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

ARALDITE® 2013 GB RESIN

Version 1.3  Revision Date: 05.06.2018  SDS Number: 400001009962  Date of last issue: 07.11.2017  Date of first issue: 27.05.2016

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

1.1 Product identifier
Trade name : ARALDITE® 2013 GB RESIN

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

1.3 Details of the supplier of the safety data sheet
Company : Huntsman Advanced Materials (Europe)BVBA
Address : Everslaan 45
          3078 Everberg
          Belgium
Telephone : +41 61 299 20 41
Telefax : +41 61 299 20 40
E-mail address of person responsible for the SDS : Global_Product_EHS_AdMat@huntsman.com

1.4 Emergency telephone number
Emergency telephone number : EUROPE: +32 35 75 1234
                              France ORFILA: +33(0)145425959
                              ASIA: +65 6336-6011
                              China: +86 20 39377888
                              +86 532 83889090
                              India: +91 22 42 87 5333
                              Australia: 1800 786 152
                              New Zealand: 0800 767 437
                              USA: +1/800/424.9300

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)
Skin irritation, Category 2 : H315: Causes skin irritation.
Eye irritation, Category 2 : H319: Causes serious eye irritation.
Skin sensitisation, Category 1 : H317: May cause an allergic skin reaction.
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 : ![Image]

Signal word : Warning

Hazard statements :
- H315: Causes skin irritation.
- H317: May cause an allergic skin reaction.
- H319: Causes serious eye irritation.
- H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

Prevention:
- P261: Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
- P264: Wash skin thoroughly after handling.
- P273: Avoid release to the environment.
- P280: Wear protective gloves/ eye protection/ face protection.

Response:
- P333 + P313: If skin irritation or rash occurs: Get medical advice/ attention.
- P391: Collect spillage.

Hazardous components which must be listed on the label:
Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.

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>Classification</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol</td>
<td>9003-36-5, 500-006-8, 01-2119454392-40</td>
<td>Skin Irrit. 2; H315 Skin Sens. 1; H317 Aquatic Chronic 2; H411</td>
<td>&gt;= 30 - &lt; 50</td>
</tr>
<tr>
<td>2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane</td>
<td>1675-54-3, 216-823-5, 603-073-00-2</td>
<td>Skin Irrit. 2; H315 Eye Irrit. 2; H319 Skin Sens. 1; H317</td>
<td>&gt;= 10 - &lt; 20</td>
</tr>
</tbody>
</table>
SECTION 4: First aid measures

4.1 Description of first aid measures

General advice:
- Move out of dangerous area.
- Show this safety data sheet to the doctor in attendance.
- Do not leave the victim unattended.

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

In case of skin contact:
- If skin irritation persists, call a physician.
- If on skin, rinse well with water.
- If on clothes, remove clothes.

In case of eye contact:
- Immediately flush eye(s) with plenty of water.
- 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 give milk or alcoholic beverages.
- Never give anything by mouth to an unconscious person.
- If symptoms persist, call a physician.

4.2 Most important symptoms and effects, both acute and delayed

None known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment:
- Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media:
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

ARALDITE® 2013 GB RESIN

Version 1.3  Revision Date: 05.06.2018

SDS Number: 400001009962  Date of last issue: 07.11.2017

Date of first issue: 27.05.2016

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 hazardous combustion products are known

5.3 Advice for firefighters

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

Specific extinguishing methods: No data is available on the product itself.

Further information: Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Use personal protective equipment.

6.2 Environmental precautions

Environmental precautions: Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

See Section 1 for emergency contact information. For personal protection see section 8. For disposal considerations see section 13.

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.
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. Electrical installations / working materials must comply with the technological safety standards.

**Advice on common storage:** Keep away from oxidizing agents and strongly acid or alkaline materials.

**Recommended storage temperature:** 2 - 40 °C

**Further information on storage stability:** No decomposition if stored and applied as directed.

### 7.3 Specific end use(s)

**Specific use(s):** No data available

---

**SECTION 8: Exposure controls/personal protection**

#### 8.1 Control parameters

**Occupational Exposure Limits**

<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>Not applicable mica</td>
<td>12001-26-2</td>
<td>TWA (Inhalable)</td>
<td>10 mg/m³</td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

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. 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</th>
<th>TWA (Respirable)</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>10 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Further information</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.8 mg/m³</td>
<td>GB EH40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></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. Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used.

Titanium dioxide

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.

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.
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>Substance</th>
<th>CAS Number</th>
<th>TWA (inhalable dust)</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium sulfate</td>
<td>7727-43-7</td>
<td>10 mg/m³</td>
<td></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></th>
<th>TWA (Respirable dust)</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 mg/m³</td>
<td></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.
Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

<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>bisphenol F-epoxy resin</td>
<td>Workers</td>
<td>Dermal</td>
<td>Acute local effects</td>
<td>0.0083 mg/cm²</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>104.15 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>29.39 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>62.5 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>8.7 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Long-term systemic effects</td>
<td>6.25 mg/kg</td>
</tr>
<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>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Systemic effects, Short-term exposure</td>
<td>0.75 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>3.571 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Systemic effects, Long-term exposure</td>
<td>0.75 mg/kg bw/day</td>
</tr>
<tr>
<td>glycidylether of C12-C14 alcohols</td>
<td>Workers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>3.6 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>1 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Inhalation</td>
<td>Long-term systemic effects</td>
<td>0.87 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Dermal</td>
<td>Long-term systemic effects</td>
<td>0.5 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Consumers</td>
<td>Oral</td>
<td>Long-term systemic effects</td>
<td>0.5 mg/kg</td>
</tr>
<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</td>
</tr>
<tr>
<td>Substance</td>
<td>Exposure Route</td>
<td>Type of Effect</td>
<td>Hazard Parameter</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>----------------</td>
<td>----------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>1-phenyleneoxymethylen[e]bisoxirane</td>
<td>Workers Inhalation</td>
<td>Systemic effects, Short-term exposure</td>
<td>12.25 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>8.33 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workers Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>12.25 mg/m³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consumers Dermal</td>
<td>Systemic effects, Short-term exposure</td>
<td>3.571 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consumers Oral</td>
<td>Systemic effects, Short-term exposure</td>
<td>0.75 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consumers Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>3.571 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Consumers Oral</td>
<td>Systemic effects, Long-term exposure</td>
<td>0.75 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Titanium dioxide</td>
<td>Workers Inhalation</td>
<td>Long-term local effects</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Consumers Oral</td>
<td>Long-term systemic effects</td>
<td>700 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>barium sulfate</td>
<td>Workers Inhalation</td>
<td>Long-term systemic effects</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers Inhalation</td>
<td>Long-term local effects</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumer use Inhalation</td>
<td>Long-term systemic effects</td>
<td>10 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumer use Oral</td>
<td>Long-term systemic effects</td>
<td>13000 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol</td>
<td>Workers Dermal</td>
<td>Acute local effects</td>
<td>0.0083 mg/cm²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers Dermal</td>
<td>Long-term systemic effects</td>
<td>104.15 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers Inhalation</td>
<td>Long-term systemic effects</td>
<td>29.39 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumers Dermal</td>
<td>Long-term systemic effects</td>
<td>62.5 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumers Inhalation</td>
<td>Long-term systemic effects</td>
<td>8.7 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consumers Oral</td>
<td>Long-term systemic effects</td>
<td>6.25 mg/kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.</td>
<td>Workers Inhalation</td>
<td>Long-term systemic effects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Workers Dermal</td>
<td>Long-term systemic effects</td>
</tr>
</tbody>
</table>
SAFETY DATA SHEET  
according to Regulation (EC) No. 1907/2006  

ARALDITE® 2013 GB RESIN  
Version 1.3  
Revision Date: 05.06.2018  
SDS Number: 400001009962  
Date of last issue: 07.11.2017  
Date of first issue: 27.05.2016  

**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>bisphenol F-epoxy resin</td>
<td>Fresh water</td>
<td>0.003 mg/l</td>
</tr>
<tr>
<td>Remarks:</td>
<td>Assessment Factors</td>
<td></td>
</tr>
<tr>
<td>Marine water</td>
<td></td>
<td>0.0003 mg/l</td>
</tr>
<tr>
<td>Assessment Factors</td>
<td>Fresh water sediment</td>
<td>0.294 mg/kg</td>
</tr>
<tr>
<td>Equilibrium method</td>
<td>Marine sediment</td>
<td>0.0294 mg/kg</td>
</tr>
<tr>
<td>Equilibrium method</td>
<td>Soil</td>
<td>0.237 mg/kg</td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td></td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Assessment Factors</td>
<td>2,2’-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxiran</td>
<td>Fresh water</td>
</tr>
<tr>
<td>Assessment Factors</td>
<td>Marine water</td>
<td>0.0006 mg/l</td>
</tr>
<tr>
<td>Assessment Factors</td>
<td>Freshwater - intermittent</td>
<td>0.018 mg/l</td>
</tr>
<tr>
<td>Equilibrium method</td>
<td>Fresh water sediment</td>
<td>0.996 mg/kg</td>
</tr>
<tr>
<td>Equilibrium method</td>
<td>Marine sediment</td>
<td>0.0996 mg/kg</td>
</tr>
<tr>
<td>Equilibrium method</td>
<td>Soil</td>
<td>0.196 mg/kg</td>
</tr>
<tr>
<td>Substance Description</td>
<td>Assessment Factors</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</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><strong>Secondary Poisoning</strong></td>
<td>11 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Glycidylether of C12-C14 alcohols</td>
<td>Fresh water</td>
<td>0.007 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>0.001 mg/l</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>0.072 mg/l</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plant</td>
<td>10 mg/l</td>
</tr>
<tr>
<td></td>
<td>Fresh water sediment</td>
<td>307.16 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Marine sediment</td>
<td>30.72 mg/kg</td>
</tr>
<tr>
<td>2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxiran</td>
<td>Fresh water</td>
<td>0.006 mg/l</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marine water</strong></td>
<td>0.0006 mg/l</td>
<td></td>
</tr>
<tr>
<td><strong>Freshwater - intermittent</strong></td>
<td>0.018 mg/l</td>
<td></td>
</tr>
<tr>
<td><strong>Fresh water sediment</strong></td>
<td>0.996 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marine sediment</strong></td>
<td>0.0996 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soil</strong></td>
<td>0.196 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Equilibrium method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sewage treatment plant</strong></td>
<td>10 mg/l</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Secondary Poisoning</strong></td>
<td>11 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>Marine water</td>
<td>0.0184 mg/l</td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fresh water sediment</strong></td>
<td>1000 mg/kg</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td>Fresh water</td>
<td>0.184 mg/l</td>
</tr>
<tr>
<td><strong>Fresh water</strong></td>
<td>0.184 mg/l</td>
<td></td>
</tr>
<tr>
<td><strong>Assessment Factors</strong></td>
<td>Marine sediment</td>
<td>100 mg/kg</td>
</tr>
<tr>
<td><strong>Soil</strong></td>
<td>100 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Assessment Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>100 mg/l</td>
<td></td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>0.193 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fresh water</td>
<td>115 µg/l</td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>62.2 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>600.4 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Soil</td>
<td>207.7 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water</td>
<td>0.003 mg/l</td>
<td></td>
</tr>
<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>Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water</td>
<td>0.007 mg/l</td>
<td></td>
</tr>
<tr>
<td>Marine water</td>
<td>0.001 mg/l</td>
<td></td>
</tr>
<tr>
<td>Freshwater - intermittent</td>
<td>0.072 mg/l</td>
<td></td>
</tr>
<tr>
<td>Sewage treatment plant</td>
<td>10 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>307.16 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Marine sediment</td>
<td>30.72 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Siloxanes and Silicones, di-Me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water sediment</td>
<td>&gt; 100 mg/kg</td>
<td></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**: Neoprene rubber

**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.
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**: grey

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

pH : 6 (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 : 180 °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 : < 0.001 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 : 380,000 - 720,000 mPa.s (25 °C)
Explosive properties : No data is available on the product itself.
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

Components:
Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Acute oral toxicity: LD50 (Rat, male and female): > 5,000 mg/kg
Method: OECD Test Guideline 401

2,2’-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Acute oral toxicity: LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 420
Assessment: The substance or mixture has no acute oral toxicity

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Acute oral toxicity: LD50 (Rat, male): ca. 26.8 g/kg
Method: Other guidelines
Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Acute inhalation toxicity: LC0 (Rat): > 0.15 mg/l
  Exposure time: 7 h
  Test atmosphere: vapour
  Method: Other guidelines

Components:
Formaldehyde, oligomeric reaction products with 1-chloro-2,3-epoxypropane and phenol:
Acute dermal toxicity: LD50 (Rat, male and female): > 2,000 mg/kg
  Method: OECD Test Guideline 402
  Assessment: The substance or mixture has no acute dermal toxicity

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Acute dermal toxicity: LD50 (Rat, male and female): > 2,000 mg/kg
  Method: OECD Test Guideline 402
  Assessment: The substance or mixture has no acute dermal toxicity

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Acute dermal toxicity: (Rabbit, male): > 4,000 mg/kg, 4.5 ml/kg
  Assessment: The substance or mixture has no acute dermal toxicity

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

Skin corrosion/irritation

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Species: Rabbit
  Assessment: Mild skin irritant
  Method: OECD Test Guideline 404
  Result: Irritating to skin.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Species: Rabbit
  Exposure time: 24 h
  Method: Acute dermal toxicity
  Result: Irritating to skin.
 Serious eye damage/eye irritation

**Components:**

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Species: Rabbit
Assessment: Mild eye irritant
Method: OECD Test Guideline 405
Result: Irritating to eyes.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Species: Rabbit
Assessment: No eye irritation
Method: OECD Test Guideline 405
Result: slight irritation

Respiratory or skin sensitisation

**Components:**

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.

2,2'-(1-methylethylidene)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.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Test Type: Buehler Test
Exposure routes: Skin
Species: Guinea pig
Method: OPPTS 870.2600
Result: May cause sensitisation by skin contact.

Assessment: No data available

Germ cell mutagenicity

**Components:**

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
Genotoxicity in vitro:

**2,2’-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:**

- 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

**Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:**

- Test Type: Ames test
  - Test system: Salmonella typhimurium
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 471
  - Result: positive

- Test Type: In vitro mammalian cell gene mutation test
  - Test system: Chinese hamster ovary cells
  - Concentration: 0.5 - 5.000 µg/mL
  - Metabolic activation: with and without metabolic activation
  - Method: OECD Test Guideline 476
  - Result: negative

**Components:**

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
Genotoxicity in vivo: Cell type: Germ
Applicaiton 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

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Genotoxicity in vivo: Test type: In vivo micronucleus test
Test species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Exposure time: 24 hr, 48 hr, and 72 hr
Method: OECD Test Guideline 474
Result: negative

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
Carcinogenicity - Assessment: No data available

Reproductive toxicity

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
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.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Species: Rat, male and female
Application Route: Dermal
Duration of Single Treatment: 13 Weeks
Frequency of Treatment: 5 days/week
General Toxicity - Parent: No observed adverse effect level: 100 mg/kg body weight
Method: OECD Test Guideline 411
Result: No teratogenic effects

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
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

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:  
Species: Rat, female  
Application Route: Dermal  
Duration of Single Treatment: 6 h  
General Toxicity Maternal: No observed adverse effect level: 200 mg/kg body weight  
Developmental Toxicity: No observed adverse effect level: 200 mg/kg body weight  
Method: OECD Test Guideline 414  
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:
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  

2,2’-[(1-methylethylidene)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
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

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Species: Rat, male and female
NOEL: 1 mg/kg
LOAEL: 10 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 5 days/week for 13 weeks
Method: OECD Test Guideline 411

Repeated dose toxicity - Assessment: No data available

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

Toxicity to fish: LC50 (Fish): 2.54 mg/l
Exposure time: 96 h
Method: Calculation method

Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 2.55 mg/l
Exposure time: 48 h
Method: Calculation method

Toxicity to algae: EC50 (Selenastrum capricornutum (green algae)): 1.8 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

M-Factor (Acute aquatic toxicity): 1

Toxicity to microorganisms: IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):

NOEC: 0.3 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211
Remarks: Information given is based on data obtained from similar substances.

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:

Toxicity to fish: LC50 (Onchorhynchus 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

Toxicity to algae: EC50 (Selenastrum capricornutum (green algae)): 9.4 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: EPA-660/3-75-009

Toxicity to microorganisms: IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC: 0.3 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:

Toxicity to fish: LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l
Exposure time: 96 h
Test Type: semi-static test
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates:
EL50 (Daphnia magna (Water flea)): 7.2 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202

Toxicity to algae:
IC50 (Selenastrum capricornutum (green algae)): 843.75 mg/l
Exposure time: 72 h
Test Type: static test
Method: OECD Test Guideline 201

Toxicity to microorganisms: IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209

12.2 Persistence and degradability

Components:
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

2,2’-[(1-methyleneidene)bis(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

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Biodegradability
- Test Type: aerobic
- Inoculum: activated sludge
- Concentration: 100 mg/l
- Result: Readily biodegradable.
- Biodegradation: 87%
- Exposure time: 28 d
- Method: OECD Test Guideline 301F

12.3 Bioaccumulative potential

Components:
- 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

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

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

- Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
  Partition coefficient: n-octanol/water: log Pow: 3.77 (20 °C)
  Method: OECD Test Guideline 107
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

ARALDITE® 2013 GB RESIN

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Date of last issue:</th>
<th>Date of first issue:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>05.06.2018</td>
<td>400001009962</td>
<td>07.11.2017</td>
<td>27.05.2016</td>
</tr>
</tbody>
</table>

12.4 Mobility in soil

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

2,2'-(1-methylethylidene)bis(4,1-phenyleneoxymethylene)bisoxirane:
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.

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: 9
class(es)
14.4 Packing group : III
Labels : Miscellaneous
Packing instruction (cargo aircraft) : 964
Packing instruction (passenger aircraft) : 964

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

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

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

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

- DSL: This product contains one or several components 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: Not in compliance with the inventory
- PICCS: Not in compliance with the inventory
- IECSC: Low volume exemption
- 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))
**ARALDITE® 2013 GB RESIN**

**Version** 1.3  
**Revision Date:** 05.06.2018  
**SDS Number:** 400001009962  
**Date of last issue:** 07.11.2017  
**Date of first issue:** 27.05.2016

### 15.2 Chemical safety assessment
Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.

### SECTION 16: Other information

**Full text of H-statements**

<table>
<thead>
<tr>
<th>H-number</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>H315</td>
<td>Causes skin irritation.</td>
</tr>
<tr>
<td>H317</td>
<td>May cause an allergic skin reaction.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H411</td>
<td>Toxic to aquatic life with long lasting effects.</td>
</tr>
</tbody>
</table>

**Full text of other abbreviations**

- **Aquatic Chronic**: Chronic aquatic toxicity
- **Eye Irrit.**: Eye irritation
- **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**

**Other information**: The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

**Sources of key data used to compile the Safety Data Sheet**: Information taken from reference works and the literature., Information derived from practical experience.

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

| Skin Irrit. 2 | H315 | Calculation method |
| Eye Irrit. 2  | H319 | Calculation method |
| Skin Sens. 1  | H317 | Calculation method |
| Aquatic Chronic 2 | H411 | Calculation method |

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.
IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

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

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

The trademarks above are the property of Huntsman Corporation or an affiliate thereof.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.
SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

ARALDITE® 2013 GB HARDENER

Version 2.0    Revision Date: 05.09.2017    SDS Number: 400001009403    Date of last issue: 22.02.2017

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

1.1 Product identifier
   Trade name: ARALDITE® 2013 GB HARDENER

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

1.3 Details of the supplier of the safety data sheet
   Company: Huntsman Advanced Materials (Europe)BVBA
   Address: Everslaan 45
             3078 Everberg
             Belgium
   Telephone: +41 61 299 20 41
   Telefax: +41 61 299 20 40
   E-mail address of person responsible for the SDS: Global_Product_EHS_AdMat@huntsman.com

1.4 Emergency telephone number
   Emergency telephone number: EUROPE: +32 35 75 1234
                              France ORFILA: +33(0)145425959
                              ASIA: +65 6336-6011
                              China: +86 20 39377888
                                   +86 532 83889090
                              India: + 91 22 42 87 5333
                              Australia: 1800 786 152
                              New Zealand: 0800 767 437
                              USA: +1/800/424.9300

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
   Classification (REGULATION (EC) No 1272/2008)
   Acute toxicity, Category 4          H332: Harmful if inhaled.
   Skin irritation, Category 2         H315: Causes skin irritation.
   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.
   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

H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H318 - Causes serious eye damage.
H332 - Harmful if inhaled.
H360F - May damage fertility.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention:
P201 - Obtain special instructions before use.
P261 - Avoid breathing mist or vapours.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/ protective clothing/ 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.
P308 + P313 - IF exposed or concerned: Get medical advice/ attention.

Storage:
P405 - Store locked up.

Disposal:
P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazardous components which must be listed on the label:
polyamide resin
Diethylenetriamine
4,4'-isopropylidenediphenol
triethylenetetramine

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>Classification</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine (UVCB)</td>
<td>68154-62-1</td>
<td>-</td>
<td>01-2119972322-40</td>
<td></td>
<td>Skin Irrit. 2; H315</td>
<td>30 - 60</td>
</tr>
<tr>
<td>Fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine Polymer</td>
<td>68154-62-1</td>
<td></td>
<td></td>
<td></td>
<td>Skin Irrit. 2; H315</td>
<td>13 - 30</td>
</tr>
<tr>
<td>2,2'-Iminodi(ethylamine)</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</td>
<td>3 - 7</td>
</tr>
<tr>
<td>4,4'-Isopropylidenediphenol</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</td>
<td>3 - 7</td>
</tr>
<tr>
<td>Amines, polyethylenepoly-, triethylenetetramine fraction</td>
<td>90640-67-8</td>
<td>-</td>
<td>01-2119487919-13</td>
<td></td>
<td>Acute Tox. 4; H302</td>
<td>0,1 - 1</td>
</tr>
</tbody>
</table>

For explanation of abbreviations see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance. Do not leave the victim unattended.

If inhaled: Consult a physician after significant exposure. If unconscious, place in recovery position and seek medical advice.
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 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:
Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

SECTION 5: Firefighting measures

5.1 Extinguishing media
- Suitable extinguishing media: No data is available on the product itself.
- 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: Neutralise with acid. 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

See Section 1 for emergency contact information., For personal protection see section 8., For disposal considerations see section 13.

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.

**Recommended storage temperature**

: 2 - 40 °C

**Further information on storage stability**

: No decomposition if stored and applied as directed.

**7.3 Specific end use(s)**

**Specific use(s)**

: No data available

---

**SECTION 8: Exposure controls/personal protection**

**8.1 Control parameters**

**Occupational Exposure Limits**

<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</td>
<td>GB EH40</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4.3 mg/m3</td>
<td></td>
</tr>
<tr>
<td>Further information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can be absorbed through skin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The assigned substances are</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>those for which there are</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>concerns that dermal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>absorption will lead to</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>systemic toxicity. Where</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>no specific short-term</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>exposure limit is listed, a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>figure three times the long-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>term exposure should be used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,4’-isopropylidenediphene</td>
<td>80-05-7</td>
<td>TWA (inhalable dust)</td>
<td>10 mg/m3</td>
<td>GB EH40</td>
</tr>
<tr>
<td>enol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further information</td>
<td></td>
<td>Where no specific short-term</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>exposure limit is listed, a</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>figure three times the long-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>term exposure should be used</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (inhalable dust)</td>
<td>10 mg/m3</td>
<td>2009/161/EU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Further information

<table>
<thead>
<tr>
<th>Silica</th>
<th>TWA (inhalable dust)</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>112945-52-5</td>
<td>6 mg/m³ (Silica)</td>
<td>2017/164/EU</td>
</tr>
<tr>
<td>silica, amorphous, fumed, crystalline free</td>
<td>TWA (inhalable dust)</td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

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.
exposure limit is listed, a figure three times the long-term exposure should be used

<table>
<thead>
<tr>
<th>TWA (inhaleable dust)</th>
<th>6 mg/m^3 (Silica)</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Further information</td>
<td>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 'inhaleable' 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.</td>
<td></td>
</tr>
<tr>
<td>TWA (Respirable dust)</td>
<td>2.4 mg/m^3 (Silica)</td>
<td>GB EH40</td>
</tr>
<tr>
<td>Further information</td>
<td>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 'inhaleable' 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.</td>
<td></td>
</tr>
<tr>
<td>Diethylenetriamine 111-40-0</td>
<td>TWA</td>
<td>1 ppm 4,3 mg/m^3</td>
</tr>
</tbody>
</table>
**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.

#### 4,4'-isopropylidenediphenol

<table>
<thead>
<tr>
<th>Substance</th>
<th>End Use</th>
<th>Exposure routes</th>
<th>Potential health effects</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TWA (inhalable dust)</td>
<td></td>
<td>10 mg/m³</td>
</tr>
<tr>
<td>80-05-7</td>
<td></td>
<td></td>
<td></td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

**Further information**

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

**Further information**

Indicative, In the Annex to Directive 2009/161/EU, the reference to bisphenol A is deleted with effect from 21 August 2018.

<table>
<thead>
<tr>
<th>Substance</th>
<th>End Use</th>
<th>Exposure routes</th>
<th>Potential health effects</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TWA ((inhalable fraction))</td>
<td></td>
<td>2 mg/m³</td>
</tr>
</tbody>
</table>

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

<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>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>Consumers</td>
<td>Oral</td>
<td></td>
<td>Local effects, Short-term exposure</td>
<td>4,88 mg/kg bw/day</td>
</tr>
<tr>
<td>Consumers</td>
<td>Inhalation</td>
<td></td>
<td>Systemic effects, Short-term exposure</td>
<td>27,5 mg/m³</td>
</tr>
<tr>
<td>Consumers</td>
<td>Dermal</td>
<td></td>
<td>Systemic effects, Long-term exposure</td>
<td>4,88 mg/kg bw/day</td>
</tr>
<tr>
<td>Consumers</td>
<td>Inhalation</td>
<td></td>
<td>Systemic effects, Long-term exposure</td>
<td>4,6 mg/m³</td>
</tr>
<tr>
<td>triethylenetetramine</td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Short-term exposure</td>
<td>5380 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Systemic effects, Long-term exposure</td>
<td>0,57 mg/kg bw/day</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>1 mg/m³</td>
</tr>
<tr>
<td></td>
<td>Workers</td>
<td>Dermal</td>
<td>Local effects, Long-term exposure</td>
<td>0,028 mg/m³</td>
</tr>
<tr>
<td>Consumers</td>
<td>Dermal</td>
<td></td>
<td>Systemic effects</td>
<td>8 mg/kg</td>
</tr>
</tbody>
</table>
### ARALDITE® 2013 GB HARDENER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Exposure Route</th>
<th>Systemic effects,</th>
<th>Duration</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Inhalation</strong></td>
<td></td>
<td>Short-term exposure</td>
<td></td>
<td>1600 mg/m³</td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Oral</strong></td>
<td></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>20 mg/kg bw/day</td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Dermal</strong></td>
<td>Local effects, Short-term exposure</td>
<td></td>
<td>1 mg/cm²</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Dermal</strong></td>
<td>Local effects, Short-term exposure</td>
<td></td>
<td>0.25 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Inhalation</strong></td>
<td></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>0.29 mg/m³</td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Oral</strong></td>
<td></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>0.41 mg/kg bw/day</td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Dermal</strong></td>
<td>Local effects, Long-term exposure</td>
<td></td>
<td>0.43 mg/cm²</td>
<td></td>
</tr>
<tr>
<td><strong>Diethylenetriamine</strong></td>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>92.1 mg/m³</td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Local effects, Short-term exposure</td>
<td></td>
<td>2.6 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Dermal</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>11.4 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>15.4 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Dermal</strong></td>
<td>Local effects, Long-term exposure</td>
<td></td>
<td>1.1 mg/cm²</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Local effects, Long-term exposure</td>
<td></td>
<td>0.87 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Oral</strong></td>
<td>Local effects, Short-term exposure</td>
<td></td>
<td>4.88 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>27.5 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Dermal</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>4.88 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>4.6 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>triethylenetetramine</strong></td>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>5380 mg/m³</td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Dermal</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>0.57 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Long-term exposure</td>
<td></td>
<td>1 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Workers</strong></td>
<td><strong>Dermal</strong></td>
<td>Local effects, Long-term exposure</td>
<td></td>
<td>0.028 mg/m³</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Dermal</strong></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>8 mg/kg bw/day</td>
<td></td>
</tr>
<tr>
<td><strong>Consumers</strong></td>
<td><strong>Inhalation</strong></td>
<td>Systemic effects, Short-term exposure</td>
<td></td>
<td>1600 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>
### SAFETY DATA SHEET

**ARALDITE® 2013 GB HARDENER**

Version: 2.0  
Revision Date: 05.09.2017  
SDS Number: 400001009403  
Date of last issue: 22.02.2017  
Date of first issue: 22.02.2017

#### Consumers

<table>
<thead>
<tr>
<th>Path of Exposure</th>
<th>Effect</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>Systemic effects, Short-term exposure</td>
<td>20 mg/kg bw/day</td>
</tr>
<tr>
<td>Dermal</td>
<td>Local effects, Short-term exposure</td>
<td>1 mg/cm²</td>
</tr>
<tr>
<td>Inhalation</td>
<td>Systemic effects, Long-term exposure</td>
<td>0.29 mg/m³</td>
</tr>
<tr>
<td>Oral</td>
<td>Systemic effects, Long-term exposure</td>
<td>0.41 mg/kg bw/day</td>
</tr>
<tr>
<td>Dermal</td>
<td>Local effects, Long-term exposure</td>
<td>0.43 mg/cm²</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>Diethylenetriamine</td>
<td>Fresh water</td>
<td>0.56 mg/l</td>
</tr>
<tr>
<td></td>
<td>Marine water</td>
<td>0.056 mg/l</td>
</tr>
<tr>
<td></td>
<td>Fresh water sediment</td>
<td>1072 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Marine sediment</td>
<td>107,2 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Soil</td>
<td>214 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Freshwater - intermittent</td>
<td>0.32 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>
<tr>
<td></td>
<td>Marine sediment</td>
<td>19,2 mg/kg</td>
</tr>
</tbody>
</table>

**Remarks:**
- Assessment Factors
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. 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: beige
Odour: amine-like
**SAFETY DATA SHEET**

according to Regulation (EC) No. 1907/2006

**ARALDITE® 2013 GB HARDENER**

Version 2.0  Revision Date: 05.09.2017  SDS Number: 400001009403  Date of last issue: 22.02.2017  Date of first issue: 22.02.2017

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

pH : 12 (25 °C)

Freezing point : No data is available on the product itself.

Melting point : No data is available on the product itself.

Boiling point : No data is available on the product itself.

Flash point : 124 °C  
Method: DIN, Other, open 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 : ca. 0,04 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 : 0,9 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 : No data is available on the product itself.

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
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 : 2.84 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

Product:
Species: Rabbit
Assessment: Irritant
Result: Irritating to skin.

Remarks: Extremely corrosive and destructive to tissue.

**Serious eye damage/eye irritation**

**Product:**
Species: Rabbit
Assessment: Severe eye irritation
Result: Severe eye irritation

Remarks: May cause irreversible eye damage.

**Respiratory or skin sensitisation**

**Product:**
Remarks: Causes sensitisation.

Assessment: No data available

**Germ cell mutagenicity**

**Components:**
fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine:
Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

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

Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
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
Diethylenetriamine:  
Genotoxicity in vivo:  
   Cell type: Somatic  
   Application Route: Oral  
   Dose: 85 - 850 mg/kg  
   Method: OECD Test Guideline 474  
   Result: negative

Application Route: Oral  
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

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:
- fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine:
  Effects on fertility: Species: Rat, male and female
  Application Route: Oral
  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

4,4'-isopropylidenediphenol:
  Species: Rat, male and female
  Application Route: Oral
  General Toxicity Maternal: No observed adverse effect level: 100 mg/kg body weight
  Method: OECD Test Guideline 421
  Result: No adverse effects
  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:
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
No data available

Repeated dose toxicity
Components:
fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine:
Species: Rat, male and female
NOAEL: 1000 mg/kg
Application Route: Ingestion
Exposure time: 6 Weeks
Number of exposures: 7 d
Method: Subacute toxicity

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

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

4,4'-isopropylidenediphenol:
Species: Dog, male and female
NOEC: 75 mg/kg, 10
Application Route: Ingestion
**ARALDITE® 2013 GB HARDENER**

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Date of last issue:</th>
<th>Date of first issue:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>05.09.2017</td>
<td>400001009403</td>
<td>22.02.2017</td>
<td>22.02.2017</td>
</tr>
</tbody>
</table>

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

Repeated dose toxicity - Assessment: No data available

**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**

**Product:**
SECTION 12: Ecological information

12.1 Toxicity

Components: fatty acids, C18-unsatd., dimers, polymers with oleic acid and triethylenetetramine:

Toxicity to fish: LC50 (Brachydanio rerio (zebrafish)): 7.07 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)): 5.18 mg/l
- Exposure time: 48 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 202

Toxicity to algae: EC50 (Selenastrum capricornutum (green algae)): 2.43 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): 421 mg/l
- Exposure time: 3 h
- Test Type: static test
- Test substance: Fresh water
- Method: OECD Test Guideline 209

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

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: EC50 (Daphnia magna (Water flea)): 32 mg/l
- Exposure time: 48 h
- Test Type: static test
- Test substance: Fresh water

Toxicity to algae: EbC50 (Selenastrum capricornutum (green algae)): 1,164 mg/l
- Exposure time: 72 h
- Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

Toxicity to fish (Chronic toxicity):
NOEC: 10 mg/l
Exposure time: 28 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 210

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC: 5.6 mg/l
Exposure time: 21 d
Species: Daphnia magna (Water flea)
Test Type: semi-static test
Test substance: Fresh water

Toxicity to soil dwelling organisms:
EC50: > 1 000 mg/kg
Exposure time: 56 d
Species: Eisenia fetida (earthworms)
Method: OECD Test Guideline 222

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

4,4'-isopropylidenediphenol:

Toxicity to fish:
LC50 (Oncorhynchus mykiss (rainbow trout)): 7.5 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates:
EC50: 3.9 - 10.2 mg/l
Exposure time: 48 h
(Ceriodaphnia dubia (Water flea)):

Toxicity to algae:
EC50 (Selenastrum capricornutum (green algae)): 2.5 - 3.1 mg/l
Exposure time: 96 h

Toxicity to fish (Chronic toxicity):
NOEC: 0.016 mg/l
Exposure time: 444 d
Species: Pimephales promelas (fathead minnow)
Test Type: flow-through test
Test substance: Fresh water
Method: EPA OPPTS 850.1500
Remarks: Toxic to aquatic organisms.

M-Factor (Chronic aquatic toxicity):
1

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

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.

12.2 Persistence and degradability

Components:

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

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

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

12.3 Bioaccumulative potential

Components:
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

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

12.4 Mobility in soil

Components:
Diethylenetriamine: Distribution among environmental compartments: Koc: 19111

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.
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 3082
14.2 UN proper shipping name: Environmentally hazardous substance, liquid, n.o.s.
(POLYAMIDE 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

IMDG
14.1 UN number: UN 3082
14.2 UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(POLYAMIDE 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.

Toxic to aquatic life with long lasting effects.
14.3 Transport hazard class(es): 9
14.4 Packing group: III
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.
   (POLYAMIDE RESIN)
14.3 Transport hazard class(es): 9
14.4 Packing group: III
14.5 Environmental hazards:
   Environmentally hazardous: yes

Transport in bulk according to Annex II of Marpol and the IBC Code
Not applicable for product as supplied.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59):
   4,4’-isopropylidenediphenol

REACH - List of substances subject to authorisation (Annex XIV):
   Not applicable

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

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

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

DSL: All components of this product are on the Canadian DSL

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

NZIoC: not determined

ENCS: On the inventory, or in compliance with the inventory
KECI : On the inventory, or in compliance with the inventory

PICCS : Not in compliance with the inventory

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

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

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

Inventories
AICS (Australia), DSL (Canada), IECSC (China), ENCS (Japan), KECI (Korea), NZIOC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (United States of America (USA))

15.2 Chemical safety assessment
Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.

SECTION 16: Other information

Full text of H-Statements
H302 : Harmful if swallowed.
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.
H411 : Toxic to aquatic life with long lasting effects.
H412 : Harmful to aquatic life with long lasting effects.

Full text of other abbreviations
Acute Tox. : Acute toxicity
Aquatic Chronic : Chronic aquatic toxicity
Eye Dam. : Serious eye damage
Eye Irrit. : Eye irritation
Repr. : Reproductive toxicity
Skin Corr. : Skin corrosion
Skin Irrit. : Skin irritation
Skin Sens. : Skin sensitisation
STOT SE : Specific target organ toxicity - single exposure
ARALDITE® 2013 GB HARDENER

<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date:</th>
<th>SDS Number:</th>
<th>Date of last issue: 22.02.2017</th>
<th>Date of first issue: 22.02.2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>05.09.2017</td>
<td>400001009403</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


GB EH40 : UK. EH40 WEL - Workplace Exposure Limits

2009/161/EU / TWA : Limit Value - eight hours
2017/164/EU / TWA : Limit Value - eight hours
GB EH40 / TWA : Long-term exposure limit (8-hour TWA reference period)

Further information

Classification of the mixture:

<table>
<thead>
<tr>
<th>Classification procedure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Tox. 4</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
</tr>
<tr>
<td>Eye Dam. 1</td>
</tr>
<tr>
<td>Skin Sens. 1</td>
</tr>
<tr>
<td>Repr. 1B</td>
</tr>
<tr>
<td>Aquatic Chronic 2</td>
</tr>
</tbody>
</table>

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

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

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

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

The trademarks above are the property of Huntsman Corporation or an affiliate thereof.

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.
<table>
<thead>
<tr>
<th>Version</th>
<th>Revision Date</th>
<th>SDS Number</th>
<th>Date of last issue</th>
<th>Date of first issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>05.09.2017</td>
<td>400001009403</td>
<td>22.02.2017</td>
<td>22.02.2017</td>
</tr>
</tbody>
</table>