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

1.1 Product identifier
   Trade name : ARALDITE® 2015 RESIN(E)/HARZ

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Use of the Substance/Mixture : Adhesives

1.3 Details of the supplier of the safety data sheet
   Company : Huntsman Advanced Materials (Europe)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)
   Skin irritation, Category 2
   Serious eye damage, Category 1
   Skin sensitisation, Category 1
   Chronic aquatic toxicity, Category 2
   H315: Causes skin irritation.
   H318: Causes serious eye damage.
   H317: May cause an allergic skin reaction.
   H411: 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 : H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements : Prevention:
P261 Avoid breathing mist or vapours.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

Response:
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.
P391 Collect spillage.

Hazardous components which must be listed on the label:
2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol

1,4-bis(2,3-epoxypropoxy)butane

bisphenol A - epoxy resins, number average MW >700 - <1100

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

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Registration number</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane</td>
<td>1675-54-3</td>
<td>216-823-5</td>
<td>603-073-00-2</td>
<td></td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

ARALDITE® 2015 RESIN(E)/HARZ

Version 1.1
Revision Date: 13.06.2018
SDS Number: 400001009041
Date of last issue: 16.02.2017
Date of first issue: 16.02.2017

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according to Regulation (EC) No. 1907/2006

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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:
If skin irritation persists, call a physician.
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
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.

5.2 Special hazards arising from the substance or mixture
Specific hazards during firefighting : Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products : No 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. 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: 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. Keep in properly labelled containers.

Advice on common storage: For incompatible materials please refer to Section 10 of this SDS.
Recommended storage temperature: 2 - 40 °C

Further information on storage stability: Stable under normal conditions.

7.3 Specific end use(s)
Specific use(s): No data available

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>1317-65-3</td>
<td>TWA (inhalable dust)</td>
<td>10 mg/m³</td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

Further information: For the purposes of these limits, respirable dust and inhalable dust are those fractions of airborne dust which will be collected when sampling is undertaken in accordance with the methods described in MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust. The COSHH definition of a substance hazardous to health includes dust of any kind when present at a concentration in air equal to or greater than 10 mg.m⁻³ 8-hour TWA of inhalable dust or 4 mg.m⁻³ 8-hour TWA of respirable dust. This means that any dust will be subject to COSHH if people are exposed above these levels. Some dusts have been assigned specific WELs and exposure to these must comply with the appropriate limit. Most industrial dusts contain particles of a wide range of sizes. The behaviour, deposition and fate of any particular particle after entry into the human respiratory system and the body response that it elicits, depend on the nature and size of the particle. HSE distinguishes two size fractions for limit-setting purposes termed 'inhalable' and 'respirable'. Inhalable dust approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. Respirable dust approximates to the fraction that penetrates to the gas exchange region of the lung. Fuller definitions and explanatory material are given in MDHS14/3. Where dusts contain components that have their own assigned WEL, all the relevant limits should be complied with. Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used.

<table>
<thead>
<tr>
<th>TWA (Respirable dust)</th>
<th>4 mg/m³</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further information</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Substance name</th>
<th>End Use</th>
<th>Exposure routes</th>
<th>Potential health effects</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,2’-[[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane</td>
<td>Workers</td>
<td>Dermal</td>
<td>Systemic effects, Short-term exposure</td>
<td>8.33 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Short-term exposure</td>
<td>12.25 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>8.33 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>12.25 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Systemic effects, Short-term exposure</td>
<td>3.571 mg/kg bw/day</td>
</tr>
</tbody>
</table>
### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

<table>
<thead>
<tr>
<th>Substance name</th>
<th>Environmental Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,2'-(1-methylethylidene)bis(4,1-phenyleneoxy)methylene]bisoxirane</strong></td>
<td>Fresh water</td>
<td>0.006 mg/l</td>
</tr>
<tr>
<td><strong>Remarks:</strong></td>
<td>Assessment Factors</td>
<td></td>
</tr>
<tr>
<td>Marine water</td>
<td>0.0006 mg/l</td>
<td></td>
</tr>
<tr>
<td>Assessment Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>0.018 mg/l</td>
<td></td>
</tr>
<tr>
<td>Assessment Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>0.996 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marine sediment</td>
<td>0.0996 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>0.196 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>10 mg/l</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Poisoning</td>
<td>11 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>bisphenol F-epoxy resin</strong></td>
<td>Fresh water</td>
<td>0.003 mg/l</td>
</tr>
</tbody>
</table>
## Assessment Factors

<table>
<thead>
<tr>
<th>Compound</th>
<th>Environment</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine water</td>
<td>0.0003 mg/l</td>
<td></td>
</tr>
<tr>
<td>Intermittent use/release</td>
<td>0.0254 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>0.294 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Marine sediment</td>
<td>0.0294 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>0.237 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>10 mg/l</td>
<td></td>
</tr>
<tr>
<td>2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane</td>
<td>Fresh water</td>
<td>0.006 mg/l</td>
</tr>
<tr>
<td>Marine water</td>
<td>0.0006 mg/l</td>
<td></td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>0.018 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>0.996 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Marine sediment</td>
<td>0.0996 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>0.196 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>10 mg/l</td>
<td></td>
</tr>
<tr>
<td>Secondary Poisoning</td>
<td>11 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol</td>
<td>Fresh water</td>
<td>0.003 mg/l</td>
</tr>
<tr>
<td>Marine water</td>
<td>0.0003 mg/l</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermittent use/release</td>
<td>0.0254 mg/l</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Assessment Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td></td>
<td>0.294 mg/kg</td>
</tr>
<tr>
<td>Marine sediment</td>
<td></td>
<td>0.0294 mg/kg</td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td>0.237 mg/kg</td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td></td>
<td>10 mg/l</td>
</tr>
</tbody>
</table>

Siloxanes and Silicones, di-Me, reaction products with silica

<table>
<thead>
<tr>
<th></th>
<th>Fresh water sediment</th>
<th>&gt; 100 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td></td>
<td>23 mg/kg</td>
</tr>
</tbody>
</table>

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

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

Material: Nitrile rubber
Break through time: 10 - 480 min

Remarks: The suitability for a specific workplace should be discussed with the producers of the protective gloves. 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: Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
Filter type: Combined particulates and organic vapour type (A-P)

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance: paste

Colour: beige

Odour: slight

Odour Threshold: No data is available on the product itself.

pH: ca. 6 - 7 (25 °C)

Concentration: 500 g/l

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: > 150 °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 / 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: < 0.002 hPa (20 °C)

Relative vapour density: No data is available on the product itself.

Relative density: No data is available on the product itself.

Density: 1.4 g/cm³ (25 °C)

Solubility(ies)

Water solubility: practically insoluble (20 °C)

Solubility in other solvents: No data is available on the product itself.
9.2 Other information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

Hazardous reactions : No hazards to be specially mentioned.

10.4 Conditions to avoid

Conditions to avoid : None known.

10.5 Incompatible materials

Materials to avoid : None known.

10.6 Hazardous decomposition products

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

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

Skin corrosion/irritation

Components:
2,2’-(1-methylene)diethylenebis(1,4-phenyleneoxymethylene)bisoxirane:
Species: Rabbit
Assessment: Mild skin irritant
Method: OECD Test Guideline 404
Result: Irritating to skin.

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Irritating to skin.

1,4-bis(2,3-epoxypropoxy)butane:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

bisphenol A - epoxy resins, number average MW >700 - <1100:
Method: OECD Test Guideline 404
Result: Skin irritation

Hydroquinone:
Species: Rabbit
Assessment: No skin irritation
Result: No skin irritation

Serious eye damage/eye irritation

Components:
2,2’-(1-methylene)diethylenebis(1,4-phenyleneoxymethylene)bisoxirane:
Species: Rabbit
Assessment: Mild eye irritant
Method: OECD Test Guideline 405
Result: Irritating to eyes.

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Species: Rabbit
Method: OECD Test Guideline 405
Result: No eye irritation

1,4-bis(2,3-epoxypropoxy)butane:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Risk of serious damage to eyes.

bisphenol A - epoxy resins, number average MW >700 - <1100:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Eye irritation

2-[[3-Hydroxy-2,2-bis[(1-oxoallyl)oxy]methyl]propoxy]methyl]-2-[[1-oxoallyl]oxy]methyl]-1,3-propanediyl diacrylate:
Result: Eye irritation

Hydroquinone:
Assessment: Risk of serious damage to eyes.
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation

Components:
2,2'-[(1-methylethyldiene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Exposure routes: Skin
Species: Mouse
Assessment: May cause sensitisation by skin contact.
Method: OECD Test Guideline 429
Result: Causes sensitisation.

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Exposure routes: Skin
Species: Mouse
Method: OECD Test Guideline 429
Result: May cause sensitisation by skin contact.

1,4-bis(2,3-epoxypropoxy)butane:
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

bisphenol A - epoxy resins, number average MW >700 - <1100:
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.

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

Assessment: No data available
Germ cell mutagenicity

**Components:**

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Genotoxicity in vitro
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 476
  - Result: positive
  - Concentration: 0 - 5000 ug/plate
    - Metabolic activation: with and without metabolic activation
    - Method: OECD Test Guideline 471
    - Result: positive

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Genotoxicity in vitro
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 471
  - Result: positive
  - Metabolic activation: with and without metabolic activation
    - Method: OECD Test Guideline 473
    - Result: positive
  - Metabolic activation: with and without metabolic activation
    - Method: OECD Test Guideline 476
    - Result: positive

1,4-bis(2,3-epoxypropoxy)butane:
Genotoxicity in vitro
  - Concentration: 10 - 5000 ug/plate
    - Metabolic activation: with and without metabolic activation
      - Method: OECD Test Guideline 471
      - Result: positive
      - Remarks: Not classified due to data which are conclusive although insufficient for classification.

  - Concentration: 1 - 100 µg/L
    - Metabolic activation: with and without metabolic activation
      - Method: OECD Test Guideline 473
      - Result: positive
      - Remarks: Not classified due to data which are conclusive although insufficient for classification.

bisphenol A - epoxy resins, number average MW >700 - <1100:
Genotoxicity in vitro
  - Metabolic activation: with and without metabolic activation
      - Method: OECD Test Guideline 476
      - Result: Positive results were obtained in some in vitro tests.
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
GLP: yes

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Components:
2,2’-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Cell type: Germ
Application Route: Oral
Method: OECD Test Guideline 478
Result: negative

Cell type: Somatic
Application Route: Oral
Dose: 0 - 5000 mg/kg
Method: OPPTS 870.5395
Result: negative

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Cell type: Somatic
Application Route: Oral
Exposure time: 48 h
Dose: 2000 mg/kg
Method: OECD Test Guideline 474
Result: negative

Cell type: Somatic
Application Route: Oral
Dose: 2000 mg/kg
Method: OECD Test Guideline 486
Result: negative

1,4-bis(2,3-epoxypropoxy)butane:
Genotoxicity in vivo
Test Type: In vivo micronucleus test
Test species: Mouse
Cell type: Somatic
Application Route: Oral
Exposure time: 4 d
Dose: 187.5 - 750 mg/kg
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Test species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

bisphenol A - epoxy resins, number average MW >700 - <1100:
Genotoxicity in vivo
Cell type: Germ
Application Route: Oral
Method: OECD Test Guideline 478
Result: negative

Cell type: Somatic
Application Route: Oral
Dose: 0 - 5000 mg/kg
Method: OPPTS 870.5395
Result: negative

Hydroquinone:
Genotoxicity in vivo
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 483
Result: positive

Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: positive
Application Route: Oral  
Exposure time: 10 Weeks  
Method: OECD Test Guideline 478  
Result: negative

**Components:**

1,4-bis(2,3-epoxypropoxy)butane:  
Germ cell mutagenicity-Assessment: Weight of evidence does not support classification as a germ cell mutagen.

Hydroquinone:  
Germ cell mutagenicity-Assessment: In vitro tests showed mutagenic effects  
Germ cell mutagenicity-Assessment: No data available

**Carcinogenicity**

**Components:**

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:  
Species: Rat, male and female  
Application Route: Oral  
Exposure time: 24 month(s)  
Dose: 15 mg/kg  
Frequency of Treatment: 7 days/week  
Method: OECD Test Guideline 453  
Result: negative

Species: Mouse, male  
Application Route: Dermal  
Exposure time: 24 month(s)  
Dose: 0.1 mg/kg  
Frequency of Treatment: 3 days/week  
Method: OECD Test Guideline 453  
Result: negative

Species: Rat, female  
Application Route: Dermal  
Exposure time: 24 month(s)  
Dose: 1 mg/kg  
Frequency of Treatment: 5 days/week  
Method: OECD Test Guideline 453  
Result: negative

bisphenol A - epoxy resins, number average MW >700 - <1100:  
Species: Rat, male and female  
Application Route: Oral  
Exposure time: 24 month(s)
Dose: 15 mg/kg
Frequency of Treatment: 7 daily
Method: OECD Test Guideline 453
Result: negative

Hydroquinone:
Species: Rat
Application Route: Oral
Exposure time: 103 weeks
Frequency of Treatment: 5 daily
Method: OECD Test Guideline 453
Result: positive

Species: Mouse
Application Route: Oral
Exposure time: 103 weeks
Frequency of Treatment: 5 daily
Method: OECD Test Guideline 453
Result: positive

Components:
Hydroquinone:
Carcinogenicity - Assessment: Limited evidence of carcinogenicity in animal studies

Reproductive toxicity
Components:
2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Effects on fertility: Test Type: Two-generation study
Species: Rat, male and female
Application Route: Oral
Dose: >750 milligram per kilogram
General Toxicity - Parent: No-observed-effect level: 540 mg/kg body weight
General Toxicity F1: No-observed-effect level: 540 mg/kg body weight
Symptoms: No adverse effects
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

bisphenol A - epoxy resins, number average MW >700 - <1100:
Species: Rat, male and female
Application Route: Oral
General Toxicity - Parent: No-observed-effect level: 750
mg/kg body weight
General Toxicity F1: No-observed-effect level: 750 mg/kg body weight
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

Hydroquinone:
Species: Rat
Application Route: Oral
Method: EPA OTS 798.4100

Components:
2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Effects on foetal development:
Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level:
30 mg/kg body weight
Method: Other guidelines
Result: No teratogenic effects

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

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

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level:
30 mg/kg body weight
Result: No teratogenic effects

bisphenol A - epoxy resins, number average MW >700 - <1100:
Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level:
30 mg/kg body weight
Method: Other guidelines
Result: No teratogenic effects

Species: Rabbit, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level:
ARALDITE® 2015 RESIN(E)/HARZ

60 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

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

Hydroquinone:

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

Species: Rabbit
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level:
25 mg/kg body weight
Method: EPA OTS 798.4900
Result: No teratogenic effects

Reproductive toxicity - Assessment: No data available

STOT - single exposure
No data available

STOT - repeated exposure
No data available

Repeated dose toxicity

Components:

2,2’-[(1-methylthylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 14 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
NOEL: 10 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity

Species: Mouse, male
NOAEL: 100 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 3 d
Method: Subchronic toxicity

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Species: Rat, male and female
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 13 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

1,4-bis(2,3-epoxypropoxy)butane:
Species: Rat, male and female
NOAEL: 200 mg/kg
Application Route: Ingestion
Exposure time: 28 d
Number of exposures: 7 d
Method: Subacute toxicity

bisphenol A - epoxy resins, number average MW >700 - <1100:
Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 14 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
NOEL: 10 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity

Hydroquinone:
Species: Mouse
LOAEL: 100
Application Route: Ingestion
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity

Species: Rat
LOAEL: 100
Application Route: Ingestion
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity

Species: Rat
NOAEL: 109.6
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity

Repeated dose toxicity - : No data available
Assessment
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:
2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:

Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 1.5 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)): 2.7 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to algae</td>
<td>EC50 (Selenastrum capricornutum (green algae)): 9.4 mg/l</td>
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<tr>
<td></td>
<td>Test Type: static test</td>
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<tr>
<td></td>
<td>Test substance: Fresh water</td>
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<tr>
<td></td>
<td>Method: EPA-660/3-75-009</td>
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<tr>
<td>Toxicity to microorganisms</td>
<td>IC50 (activated sludge): &gt; 100 mg/l</td>
</tr>
<tr>
<td></td>
<td>Test Type: static test</td>
</tr>
<tr>
<td></td>
<td>Test substance: Fresh water</td>
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<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td></td>
</tr>
<tr>
<td>(Chronic toxicity)</td>
<td>NOEC: 0.3 mg/l</td>
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<td></td>
<td>Exposure time: 21 d</td>
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<td></td>
<td>Species: Daphnia magna (Water flea)</td>
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<tr>
<td></td>
<td>Test Type: semi-static test</td>
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<tr>
<td></td>
<td>Test substance: Fresh water</td>
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<tr>
<td></td>
<td>Method: OECD Test Guideline 211</td>
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<tr>
<td>Formaldehyde, oligomeric reaction products  with 1-chloro-2,3-epoxypropane and phenol:</td>
<td></td>
</tr>
<tr>
<td>Toxicity to fish</td>
<td>LC50 (Fish): 2.54 mg/l</td>
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<td></td>
<td>Exposure time: 96 h</td>
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<tr>
<td></td>
<td>Method: Calculation method</td>
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<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
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</tr>
<tr>
<td>(Chronic toxicity)</td>
<td>EC50 (Daphnia magna (Water flea)): 2.55 mg/l</td>
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<td>Exposure time: 48 h</td>
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<tr>
<td></td>
<td>Method: Calculation method</td>
</tr>
<tr>
<td>Toxicity to algae</td>
<td>EC50 (Selenastrum capricornutum (green algae)): 1.8 mg/l</td>
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<td>Method: OECD Test Guideline 201</td>
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<td>M-Factor (Acute aquatic toxicity)</td>
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<tr>
<td>Toxicity to microorganisms</td>
<td>IC50 (activated sludge): &gt; 100 mg/l</td>
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<td>Test Type: static test</td>
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<tr>
<td></td>
<td>Test substance: Fresh water</td>
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<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td></td>
</tr>
<tr>
<td>(Chronic toxicity)</td>
<td>NOEC: 0.3 mg/l</td>
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<tr>
<td></td>
<td>Exposure time: 21 d</td>
</tr>
<tr>
<td></td>
<td>Species: Daphnia magna (Water flea)</td>
</tr>
<tr>
<td></td>
<td>Test Type: semi-static test</td>
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<tr>
<td></td>
<td>Test substance: Fresh water</td>
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<tr>
<td></td>
<td>Method: OECD Test Guideline 211</td>
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<tr>
<td>Remarks: Information given is based on data obtained from similar substances.</td>
<td></td>
</tr>
<tr>
<td>1,4-bis(2,3-epoxypropoxy)butane:</td>
<td>LC50 (Brachydanio rerio (zebrafish)): 24 mg/l</td>
</tr>
</tbody>
</table>
Toxicity to daphnia and other aquatic invertebrates:

- EC50 (Daphnia magna (Water flea)): 75 mg/l
- Exposure time: 24 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 203

Toxicity to algae:

- EL50: > 160 mg/l
- Exposure time: 72 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 202

Toxicity to microorganisms:

- IC50 (activated sludge): > 100 mg/l
- Exposure time: 3 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 209

Toxicity to fish:

- LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
- Exposure time: 96 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 203
  - GLP: no

Hydroquinone:

- LC50 (Oncorhynchus mykiss (rainbow trout)): 0.638 mg/l
- Exposure time: 96 h
- Test Type: flow-through test
- Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates:

- EC50 (Daphnia magna (Water flea)): 0.134 mg/l
- Exposure time: 48 h
- Test Type: semi-static test

Toxicity to algae:

- EgC50 (Selenastrum capricornutum (green algae)): > 100 mg/l
- Exposure time: 72 h
- Method: OECD Test Guideline 201
  - GLP: no

bisphenol A - epoxy resins, number average MW >700 - <1100:

Toxicity to fish:

- LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
- Exposure time: 96 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 203
  - GLP: no
Method: OECD Test Guideline 202
GLP: yes

Toxicity to algae: ErC50 (Selenastrum capricornutum (green algae)): 0.33 mg/l
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201
GLP: yes

M-Factor (Acute aquatic toxicity): 10

Toxicity to microorganisms: IC50 (activated sludge): 71 mg/l
Exposure time: 2 h
GLP:

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC: 0.0057 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Method: OECD Test Guideline 211
GLP: yes

12.2 Persistence and degradability

Components:
2,2’-[(1-methylene)dibis(4,1-phenyleneoxymethylene)]bisoxirane:
Biodegradability: Inoculum: Sewage (STP effluent)
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Stability in water: Degradation half life (DT50): 4.83 d (25 °C)
pH: 4
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 7.1 d (25 °C)
pH: 9
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life (DT50): 3.58 d (25 °C)
pH: 7
Method: OECD Test Guideline 111
Remarks: Fresh water

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Biodegradability: Inoculum: activated sludge
Concentration: 3 mg/l
Result: Not biodegradable
Biodegradation: ca. 0 %
Exposure time: 28 d

1,4-bis(2,3-epoxypropoxy)butane:

**Biodegradability**

- Inoculum: activated sludge
- Concentration: 20 mg/l
- Result: Not readily biodegradable.
- Biodegradation: 43 %
- Exposure time: 28 d
- Method: OECD Test Guideline 301F

**Stability in water**

- Degradation half life (DT50): 4.83 d (25 °C)
- pH: 4
- Method: OECD Test Guideline 111
- Remarks: Fresh water

- Degradation half life (DT50): 7.1 d (25 °C)
- pH: 9
- Method: OECD Test Guideline 111
- Remarks: Fresh water

- Degradation half life (DT50): 3.58 d (25 °C)
- pH: 7
- Method: OECD Test Guideline 111
- Remarks: Fresh water

**Hydroquinone**

**Biodegradability**

- Test Type: aerobic
- Inoculum: activated sludge
- Concentration: 100 mg/l
- Result: Readily biodegradable.
- Biodegradation: 70 %
- Exposure time: 14 d
- Method: OECD Test Guideline 301C

### 12.3 Bioaccumulative potential

**Components:**

- 2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
  - **Bioaccumulation**: Bioconcentration factor (BCF): 31
  - Remarks: Does not bioaccumulate.

- Partition coefficient: n-
  - log Pow: 3.242 (25 °C)
octanol/water  pH: 7.1  
Method: OECD Test Guideline 117

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Bioaccumulation  :  Species: Fish  
Bioconcentration factor (BCF): 150  
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water  :  log Pow: 2.7 - 3.6  
Method: OECD Test Guideline 117

1,4-bis(2,3-epoxypropoxy)butane:
Partition coefficient: n-octanol/water  :  log Pow: -0.269 (25 °C)  
pH: 6.7  
Method: OECD Test Guideline 117

bisphenol A - epoxy resins, number average MW >700 - <1100:
Bioaccumulation  :  Species: Fish  
Bioconcentration factor (BCF): 31  
Remarks: Does not bioaccumulate.

Hydroquinone:
Bioaccumulation  :  Bioconcentration factor (BCF): 3.16

Partition coefficient: n-octanol/water  :  log Pow: 0.59

12.4 Mobility in soil

Components:
2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Distribution among environmental compartments  :  Koc: 445

Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Distribution among environmental compartments  :  Koc: 4460  
Method: OECD Test Guideline 121

1,4-bis(2,3-epoxypropoxy)butane:
Distribution among environmental compartments  :  Koc: 12.59  
Method: OECD Test Guideline 121

bisphenol A - epoxy resins, number average MW >700 - <1100:
Distribution among environmental compartments  :  Koc: 445

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 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 3082
14.2 UN proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)
14.3 Transport hazard class(es): 9
14.4 Packing group: III
Labels: Miscellaneous
Packing instruction (cargo aircraft): 964
Packing instruction (passenger aircraft): 964

IATA (Passenger)
Environmentally hazardous: yes

IATA (Cargo)
Environmentally hazardous: yes

IMDG
14.1 UN number: UN 3082
14.2 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)

14.3 Transport hazard class(es): 9

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

14.5 Environmental hazards:
Marine pollutant: yes

ADR
14.1 UN number: UN 3082
14.2 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)

14.3 Transport hazard class(es): 9
14.4 Packing group: III
Labels: 9

14.5 Environmental hazards:
Environmentally hazardous: yes

RID
14.1 UN number: UN 3082
14.2 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, BISPHENOL F EPOXY RESIN)

14.3 Transport hazard class(es): 9
14.4 Packing group: III
Labels: 9

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): 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
 SAFETY DATA SHEET  
 according to Regulation (EC) No. 1907/2006  

ARALDITE® 2015 RESIN(E)/HARZ  

Version 1  Revision Date: 13.06.2018  
SDS Number: 400001009041  Date of last issue: 16.02.2017  
Date of first issue: 16.02.2017  

REACH - List of substances subject to authorisation - Not applicable  
Future sunset date  

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

The components of this product are reported in the following inventories:  

DSL : This product contains one or several components listed in the Canadian NDSL.  

AICS : 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 : 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.  

H312 : Harmful in contact with skin.  

H315 : Causes skin irritation.  

H317 : May cause an allergic skin reaction.  

H318 : Causes serious eye damage.
### SAFETY DATA SHEET

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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**ARALDITE® 2015 RESIN(E)/HARZ**

<table>
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<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Date of last issue:</th>
<th>Date of first issue:</th>
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<td>13.06.2018</td>
<td>400001009041</td>
<td>16.02.2017</td>
<td>16.02.2017</td>
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</tbody>
</table>

---

H319: Causes serious eye irritation.
H332: Harmful if inhaled.
H341: Suspected of causing genetic defects.
H351: Suspected of causing cancer.
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
- **Carc.** : Carcinogenicity
- **Eye Dam.** : Serious eye damage
- **Eye Irrit.** : Eye irritation
- **Muta.** : Germ cell mutagenicity
- **Skin Irrit.** : Skin irritation
- **Skin Sens.** : Skin sensitisation
- **GB EH40** : UK. EH40 WEL - Workplace Exposure Limits
- **GB EH40 / TWA** : Long-term exposure limit (8-hour TWA reference period)

**Further information**

**Classification of the mixture:**

- **Skin Irrit. 2** H315 Calculation method
- **Eye Dam. 1** H318 Calculation method
- **Skin Sens. 1** H317 Calculation method
- **Aquatic Chronic 2** H411 Calculation method

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

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

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

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

1.1 Product identifier
   Trade name : ARALDITE® 2015 HARDENER

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Use of the Substance/Mixture : Adhesives

1.3 Details of the supplier of the safety data sheet
   Company : Huntsman Advanced Materials (Europe)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 : H332: Harmful if inhaled.
   Skin corrosion, 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.
   Reproductive toxicity, Category 1B : H360F: May damage fertility.
   Specific target organ toxicity - repeated : H373: May cause damage to organs through
exposure, Category 2, Respiratory Tract prolonged or repeated exposure if inhaled.

Chronic aquatic toxicity, 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: Danger

Hazard statements:

H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H332 Harmful if inhaled.
H360F May damage fertility.
H373 May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.
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.
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:

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

Diethylenetriamine

Aminoethylpiperazine

4,4'-isopropylidenediphenol
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

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Registration number</th>
<th>Classification</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Propenenitrile, polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[(2-(1-piperazinyl)ethyl]amino]butyl-terminated</td>
<td>68683-29-4 Polymer</td>
<td>68683-29-4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317</td>
<td>13 - 30</td>
</tr>
<tr>
<td>Naphthalene, bis(1-methylethyl)-</td>
<td>38640-62-9 254-052-6 01-2119565150-48</td>
<td>38640-62-9</td>
<td>254-052-6</td>
<td>01-2119565150-48</td>
<td>-</td>
<td>Asp. Tox. 1; H304 Aquatic Acute 1; H400 Aquatic Chronic 1; H410</td>
<td>2.5 - &lt; 10</td>
</tr>
<tr>
<td>Fatty acids, C18-unsatd., dimers, oligomeric reaction products with tall-oil fatty acids and triethylenetetramine</td>
<td>68082-29-1 500-191-5 01-2119972320-44</td>
<td>68082-29-1</td>
<td>500-191-5</td>
<td>01-2119972320-44</td>
<td>-</td>
<td>Skin Irrit. 2; H315 Eye Dam. 1; H318 Skin Sens. 1; H317 Aquatic Chronic 2; H411</td>
<td>3 - 10</td>
</tr>
<tr>
<td>2,2'-Iminodi(ethylamine)</td>
<td>111-40-0 203-865-4 612-058-00-X 01-2119473793-27</td>
<td>111-40-0</td>
<td>203-865-4</td>
<td>612-058-00-X</td>
<td>01-2119473793-27</td>
<td>Acute Tox. 4; H302 Acute Tox. 2; H330 Acute Tox. 4; H312 Skin Corr. 1B; H314 Eye Dam. 1; H318 Skin Sens. 1; H317 STOT SE 3; H335</td>
<td>3 - 10</td>
</tr>
<tr>
<td>2-Piperazin-1-ylethylamine</td>
<td>140-31-8 205-411-0 612-105-00-4 01-2119471486-30</td>
<td>140-31-8</td>
<td>205-411-0</td>
<td>612-105-00-4</td>
<td>01-2119471486-30</td>
<td>Acute Tox. 4; H302 Acute Tox. 3; H311 Skin Corr. 1B; H314 Skin Sens. 1; H317 Rep. 2; H361d STOT RE 1; H372 Aquatic Chronic 3; H412</td>
<td>1 - &lt; 3</td>
</tr>
<tr>
<td>2,4,6-Tris(dimethylaminomethyl)phenol</td>
<td>90-72-2 202-013-9 603-069-00-0 01-2119560597-27</td>
<td>90-72-2</td>
<td>202-013-9</td>
<td>603-069-00-0</td>
<td>01-2119560597-27</td>
<td>Skin Corr. 1C; H314 Eye Dam. 1; H318 Skin Sens. 1B; H317</td>
<td>1 - &lt; 3</td>
</tr>
<tr>
<td>4,4'-Isopropylidenediphenol</td>
<td>80-05-7 201-245-8 604-030-00-0 01-2119457856-23</td>
<td>80-05-7</td>
<td>201-245-8</td>
<td>604-030-00-0</td>
<td>01-2119457856-23</td>
<td>Eye Dam. 1; H318 Skin Sens. 1; H317 Rep. 1B; H360F STOT SE 3; H335 Aquatic Chronic 2;</td>
<td>0,1 - &lt; 1</td>
</tr>
</tbody>
</table>
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 : Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.

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

Treatment: No information available.

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: 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. Ensure adequate ventilation.

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,
6.4 Reference to other sections
None

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling:
Avoid formation of aerosol.
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.
Provide sufficient air exchange and/or exhaust in work rooms.
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.

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

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylenetriamine</td>
<td>111-40-0</td>
<td>TWA</td>
<td>1 ppm 4.3 mg/m³</td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.
Further information: Can be absorbed through skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity.

Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used.

<table>
<thead>
<tr>
<th>Substance name</th>
<th>End Use</th>
<th>Exposure routes</th>
<th>Potential health effects</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene, bis(1-methylethyl)-</td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>30 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>4,3 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>7,4 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>2,1 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Systemic effects, Long-term exposure</td>
<td>2,1 mg/kg bw/day</td>
</tr>
<tr>
<td>Dimer fatty acid (c18) polyamidoamine resin</td>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>3,9 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>1,1 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>0,97 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>0,56 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Long-term systemic effects</td>
<td>0,56 mg/kg</td>
</tr>
<tr>
<td>Diethylenetriamine</td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Short-term exposure</td>
<td>92,1 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Local effects, Short-term exposure</td>
<td>2,6 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>11,4 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>15,4 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Local effects, Long-term exposure</td>
<td>1,1 mg/cm²</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Local effects, Long-term exposure</td>
<td>0,87 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Local effects, Short-term exposure</td>
<td>4,88 mg/kg</td>
</tr>
</tbody>
</table>
### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

<table>
<thead>
<tr>
<th>Substance name</th>
<th>Environmental Compartment</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>naphthalene, bis(1-methylethyl)-</td>
<td>Fresh water</td>
<td>0.26 µg/l</td>
</tr>
</tbody>
</table>

**Remarks:**

<table>
<thead>
<tr>
<th>Assessment Factors</th>
<th></th>
</tr>
</thead>
</table>
### Marine water
- **Assessment Factors:**
  - **Sewage treatment plant:** 0.15 mg/l
  - **Fresh water sediment:** 0.94 mg/kg
  - **Equilibrium method:**
    - **Marine sediment:** 0.094 mg/kg
    - **Soil:** 0.1872 mg/kg
    - **Secondary Poisoning:** 25 mg/kg

### Dimer fatty acid (c18)
- **polyamidoamine resin**
  - **Fresh water:** 0.00434 mg/l
  - **Assessment Factors:**
    - **Marine water:** 0.00043 mg/l
    - **Freshwater - intermittent:** 0.0434 mg/l
    - **Sewage treatment plant:** 3.84 mg/l
    - **Fresh water sediment:** 434,02 mg/kg
    - **Equilibrium method:**
      - **Marine sediment:** 43.4 mg/kg
      - **Soil:** 86.78 mg/kg

### Diethylenetriamine
  - **Fresh water:** 0.56 mg/l
  - **Assessment Factors:**
    - **Marine water:** 0.056 mg/l
    - **Fresh water sediment:** 1072 mg/kg
    - **Equilibrium method:**
      - **Marine sediment:** 107.2 mg/kg
<table>
<thead>
<tr>
<th>Substance</th>
<th>Environment</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminoethylpiperazine</td>
<td>Fresh water</td>
<td>0.058 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>0.0058 mg/l</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>0.58 mg/l</td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>Fresh water sediment</td>
<td>215 mg/kg</td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>Fresh water</td>
<td>0.084 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>0.0084 mg/l</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>0.84 mg/l</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plant</td>
<td>0.2 mg/l</td>
</tr>
<tr>
<td>2,4,6-tris(dimethylaminomethyl)phenol</td>
<td>Fresh water</td>
<td>0.084 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>0.0084 mg/l</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>0.84 mg/l</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plant</td>
<td>0.2 mg/l</td>
</tr>
<tr>
<td>triethylenetetramine</td>
<td>Fresh water</td>
<td>190 µg/l</td>
</tr>
<tr>
<td></td>
<td>Fresh water sediment</td>
<td>95.9 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>38 µg/l</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>200 µg/l</td>
</tr>
</tbody>
</table>
### 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: 10 - 480 min

**Remarks**
- The suitability for a specific workplace should be discussed with the producers of the protective gloves. 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**
- 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**
- paste
Colour : light cream
Odour : amine-like
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 : < 0,49 hPa (20 °C)
Relative vapour density : No data is available on the product itself.
Relative density : No data is available on the product itself.
Density : 1,4 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 : thixotropic
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
Materials to avoid : No data available

10.6 Hazardous decomposition products
Burning produces noxious and toxic fumes.
Carbon oxides
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

11.1 Information on toxicological effects

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

Acute inhalation toxicity - Product : Acute toxicity estimate : 3,12 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: Calculation method

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:
2-propenitrile 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.

naphthalene, bis(1-methylethyl)-:
Species: Rabbit
Exposure time: 4 h
Assessment: No skin irritation
Method: OECD Test Guideline 404
Result: Normally reversible injuries
GLP: yes

Dimer fatty acid (c18) polyamidoamine resin:
Species: human skin
Method: OECD Test Guideline 431
Result: Non-corrosive

Species: human skin
Exposure time: 1 h
Assessment: Irritating to skin.
Method: OECD Test Guideline 439
Result: irritating

Diethylenetriamine:
Species: Rabbit
Assessment: Causes burns.
Result: Causes burns.

Aminoethylpiperazine:
Species: Rabbit
Result: Causes burns.

2,4,6-tris(dimethylaminomethyl)phenol:
Species: Rabbit
Assessment: Corrosive
Method: OECD Test Guideline 404
Result: Corrosive

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

Triethylenetetramine:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Corrosive after 3 minutes to 1 hour of exposure

3-aminopropyltriethoxysilane:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Causes burns.

**Serious eye damage/eye irritation**

**Components:**

2-propenenitrile polymer with 1,3-butadiene, 1-cyano-1-methyl-4-oxo-4-[[2-(1-piperaziny1)ethyl]amino]butyl-terminated:
Species: Rabbit
Assessment: Mild eye irritant
Result: slight irritation

Naphthalene, bis(1-methylethyl)-:
Species: Rabbit
Assessment: No eye irritation
Method: OECD Test Guideline 405
Result: No eye irritation
GLP: yes

Dimer fatty acid (c18) polyamidoamine resin:
Species: Rabbit
Assessment: Risk of serious damage to eyes.
Method: OECD Test Guideline 405
Result: Severe eye irritation

Diethylenetriamine:
Species: Rabbit
Assessment: Corrosive
Result: Corrosive

Aminoethylpiperazine:
Species: Rabbit
Result: Risk of serious damage to eyes.

2,4,6-tris(dimethylaminomethyl)phenol:
Species: Rabbit
Assessment: Corrosive
Result: Corrosive

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

Triethylenetetramine:
Species: Rabbit
Assessment: Corrosive
Method: OECD Test Guideline 404
Result: Corrosive

3-aminopropytriethoxysilane:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Risk of serious damage to eyes.

**Respiratory or skin sensitisation**

**Components:**

- 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.

- Naphthalene, bis(1-methylethyl)-:
  - Test Type: Maximisation Test
  - Exposure routes: Skin
  - Species: Guinea pig
  - Method: OECD Test Guideline 406
  - Result: Does not cause skin sensitisation.

- Dimer fatty acid (c18) polyamidoamine resin:
  - Test Type: LLNA (Local Lymph Node Assay)
  - Exposure routes: Skin contact
  - Species: Mouse
  - Assessment: May cause sensitisation by skin contact.
  - Method: OECD Test Guideline 429
  - Result: May cause sensitisation by skin contact.

- Diethylenetriamine:
  - Exposure routes: Skin
  - Species: Mouse
  - Method: OECD Test Guideline 429
  - Result: May cause sensitisation by skin contact.
  - Remarks: Causes sensitisation.

- Exposure routes: Respiratory Tract
  - Species: Mouse
  - Result: Does not cause respiratory sensitisation.

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

- 2,4,6-tris(dimethylaminomethyl)phenol:
  - Exposure routes: Skin
  - Species: Guinea pig
  - Method: OECD Test Guideline 406
  - Result: negative

- Assessment: The product is a skin sensitiser, sub-category 1B.
  - Result: The product is a skin sensitiser, sub-category 1B.

- 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.

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

3-aminopropyltriethoxysilane:
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: The product is a skin sensitiser, sub-category 1B.

**Components:**
naphthalene, bis(1-methylethyl) -:
Assessment: May be harmful if swallowed or if inhaled.
Does not cause skin sensitisation.

Dimer fatty acid (c18) polyamidoamine resin:
Assessment: May cause an allergic skin reaction.

**Germ cell mutagenicity**

**Components:**
naphthalene, bis(1-methylethyl) -:
Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Test species: Chinese hamster ovary cells
Concentration: 9.5 - 60 µg/L
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

: Test Type: Ames test
Test species: Salmonella typhimurium
Concentration: 92 mg/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Test species: mouse lymphoma cells
Concentration: 40 - 60 mg/ml
Dimer fatty acid (c18) polyamidoamine resin:
Genotoxicity in vitro
- 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

- Test Type: Micronucleus test
  Test species: Human lymphocytes
  Metabolic activation: with and without metabolic activation
  Method: OECD Test Guideline 487
  Result: negative

Aminoethylpipеразине:
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

2,4,6-tris(dimethylaminomethyl)phenol:
Genotoxicity in vitro
- Concentration: 5000 ug/plate
  Metabolic activation: with and without metabolic activation
  Method: OECD Test Guideline 471
  Result: negative

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

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

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

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

3-aminopropyltriethoxysilane:
Genotoxicity in vitro
: Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

**Components:**

naphthalene, bis(1-methylethyl)-:
Genotoxicity in vivo
: Test Type: Micronucleus test
Test species: Mouse (male and female)
Application Route: Intraperitoneal injection
Dose: 1.92 g/kg
Method: OECD Test Guideline 474
Result: negative

Diethylenetriamine:
Genotoxicity in vivo
: Cell type: Somatic
Application Route: Oral
Dose: 85 - 850 mg/kg
Method: OECD Test Guideline 474
Result: negative

Aminoethylpiperazine:
Genotoxicity in vivo
: Application Route: Intraperitoneal injection
Dose: 175 - 560 mg/kg
Method: OECD Test Guideline 474
Result: negative
4,4’-isopropylidenediphenol:
Genotoxicity in vivo : Method: OECD Test Guideline 474
Result: negative

Triethylenetetramine:
Genotoxicity in vivo : Application Route: Intraperitoneal injection
Dose: 0 - 600 mg/kg
Method: OECD Test Guideline 474
Result: negative

3-aminopropyltriethoxysilane:
Genotoxicity in vivo : Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative

Components:
naphthalene, bis(1-methylethyl):
Germ cell mutagenicity- Assessment : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Dimer fatty acid (c18) polyamidoamine resin:
Germ cell mutagenicity- Assessment : In vitro tests did not show mutagenic effects

Germ cell mutagenicity- Assessment : No data available

Carcinogenicity
Components:
Diethylenetriamine:
Species: Mouse, (male)
Application Route: Dermal
Dose: 56.3 mg/kg
Frequency of Treatment: 3 daily
Result: negative

4,4’-isopropylidenediphenol:
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 103 weeks
Frequency of Treatment: 7 daily
Result: negative

Triethylenetetramine:
Species: Mouse, (male)
Application Route: Dermal
Dose: 42 mg/kg
Frequency of Treatment: 3 daily
Method: OECD Test Guideline 451
Result: negative

Carcinogenicity - Assessment: No data available

Reproductive toxicity

Components:
Dimer fatty acid (c18) polyamidoamine resin:
Effects on fertility: Species: Rat, male and female
Application Route: Oral
Dose: 0, 100, 300, 1000 mg/kg bw/d
Frequency of Treatment: 7 days/week
General Toxicity - Parent: No observed adverse effect level: 1000 mg/kg body weight
Method: OECD Test Guideline 422
Result: Animal testing did not show any effects on fertility.

Diethylenetriamine:
Species: Rat, male and female
Application Route: Oral
General Toxicity - Parent: No observed adverse effect level: 30 mg/kg wet weight
Method: OECD Test Guideline 421
Result: positive

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

2,4,6-tris(dimethylaminomethyl)phenol:
Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 422
Remarks: No significant adverse effects were reported

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.

Components:
naphthalene, bis(1-methylethyl):-
Effects on foetal: Species: Rat, female
**Development**

- **Species:** Rat
- **Application Route:** Oral
- **General Toxicity Maternal:** No observed adverse effect level: 100 mg/kg body weight
- **Embryo-foetal toxicity:** No observed adverse effect level: 1000 mg/kg body weight
- **Method:** OECD Test Guideline 414
- **Result:** No teratogenic effects

**Diethylenetriamine:**

- **Species:** Rat
- **Application Route:** Oral
- **General Toxicity Maternal:** Lowest observed adverse effect level: 250 mg/kg body weight
- **Teratogenicity:** No observed adverse effect level: 625 mg/kg body weight
- **Embryo-foetal toxicity:** No observed adverse effect level: 625 mg/kg body weight
- **Result:** No teratogenic effects

**Aminoethylpiperazine:**

- **Test Type:** Embryo-foetal development
- **Species:** Rat, female
- **Application Route:** Oral
- **General Toxicity Maternal:** No observed adverse effect level: 100 mg/kg body weight
- **Embryo-foetal toxicity:** No observed adverse effect level: 1000 mg/kg body weight
- **Method:** OECD Test Guideline 414
- **Result:** No teratogenic effects

- **Test Type:** Fertility/early embryonic development
- **Species:** Rabbit, female
- **Application Route:** Oral
- **General Toxicity Maternal:** No observed adverse effect level: 75 mg/kg body weight
- **Embryo-foetal toxicity:** No observed adverse effect level: 75 mg/kg body weight
- **Method:** OECD Test Guideline 414
- **Result:** Teratogenicity and developmental toxicity

**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

**Triethylenetetramine:**

- **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:**
naphthalene, bis(1-methylethyl)-:  
Reproductive toxicity - Assessment: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

Aminoethylpiperazine:  
Reproductive toxicity - Assessment: Some evidence of adverse effects 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:**
Diethylenetriamine:  
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.

**STOT - repeated exposure**

**Components:**
Aminoethylpiperazine:  
Exposure routes: Inhalation  
Target Organs: Respiratory Tract  
Assessment: Causes damage to organs through prolonged or repeated exposure.

**Repeated dose toxicity**

**Components:**
naphthalene, bis(1-methylethyl)-:  
Species: Rat, male and female  
NOAEL: 170 mg/kg  
Application Route: oral (feed)
Exposure time: 4 320 hNumber of exposures: 7 d
Dose: 170, 340, and 670 mg/kg
Method: Subchronic toxicity
Remarks: No significant adverse effects were reported

Dimer fatty acid (c18) polyamidoamine resin:
Species: Rat, male and female
NOAEL: 1000 mg/kg
NOAEL: 1 000 mg/kg
Application Route: Oral
Exposure time: 14 days Number of exposures: Once daily
Dose: 0, 100, 300, 1000 mg/kg bw/d
Group: yes
Method: OECD Test Guideline 422
Target Organs: Liver

Diethylenetriamine:
Species: Rat, male and female
: 70 - 80
Application Route: Ingestion
Test atmosphere: vapour
Exposure time: 360 hNumber of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
NOAEL: 114
Application Route: Skin contact
Exposure time: 9 600 hNumber of exposures: 6 d
Method: Chronic toxicity

Aminoethylpiperazine:
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 d
Number of exposures: 6h/d, 5d/week
Method: OECD Test Guideline 413

2,4,6-tris(dimethylaminomethyl)phenol:
Species: Rat, male and female
NOEL: 15 mg/kg
Application Route: Ingestion
Exposure time: 1 032 h
Number of exposures: 7 d
Method: Subacute toxicity

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

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

Triethylenetetramine:
Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 26 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

3-aminopropyltriethoxysilane:
Species: Rat, male and female
NOAEL: 200 mg/kg
Application Route: Ingestion
Exposure time: 2 160 h
Method: Subchronic toxicity

Components:
naphthalene, bis(1-methylethyl)-:
Repeated dose toxicity - Assesment: May be harmful if swallowed or if inhaled. No adverse effect has been observed in chronic toxicity tests.

Dimer fatty acid (c18) polyamidoamine resin:
Repeated dose toxicity - Assessment: No adverse effect has been observed in chronic toxicity tests.

Aspiration toxicity
Components:
naphthalene, bis(1-methylethyl)-:
May be fatal if swallowed and enters airways.
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:

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: EC50 (No information available.): > 1 000 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
	naphthalene, bis(1-methylethyl)-:

Toxicity to fish: LC50: > 0.5 mg/l
Exposure time: 96 h
Test Type: semi-static test
Remarks: Aquatic toxicity is unlikely due to low solubility.

| Toxicity to daphnia and other aquatic invertebrates | EC50 (Daphnia magna (Water flea)): > 0,16 mg/l  
Exposure time: 48 h  
Test Type: static test  
Method: OECD Test Guideline 202  
Remarks: Aquatic toxicity is unlikely due to low solubility.  
EL50 (Daphnia magna (Water flea)): 1,7 mg/l  
Exposure time: 48 h  
Test Type: semi-static test  
Method: OECD Test Guideline 202 |
| Toxicaity to algae | NOECr (Desmodesmus subspicatus (Scenedesmus subspicatus)): ca. 0,15 mg/l  
Exposure time: 72 h  
Test Type: static test  
Method: DIN 38412  
GLP: no  
Remarks: Aquatic toxicity is unlikely due to low solubility. |
| M-Factor (Acute aquatic toxicity) | 1 |
| M-Factor (Chronic aquatic toxicity) | 1 |

**Dimer fatty acid (c18) polyamidoamine resin:**

| Toxicity to fish | LC50 (Brachydanio rerio (zebrafish)): 7,07 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 203 |
| Toxicity to daphnia and other aquatic invertebrates | EC50 (Daphnia magna (Water flea)): 7,07 mg/l  
Exposure time: 48 h  
Test Type: static test  
Method: OECD Test Guideline 202 |
| Toxicity to algae | EC50 (Selenastrum capricornutum (green algae)): 4,34 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): 384 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209

Diethylenetriamine:
Toxicity to fish: LC50: 430 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates:
Test Type: static test
Method: OECD Test Guideline 201

Toxicity to algae:
Test Type: static test
Method: OECD Test Guideline 201

Toxicity to fish (Chronic toxicity):
Test Type: semi-static test
Method: OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
Species: Daphnia magna (Water flea)
Test Type: semi-static test

Toxicity to soil dwelling organisms:
Species: Eisenia fetida (earthworms)
Method: OECD Test Guideline 222

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

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

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

Toxicity to daphnia and other aquatic invertebrates:
- LC50: 718 mg/l
- Exposure time: 96 h
- Test Type: static test
- Test substance: Marine water

Toxicity to algae:
- ErC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): 84 mg/l
- Exposure time: 72 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (Scenedesmus subspicatus)): 6.25 mg/l
- Exposure time: 72 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 201

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

4,4′-isopropylidenediphenol:
Toxicity to fish: LC50 (Onchorhynchus 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.

Triethylenetetramine:
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

Toxicity to algae: 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

Ecotoxicology Assessment

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

3-aminopropyltriethoxysilane:

Toxicity to fish:
- **LC50** (Brachydanio rerio (zebrafish)): > 934 mg/l
- 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)): 331 mg/l
- Exposure time: 48 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 202

Toxicity to algae:
- **EC50** (Desmodesmus subspicatus (Scenedesmus subspicatus)): > 1 000 mg/l
- Exposure time: 72 h
- Test Type: static test
- Test substance: Fresh water

Toxicity to microorganisms:
- **EC50** (Pseudomonas putida): 43 mg/l
- Exposure time: 5.75 h
- Test Type: static test
- Test substance: Fresh water

12.2 Persistence and degradability

**Components:**
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.

naphthalene, bis(1-methylethyl)-:

**Biodegradability:** Inoculum: activated sludge
- Concentration: 0.2 mg/l
- Result: Not readily biodegradable.
- Biodegradation: 30 - 35 %
- Exposure time: 56 d
- Method: OECD Test Guideline 310

Dimer fatty acid (c18) polyamidoamine resin:

**Biodegradability:** Test Type: aerobic
Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 0 - 70 %
Exposure time: 74 d
Method: OECD Test Guideline 301B

Diethylenetriamine:
Biodegradability: Inoculum: activated sludge
 Result: Readily biodegradable.
 Biodegradation: 87 %
 Exposure time: 21 d
 Method: OECD Test Guideline 301D

Photodegradation:
 Rate constant: 500000
 Degradation (direct photolysis): 50 %

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

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

Chemical Oxygen Demand (COD):
 Concentration: 560 mg/l

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

2,4,6-tris(dimethylaminomethyl)phenol:
Biodegradability: Inoculum: activated sludge
 Concentration: 2 mg/l
 Result: Not readily biodegradable.
 Biodegradation: 4 %
 Exposure time: 28 d
 Method: OECD Test Guideline 301D

4,4'-isopropylidenediphenol:
Biodegradability: Result: Not readily biodegradable.
 Biodegradation: 1 - 2 %
 Exposure time: 28 d

Triethylenetetramine:
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

3-aminopropyltriethoxysilane:
Biodegradability:
Inoculum: activated sludge
Concentration: 8.95 mg/l
Result: Not readily biodegradable.
Biodegradation: 67 %
Exposure time: 28 d

12.3 Bioaccumulative potential

Components:
naphthalene, bis(1-methylethyl)-:
Bioaccumulation:
Species: Cyprinus carpio (Carp)
Exposure time: 60 d
Bioconcentration factor (BCF): 770 - 6 400
Test substance: Fresh water
Method: flow-through test

Partition coefficient: n-octanol/water:
log Pow: 6,081
Method: QSAR

Dimer fatty acid (c18) polyamidoamine resin:
Bioaccumulation:
Bioconcentration factor (BCF): 77,4
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water:
log Pow: 10,34
Method: OECD Test Guideline 117

Diethylenetriamine:
Bioaccumulation:
Species: Cyprinus carpio (Carp)
Exposure time: 42 d
Bioconcentration factor (BCF): 0,3 - 6,3
Test substance: Fresh water
Method: flow-through test
Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water:
log Pow: -1,58 (20 °C)
pH: 7

Aminoethylpiperazine:
Bioaccumulation:
Species: Fish
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water:
log Pow: -1,48 (20 °C)
2,4,6-tris(dimethylaminomethyl)phenol:
Partition coefficient: n-octanol/water: log Pow: 0.219 (21.5 °C)
Method: OPPTS 830.7550

Triethylenetetramine:
Partition coefficient: n-octanol/water: log Pow: -2.65 (20 °C)
Method: OECD Test Guideline 117

3-aminopropytriethoxysilane:
Bioaccumulation: Species: Cyprinus carpio (Carp)
Bioccentration factor (BCF): 3.4
Remarks: Does not bioaccumulate.
Partition coefficient: n-octanol/water: log Pow: 1.7 (20 °C)
pH: 7

12.4 Mobility in soil

Components:
naphthalene, bis(1-methylethyl)-:
Distribution among environmental compartments: Koc: 36108
Method: QSAR

Diethylenetriamine:
Distribution among environmental compartments: Koc: 19111

Aminoethylpiperazine:
Distribution among environmental compartments: Koc: ca. 37000

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

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 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.
(DIETHYLENE TRIAMINE, DIISOPROPYLNAPHTHALENE ISOMERS)

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.
(DIETHYLENE TRIAMINE, DIISOPROPYLNAPHTHALENE ISOMERS)

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
14.3 Transport hazard class(es) : 8
14.4 Packing group : II
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. (DIETHYLENE TRIAMINE, DIISOPROPYLNAPHTHALENE ISOMERS)
14.3 Transport hazard class(es) : 8
14.4 Packing group : II
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).

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 : On the inventory, or in compliance with the inventory
ENCS : On the inventory, or in compliance with the inventory
15.2 Chemical safety assessment

Full text of H-Statements

H302 : Harmful if swallowed.
H304 : May be fatal if swallowed and enters airways.
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.
H330 : Fatal if inhaled.
H335 : May cause respiratory irritation.
H360F : May damage fertility.
H361d : Suspected of damaging the unborn child.
H372 : Causes damage to organs through prolonged or repeated exposure if inhaled.
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
Asp. Tox. : Aspiration hazard
Eye Dam. : Serious eye damage
Eye Irrit. : Eye irritation
ARALDITE® 2015 HARDENER

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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

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