:**
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

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

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: May cause sensitisation by skin contact.

Components:

polymeric cycloaliphatic amines**:**

Assessment: Causes severe skin burns and eye damage.
May cause sensitisation by skin contact.

Germ cell mutagenicity

Components:

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

polymeric cycloaliphatic amines**:**

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

: Test Type: Ames test
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

3,6-diazaoctanethylenediamin**:**

Genotoxicity in vitro : Concentration: 0 - 200 µg/L
Metabolic activation: negative
Method: OECD Test Guideline 482
Result: negative

Diaminopolypropylene glycol**:**
Genotoxicity in vitro : Concentration: 0 - 10000 ug/plate
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 476
Result: negative

2-piperazin-1-ylethylamine**:**
Genotoxicity in vitro : Concentration: 5000 ug/plate
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 476
Result: negative

: Metabolic activation: negative
Method: OECD Test Guideline 482
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

3,6-diazaoctanethylenediamin**:**
Genotoxicity in vivo : Application Route: Intraperitoneal injection
Dose: 0 - 600 mg/kg
Method: OECD Test Guideline 474
Result: negative

Diaminopolypropylene glycol**:**
Genotoxicity in vivo : Application Route: Oral
Dose: 500 mg/kg
Method: OECD Test Guideline 474
Result: negative

2-piperazin-1-ylethylamine**:**
Genotoxicity in vivo : Application Route: Intraperitoneal injection
Dose: 175 - 560 mg/kg
Method: OECD Test Guideline 474
Result: negative

Components:

polymeric cycloaliphatic amines**:**
Germ cell mutagenicity-Assessment : In vitro tests did not show mutagenic effects

Germ cell mutagenicity-Assessment : No data available

Carcinogenicity

Components:

3,6-diazaoctanethylenediamin**:**
Species: Mouse, male
Application Route: Dermal
Dose: 42 mg/kg
Frequency of Treatment: 3 days/week
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 days/week
Method: OECD Test Guideline 451

Carcinogenicity - Assessment : No data available

Reproductive toxicity

Components:

4,4'-methylenebis(cyclohexylamine)**:**
Effects on fertility : Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 422
Result: positive

polymeric cycloaliphatic amines**:**
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

Method: OECD Test Guideline 421
Result: Animal testing did not show any effects on fertility.

Diaminopolypropylene glycol**:**

Species: Rat, male and female
Application Route: Dermal
Method: OECD Test Guideline 421
Result: Animal testing did not show any effects on fertility.

Components:

polymeric cycloaliphatic amines**:**

Effects on foetal development : Species: Rat
Application Route: Oral
Developmental Toxicity: No observed adverse effect level: 280 mg/kg body weight
Method: OECD Test Guideline 421
Result: No teratogenic effects

3,6-diazaoctanethylenediamin**:**

Species: Rat
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: > 750 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Species: Rabbit
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level: 125 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Components:

polymeric cycloaliphatic amines**:**

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

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:

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.

polymeric cycloaliphatic amines**:**
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.

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:

4,4'-methylenebis(cyclohexylamine)**:**
Species: Rat, male and female
: 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

polymeric cycloaliphatic amines**:**
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
Target Organs: Kidney, Liver, Adrenal gland
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

3,6-diazaoctanethylenediamin**:**
Species: Rat, male and female
NOAEL: 50
Application Route: Ingestion
Exposure time: 26 WeeksNumber of exposures: 7 d
Method: Subchronic toxicity

Diaminopolypropylene glycol**:**
Species: Rat, male and female
NOAEL: 250
Application Route: Skin contact
Exposure time: 2,160 hNumber of exposures: 5 d
Method: Subchronic toxicity

Species: Rat, male and female
NOAEL: 239
Application Route: Ingestion
Exposure time: 744 hMethod: Subchronic toxicity

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

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

Species: Rat, male and female
: 0.2
Application Route: Inhalation
Exposure time: 90 dNumber of exposures: 6h/d, 5d/week
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
: 53.3
Application Route: Inhalation
Exposure time: 90 dNumber of exposures: 6h/d, 5d/week
Method: OECD Test Guideline 413

Components:

polymeric cycloaliphatic amines**:**
Repeated dose toxicity - Assessment : Causes severe skin burns and eye damage.

Aspiration toxicity

No data available

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:

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.

polymeric cycloaliphatic amines**:**

Toxicity to fish	:	LC50 (Poecilia reticulata (guppy)): 63 mg/l Exposure time: 96 h Test Type: static test Method: OECD Test Guideline 203
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
Toxicity to algae/aquatic plants	:	EC50 (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.
Toxicity to microorganisms	:	EC50 (activated sludge): 186.7 mg/l Exposure time: 180 min Test Type: static test Method: Directive 67/548/EEC, Annex V, C.11
Ecotoxicology Assessment Acute aquatic toxicity	:	Harmful to aquatic life.
Chronic aquatic toxicity	:	Harmful to aquatic life with long lasting effects.

3,6-diazaoctanethylenediamin**:**

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
Toxicity to microorganisms	:	EC50 (activated sludge): 800 mg/l Exposure time: 0.5 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

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

Diaminopolypropylene glycol**:**

Toxicity to fish : EC50 (Oncorhynchus mykiss (rainbow trout)): > 15 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 203

LC50 : 772.14 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Marine 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

ErC10 (Selenastrum capricornutum (green algae)): 1.4 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

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

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

Toxicity to fish	:	LC50 : 2,190 mg/l 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 Exposure time: 48 h Test Type: static test 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 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:

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

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

polymeric cycloaliphatic amines**:**

Biodegradability	:	Inoculum: activated sludge Result: Not biodegradable Exposure time: 28 d Method: Other guidelines

3,6-diazaoctanethylenediamin**:**

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

Result: Not readily biodegradable.
Biodegradation: 20 %
Exposure time: 84 d
Method: OECD Test Guideline 302 A

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.

Diaminopolypropylene glycol**:**

Biodegradability : 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 : 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:

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

polymeric cycloaliphatic amines**:**

Bioaccumulation : Species: Cyprinus carpio (Carp)
Exposure time: 8 Weeks
Temperature: 25 °C
Bioconcentration factor (BCF): > 10 - < 219

Method: OECD Test Guideline 305C
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

3,6-diazaoctanethylenediamin**:**
Partition coefficient: n-octanol/water : log Pow: -2.65 (20 °C)
Method: OECD Test Guideline 117

Diaminopolypropylene glycol**:**
Partition coefficient: n-octanol/water : 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

3,6-diazaoctanethylenediamin**:**
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 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.
Harmful to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	The product should not be allowed to enter drains, water courses or the soil. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company. Dispose of as hazardous waste in compliance with local and national regulations. Dispose of contents/ container to an approved waste disposal plant.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14: Transport information

IATA

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	Amines, liquid, corrosive, n.o.s. (4,4'-METHYLENEBIS(CYCLOHEXYLAMINE), POLYOXYPROPYLENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	Corrosive
Packing instruction (cargo aircraft)	:	855
Packing instruction (passenger aircraft)	:	851

IMDG

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBIS(CYCLOHEXYLAMINE), POLYOXYPROPYLENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	8
EmS Code	:	F-A, S-B
14.5 Environmental hazards		
Marine pollutant	:	no

ADR

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBIS(CYCLOHEXYLAMINE), POLYOXYPROPYLENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	8
14.5 Environmental hazards		
Environmentally hazardous	:	no

RID

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (4,4'-METHYLENEBIS(CYCLOHEXYLAMINE), POLYOXYPROPYLENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	8
14.5 Environmental hazards		
Environmentally hazardous	:	no

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

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 - 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 - List of substances subject to authorisation (Annex XIV)	:	Not applicable
REACH - List of substances subject to authorisation - Future sunset date	:	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
AICS	:	On the inventory, or in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
ENCS	:	On the inventory, or in compliance with the inventory
KECI	:	On the inventory, or in compliance with the inventory
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	:	On the inventory, or in compliance with the inventory

Inventories

AICS (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.
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.

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
STOT RE 2	H373	Calculation method
Aquatic Chronic 3	H412	Calculation method

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

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