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

1.1 Product identifier

Trade name : REN HY 5213 BD

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.
Acute toxicity, Category 4	H312: Harmful in contact with skin.
Skin corrosion, Category 1A	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.
Reproductive toxicity, Category 1B	H360F: May damage fertility.

Specific target organ toxicity - repeated exposure, Category 2, Liver, Kidney, Pancreas	H373: May cause damage to organs through prolonged or repeated exposure if swallowed.
Acute aquatic toxicity, Category 1	H400: Very toxic to aquatic life.
Chronic aquatic toxicity, Category 1	H410: Very toxic 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 + H312	Harmful if swallowed or in contact with skin
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H360F	May damage fertility.
H373	May cause damage to organs (Liver, Kidney, Pancreas) through prolonged or repeated exposure if swallowed.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P201	Obtain special instructions before use.
P260	Do not breathe mist or vapours.
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/shower.
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.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.

Hazardous components which must be listed on the label:
diethyltoluenediamine

isophorone diamine

1,2-diaminocyclohexane

4,4'-isopropylidenediphenol

Additional Labelling:

Restricted to professional users.

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)
Diethylmethylbenzenediamine	68479-98-1 270-877-4 612-130-00-0 01-2119486805-25	Acute Tox. 4; H302 Acute Tox. 4; H312 Eye Irrit. 2; H319 STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	30 - 60
Isophoronediamine	2855-13-2 220-666-8 612-067-00-9 -	Acute Tox. 4; H302 Acute Tox. 4; H312 Skin Corr. 1B; H314 Skin Sens. 1; H317 Aquatic Chronic 3; H412	13 - 30
Cyclohex-1,2-ylenediamine	694-83-7 211-776-7 -	Acute Tox. 4; H302 Acute Tox. 4; H332 Acute Tox. 4; H312 Skin Corr. 1A; H314 STOT SE 3; H335	7 - 13
m-Phenylenebis(methylamine)	1477-55-0 216-032-5 01-2119480150-50	Acute Tox. 4; H302 Acute Tox. 4; H332 Skin Corr. 1B; H314 Eye Dam. 1; H318 Skin Sens. 1; H317 Aquatic Chronic 3; H412	7 - 13
4,4'-Isopropylidenediphenol	80-05-7 201-245-8 604-030-00-0	Eye Dam. 1; H318 Skin Sens. 1; H317 Repr. 1B; H360F	3 - 7

	01-2119457856-23	STOT SE 3; H335 Aquatic Chronic 2; H411	
1-Methylimidazole	616-47-7 210-484-7 613-035-00-7 -	Acute Tox. 4; H302 Acute Tox. 3; H311 Skin Corr. 1B; H314	1 - 3
Toluene-4-sulphonic acid	104-15-4 203-180-0 -	STOT SE 3; H335 Skin Irrit. 2; H315 Eye Irrit. 2; H319	0,1 - 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.
Do not leave the victim unattended.

If inhaled : If unconscious, place in recovery position and seek medical advice.
If symptoms persist, call a physician.

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

If swallowed : Keep respiratory tract clear.
Do NOT induce vomiting.
Do not give milk or alcoholic beverages.
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

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 : No data is available on the product itself.

Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products : No hazardous combustion products are known

No data is available on the product itself.

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.

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

None

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	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. 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. Electrical installations / working materials must comply with the technological safety standards.
Recommended storage temperature	:	2 - 40 °C
Other data	:	No decomposition if stored and applied as directed.

7.3 Specific end use(s)

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
4,4'-	80-05-7	TWA (inhalable	10 mg/m3	GB EH40

isopropylidenediphenol		dust)		
Further information	Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
		TWA (inhalable dust)	10 mg/m3	2009/161/EU
Further information	Indicative			

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

Substance name	End Use	Exposure routes	Potential health effects	Value
isophorone diamine	Workers	Inhalation	Systemic effects, Short-term exposure	20,1 mg/m3
	Workers	Inhalation	Local effects, Short-term exposure	20,1 mg/m3
	Consumers	Oral	Systemic effects, Long-term exposure	0,526 mg/kg bw/day
metaxylenediamine	Workers	Inhalation	Long-term systemic effects	1,2 mg/m3
	Workers	Inhalation	Long-term local effects	0,2 mg/m3
	Workers	Dermal	Long-term systemic effects	0,33 mg/kg
1-Methylimidazole	Workers	Inhalation	Systemic effects, Long-term exposure	1,47 mg/m3
	Workers	Dermal	Systemic effects, Long-term exposure	0,42 mg/kg bw/day

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

Substance name	Environmental Compartment	Value
isophorone diamine	Fresh water	0,06 mg/l
Remarks:	Assessment Factors	
	Marine water	0,006 mg/l
	Assessment Factors	
	Freshwater - intermittent	0,23 mg/l
	Assessment Factors	
	Sewage treatment plant	3,18 mg/l
	Assessment Factors	
	Fresh water sediment	5,784 mg/kg
	Assessment Factors	
	Marine sediment	0,578 mg/kg
	Assessment Factors	
	Soil	1,121 mg/kg

	Assessment Factors	
	Secondary Poisoning	
	Assessment Factors	
metaxylenediamine	Fresh water	0,094 mg/l
	Marine water	0,009 mg/l
	Freshwater - intermittent	0,152 mg/l
	Sewage treatment plant	10 mg/l
	Fresh water sediment	0,43 mg/kg
	Marine sediment	0,043 mg/kg
	Soil	0,045 mg/kg
1-Methylimidazole	Fresh water	0,1 mg/l
	Assessment Factors	
	Marine water	0,01 mg/l
	Assessment Factors	
	Freshwater - intermittent	1 mg/l
	Assessment Factors	
	Sewage treatment plant	590 mg/kg
	Assessment Factors	
	Fresh water sediment	6,95 mg/kg
	Equilibrium method	
	Marine sediment	0,695 mg/kg
	Equilibrium method	
	Soil	1,26 mg/kg
	Equilibrium method	

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

Material : Nitrile rubber

Break through time	:	10 - 480 min
Remarks	:	The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC 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	:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Recommended Filter type: Combined particulates and organic vapour type
Filter type	:	Filter type A-P

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	:	liquid
Colour	:	brown yellow
Odour	:	slight
Odour Threshold	:	No data is available on the product itself.
pH	:	No data is available on the product itself.
Freezing point	:	No data is available on the product itself.
Melting point		No data is available on the product itself.
Boiling point	:	> 200 °C
Flash point	:	> 100 °C Method: Pensky-Martens closed cup, 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	:	No data is available on the product itself.
Lower explosion limit	:	No data is available on the product itself.
Vapour pressure	:	< 0,1 hPa (25 °C)
Relative vapour density	:	No data is available on the product itself.
Relative density	:	No data is available on the product itself.
Density	:	1 g/cm3 (20 °C)
Solubility(ies)		
Water solubility	:	partly soluble (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	:	250 - 500 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

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No decomposition if stored and applied as directed.

10.2 Chemical stability

No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions

Hazardous reactions : No decomposition if stored and applied as directed.

10.4 Conditions to avoid

Conditions to avoid : No data available

10.5 Incompatible materials

10.6 Hazardous decomposition products

Carbon oxides
Nitrogen oxides (NOx)
Burning produces noxious and toxic fumes.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity - Product	:	Acute toxicity estimate : 952,14 mg/kg Method: Calculation method
Acute inhalation toxicity - Product	:	Acute toxicity estimate : > 5 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity - Product	:	Acute toxicity estimate : 1 689 mg/kg Method: Calculation method
Acute toxicity (other routes of administration)	:	No data available

Skin corrosion/irritation

Components:

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

isophorone diamine**:**
Species: Rabbit
Assessment: Causes burns.
Result: Causes burns.

1,2-diaminocyclohexane**:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: Causes severe burns.
GLP: no

metaxylenediamine**:**
Species: Rat
Assessment: Causes burns.
Method: Directive 67/548/EEC, Annex V, B.4.
Result: Causes burns.

4,4'-isopropylidenediphenol**:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

1-Methylimidazole**:**
Species: Rabbit
Assessment: Causes burns.
Method: OECD Test Guideline 404
Result: Causes burns.

P-toluenesulphonic acid**:**
Species: Rabbit
Method: OECD Test Guideline 404
Result: Irritating to skin.

Serious eye damage/eye irritation

Components:

diethyltoluenediamine**:**
Species: Rabbit
Assessment: Irritant
Result: Irritating to eyes.

Species: Rabbit
Assessment: Irritant
Method: OECD Test Guideline 405
Result: Normally reversible injuries

1,2-diaminocyclohexane**:**
Species: Rabbit
Result: Risk of serious damage to eyes.
GLP: no

4,4'-isopropylidenediphenol**:**
Species: Rabbit
Method: OECD Test Guideline 405
Result: Irreversible effects on the eye

1-Methylimidazole**:**
Species: Rabbit
Assessment: Corrosive
Method: OECD Test Guideline 405
Result: Corrosive

P-toluenesulphonic acid**:**
Species: Rabbit
Result: Irritation to eyes, reversing within 7 days

Assessment: Irritating to eyes.
Result: Irritating to eyes.

Respiratory or skin sensitisation

Components:

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

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

1,2-diaminocyclohexane**:**
Exposure routes: Skin
Species: Guinea pig
Result: negative

metaxylenediamine**:**
Exposure routes: Skin
Species: Mouse
Assessment: May cause sensitisation by skin contact.
Method: OECD Test Guideline 429
Result: Causes sensitisation.

4,4'-isopropylidenediphenol**:**
Exposure routes: Skin
Species: Mouse
Method: OECD Test Guideline 429
Result: Does not cause skin sensitisation.

Exposure routes: Skin
Species: Humans
Assessment: May cause sensitisation by skin contact.
Result: Causes sensitisation.

P-toluenesulphonic acid**:**
Exposure routes: Skin
Species: Guinea pig
Method: Directive 67/548/EEC, Annex V, B.6.
Result: Does not cause skin sensitisation.

Components:

metaxylenediamine**:**

Assessment:	Harmful if swallowed or if inhaled, May be harmful in contact with skin., Causes severe skin burns and eye damage. May cause an allergic skin reaction.

Germ cell mutagenicity

Components:

diethyltoluenediamine:
Genotoxicity in vitro : Metabolic activation: negative
Method: OECD Test Guideline 476
Result: negative

1,2-diaminocyclohexane:
Genotoxicity in vitro : Concentration: 15 - 1500 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

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

: Concentration: 33 - 1142 µg/L
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
GLP: yes

metaxylenediamine:
Genotoxicity in vitro : Test Type: Ames test
Test species: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

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

: Test Type: In vitro mammalian cell gene mutation test
Test species: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

4,4'-isopropylidenediphenol:
Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Result: negative

1-Methylimidazole**:**
Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Result: negative

: 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

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

: Concentration: 1902 µg/L
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Components:

diethyltoluenediamine**:**
Genotoxicity in vivo : Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

1,2-diaminocyclohexane**:**
Genotoxicity in vivo : Application Route: Inhalation
Exposure time: 13 Weeks
Dose: 1.6 - 160 mg/m3
Method: OECD Test Guideline 474
Result: negative
GLP: yes

Application Route: Oral
Dose: 75 - 750 mg/kg
Method: OECD Test Guideline 475
Result: negative
GLP: yes

metaxylenediamine**:**
Genotoxicity in vivo : Test Type: In vivo micronucleus test

Test species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Oral
Exposure time: single dose
Dose: 750 mg/kg body weight
Method: OECD Test Guideline 474
Result: negative

4,4'-isopropylidenediphenol**:**
Genotoxicity in vivo : Method: OECD Test Guideline 474
Result: negative

P-toluenesulphonic acid**:**
Genotoxicity in vivo : Application Route: Oral
Exposure time: 72 h
Dose: 4467 mg/kg
Method: OECD Test Guideline 474
Result: negative

Application Route: Intraperitoneal injection
Exposure time: 72 h
Dose: 580 mg/kg
Method: EPA OTS 798.5395
Result: negative

Components:

metaxylenediamine**:**
Germ cell mutagenicity-Assessment : Tests on bacterial or mammalian cell cultures did not show mutagenic effects., Animal testing did not show any mutagenic effects.

Germ cell mutagenicity-Assessment : No data available

Carcinogenicity

Components:

diethyltoluenediamine**:**
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 24 month(s)
Dose: 1.8 - 3.2 mg/kg
Frequency of Treatment: 7 daily
Method: OECD Test Guideline 451
Result: negative

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

Application Route: Oral
Exposure time: 103 weeks
Frequency of Treatment: 7 daily
Result: negative

P-toluenesulphonic acid**:**
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 24 month(s)
Dose: >= 240 mg/kg
Frequency of Treatment: 5 daily
Method: OECD Test Guideline 453
Result: negative

Carcinogenicity - Assessment : No data available

Reproductive toxicity

Components:

1,2-diaminocyclohexane**:**
Effects on fertility : Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 416
GLP: yes

metaxylenediamine**:**
Species: Rat, male and female
Application Route: Oral
Dose: 0, 50, 150 and 450 mg/kg
General Toxicity - Parent: No-observed-effect level: 50 - 150 mg/kg body weight
General Toxicity F1: No-observed-effect level: 450 mg/kg body weight
Method: OECD Test Guideline 421
Result: No effects on fertility and early embryonic development were detected.

4,4'-isopropylidenediphenol**:**
Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 416
Result: Embryotoxic effects and adverse effects on the offspring were detected.

1-Methylimidazole**:**
Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 422
Result: No effects on fertility and early embryonic development were detected.

Components:

isophorone diamine**:**

Effects on foetal development : Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No-observed-effect level: 50 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

1,2-diaminocyclohexane**:**

Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: ca. 184 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects
GLP: no

metaxylenediamine**:**

Test Type: Pre-natal
Species: Rat, male and female
Strain: Sprague-Dawley
Application Route: Oral
Dose: 0, 30, 100, 300 mg/kg milligram per kilogram
Duration of Single Treatment: 19 d
Frequency of Treatment: 1 daily
General Toxicity Maternal: No observed adverse effect level: 100 mg/kg body weight
Embryo-foetal toxicity: No observed adverse effect level: 300 mg/kg body weight
Method: OECD Test Guideline 414
Result: No effects on fertility and early embryonic development were detected.

4,4'-isopropylidenediphenol**:**

Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: < 160 mg/kg body weight
Method: OECD Test Guideline 416
Result: No teratogenic effects

P-toluenesulphonic acid**:**

Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: > 936 mg/kg body weight
Result: No teratogenic effects

Components:

metaxylenediamine**:**

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

4,4'-isopropylidenediphenol**:**
Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, based on animal experiments.

STOT - single exposure

Components:

1,2-diaminocyclohexane**:**
Exposure routes: Inhalation
Target Organs: Respiratory Tract
Assessment: May cause respiratory irritation.

4,4'-isopropylidenediphenol**:**
Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

P-toluenesulphonic acid**:**
Target Organs: Respiratory Tract
Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

STOT - repeated exposure

Components:

diethyltoluenediamine**:**
Exposure routes: Ingestion
Target Organs: Pancreas, Liver, Kidney
Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

diethyltoluenediamine**:**
Species: Rat, male and female
NOAEL: 8 - 10 mg/kg
Application Route: Ingestion
Exposure time: 2 160 hMethod: Subchronic toxicity

isophorone diamine**:**
Species: Rat, male and female
: 60 mg/kg, 200
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 216 hNumber of exposures: 6 h
Method: Subchronic toxicity

1,2-diaminocyclohexane**:**
Species: Rat, male and female
: 16
Test atmosphere: dust/mist

Exposure time: 13 WeeksMethod: OECD Test Guideline 413

metaxylenediamine**:**
Species: Rat, male and female
NOEL: 150 mg/kg
Application Route: oral (gavage)
Exposure time: 672 hNumber of exposures: 7 d
Dose: 0, 10, 40, 150 and 600 mg/kg/d
Method: OECD Test Guideline 407

Species: Rat, male and female
: 0,6
Application Route: Inhalation
Exposure time: 13 weeks Number of exposures: 6 hours per day, 5 days per we
Dose: 0, 0.64, 5.1, 31 mg/m3
Method: OECD Test Guideline 413
Target Organs: Lungs

4,4'-isopropylidenediphenol**:**
Species: Dog, male and female
: 75 mg/kg, 10
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 2 160 hNumber of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
LOAEL: 600 mg/kg
Application Route: Ingestion
Exposure time: 672 hNumber of exposures: 7 d
Method: Subchronic toxicity

1-Methylimidazole**:**
Species: Rat, male and female
NOAEL: 30
Application Route: Ingestion
Number of exposures: 7 d
Method: Subacute toxicity

P-toluenesulphonic acid**:**
Species: Rat, male and female
NOAEL: >= 500 mg/kg
Application Route: Ingestion
Exposure time: 672 hNumber of exposures: 7 d
Method: Subchronic toxicity

Components:

metaxylenediamine**:**

Repeated dose toxicity - Assessment	:	Harmful if swallowed or if inhaled, May be harmful in contact with skin., Causes severe skin burns and eye damage. No adverse effect has been observed in chronic toxicity tests.

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:

diethyltoluenediamine**:**

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 200 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 0,5 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 : ErC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): ca. 104 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): >= 170 mg/l
Exposure time: 24 h
Test Type: static test
Test substance: Fresh water

isophorone diamine**:**

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 110 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.1.

Toxicity to daphnia and other aquatic invertebrates : EC50 : 23 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

Toxicity to algae : EC50 : 37 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC10 : 1 120 mg/l
Exposure time: 18 h
Method: Measured

(Pseudomonas putida): 1 120 mg/l
Exposure time: 18 h
Test Type: static test
Test substance: Fresh water

1,2-diaminocyclohexane**:**

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 200 mg/l
Exposure time: 48 h
Test substance: Fresh water
Method: DIN 38412
GLP: yes
Remarks: Toxic to aquatic organisms.

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 19,8 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202 GLP: no
Toxicity to algae	:	EC50 : 29,6 mg/l Exposure time: 72 h
Toxicity to fish (Chronic toxicity)	:	GLP: yes
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 4,16 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

metaxylenediamine**:**

Toxicity to fish	:	LC50 (Oryzias latipes (Orange-red killifish)): 87,6 mg/l Exposure time: 96 h Test Type: semi-static test Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 15,2 mg/l Exposure time: 48 h Test Type: static test Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Selenastrum capricornutum (green algae)): 32,1 mg/l Exposure time: 72 h Test Type: static test Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50 (activated sludge): > 1 000 mg/l Exposure time: 0,5 h Test Type: static test Method: OECD Test Guideline 209
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 4,7 mg/l Exposure time: 21 d Species: Daphnia magna (Water flea) Test Type: semi-static test Method: OECD Test Guideline 211

4,4'-isopropylidenediphenol**:**

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 7,5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 : 3,9 - 10,2 mg/l Exposure time: 48 h

(Ceriodaphnia dubia (Water flea)):

Toxicity to algae : EC50 (Selenastrum capricornutum (green algae)): 2,5 - 3,1 mg/l
Exposure time: 96 h

Toxicity to fish (Chronic toxicity) : NOEC: 0,016 mg/l
Exposure time: 444 d
Species: Pimephales promelas (fathead minnow)
Test Type: flow-through test
Test substance: Fresh water
Method: EPA OPPTS 850.1500
Remarks: Toxic to aquatic organisms.

M-Factor (Chronic aquatic toxicity) : 1

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

1-Methylimidazole**:**

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): > 100 - < 215 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 267,9 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 : ErC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): 180,7 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50 (activated sludge): 1 050 mg/l
Exposure time: 7 h
Method: DIN 38 412 Part 8

P-toluenesulphonic acid**:**

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 325 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): > 103 mg/l

aquatic invertebrates		Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Selenastrum capricornutum (green algae)): 73 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 201 ErC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): > 40 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: Directive 67/548/EEC, Annex V, C.3. EC50 (Selenastrum capricornutum (green algae)): >= 758 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water EC50 (Selenastrum capricornutum (green algae)): >= 230 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water
Toxicity to microorganisms	:	EC50 (activated sludge): > 650 mg/l Exposure time: 3 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 209

12.2 Persistence and degradability

Components:

diethyltoluenediamine**:**

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: < 60 % Exposure time: 28 d Result: Not readily biodegradable. Biodegradation: < 1 % Exposure time: 28 d Method: OECD Test Guideline 301D
Photodegradation	:	Test Type: Air Rate constant: < .00001

isophorone diamine**:**

Biodegradability : Inoculum: activated sludge
Concentration: 6,9 mg/l
Result: Not readily biodegradable.
Biodegradation: 8 %
Exposure time: 28 d
Method: Directive 67/548/EEC Annex V, C.4.A.

1,2-diaminocyclohexane:

Biodegradability : Result: Readily biodegradable.
Exposure time: 17 d
Method: OECD Test Guideline 301D

Stability in water : Method: No information available.
GLP: No information available.
Remarks: see user defined free text

Photodegradation : Rate constant: < .001
GLP: no

metaxylenediamine:

Biodegradability : Inoculum: activated sludge
Concentration: 14,2 mg/l
Result: Not readily biodegradable.
Biodegradation: 49 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

4,4'-isopropylidenediphenol:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 1 - 2 %
Exposure time: 28 d

1-Methylimidazole:

Biodegradability : Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Inoculum: activated sludge
Concentration: 9 000 mg/l
Result: Inherently biodegradable.
Biodegradation: 79 %
Exposure time: 60 d
Method: ISO

P-toluenesulphonic acid:

Biodegradability : Result: Readily biodegradable.
Biodegradation: > 60 %
Exposure time: 28 d

12.3 Bioaccumulative potential

Components:

diethyltoluenediamine:

Bioaccumulation	:	Bioconcentration factor (BCF): 13,82 Remarks: Bioaccumulation is unlikely.
		Bioconcentration factor (BCF): 2,75 Remarks: Does not bioaccumulate.
Partition coefficient: n-octanol/water	:	log Pow: 1,17 (25 °C) Method: OECD Test Guideline 107

isophorone diamine:

Partition coefficient: n-octanol/water	:	log Pow: 0,99 (23 °C) pH: 6,34 Method: OECD Test Guideline 107

1,2-diaminocyclohexane:

Partition coefficient: n-octanol/water	:	log Pow: < -0,9 (20 °C) pH: 7 Method: OECD Test Guideline 107 GLP: yes

metaxylenediamine:

Bioaccumulation	:	Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF): < 0,3 Remarks: Does not bioaccumulate.
Partition coefficient: n-octanol/water	:	log Pow: 0,18 (25 °C) pH: 10,3 - 10,4 Method: OECD Test Guideline 107

1-Methylimidazole:

Partition coefficient: n-octanol/water	:	log Pow: -0,19 (25 °C) pH: 9,25 - 9,85 Method: OECD Test Guideline 107

P-toluenesulphonic acid:

Partition coefficient: n-octanol/water	:	log Pow: 0,41 (25 °C) Method: Partition coefficient

12.4 Mobility in soil

Components:

diethyltoluenediamine:

Distribution among environmental compartments	:	Koc: 132 - 170
	:	Koc: 31,72 - 551

isophorone diamine:

Distribution among environmental compartments	:	Koc: 928

1-Methylimidazole**:**

Distribution among environmental compartments	:	Koc: 27 Method: Calculation method

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. Very toxic 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.
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. (ISOPHORONE DIAMINE, DIETHYLTOLUENEDIAMINE)
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. (ISOPHORONE DIAMINE, DIETHYLTOLUENEDIAMINE)
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	:	yes

ADR

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (ISOPHORONE DIAMINE, DIETHYLTOLUENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	8
14.5 Environmental hazards		
Environmentally hazardous	:	yes

RID

14.1 UN number	:	UN 2735
14.2 UN proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (ISOPHORONE DIAMINE, DIETHYLTOLUENEDIAMINE)
14.3 Transport hazard class(es)	:	8
14.4 Packing group	:	II
Labels	:	8
14.5 Environmental hazards		
Environmentally hazardous	:	yes

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) : 4,4'-isopropylidenediphenol

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	:	Not in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
ENCS	:	Low volume exemption
KECI	:	On the inventory, or in compliance with the inventory
PICCS	:	Not in compliance with the inventory
IECSC	:	On the inventory, or in compliance with the inventory
TCSI	:	On the inventory, or in compliance with the inventory
TSCA	:	On 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

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.

H332	:	Harmful if inhaled.
H335	:	May cause respiratory irritation.
H360F	:	May damage fertility.
H373	:	May cause damage to organs through prolonged or repeated exposure.
H400	:	Very toxic to aquatic life.
H410	:	Very toxic to aquatic life with long lasting effects.
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 Acute	:	Acute aquatic toxicity
Aquatic Chronic	:	Chronic aquatic toxicity
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
STOT SE	:	Specific target organ toxicity - single exposure

Further information

Classification of the mixture:		**Classification procedure:**
Acute Tox. 4	H302	Calculation method
Acute Tox. 4	H312	Calculation method
Skin Corr. 1A	H314	Calculation method
Eye Dam. 1	H318	Calculation method
Skin Sens. 1	H317	Calculation method
Repr. 1B	H360F	Calculation method
STOT RE 2	H373	Calculation method
Aquatic Acute 1	H400	Calculation method
Aquatic Chronic 1	H410	Calculation method

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