SECTION 1. IDENTIFICATION

Product name: ARALDITE® 2014 A US

Manufacturer or supplier’s details
Company name of supplier: Huntsman Advanced Materials Americas LLC
Address: P.O. Box 4980, The Woodlands, TX 77387, United States of America (USA)
Telephone: Non-Emergency: (800) 257-5547
E-mail address of person responsible for the SDS: MSDS@huntsman.com
Emergency telephone number: Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use
Recommended use: Adhesives

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Skin irritation: Category 2
Serious eye damage: Category 1
Skin sensitisation: Category 1
Germ cell mutagenicity: Category 2
Specific target organ toxicity - repeated exposure (Oral): Category 2 (Cardio-vascular system)
Acute aquatic toxicity: Category 2
Chronic aquatic toxicity: Category 2

GHS label elements
Hazard pictograms:

Signal word: Danger
Hazard statements: H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H341 Suspected of causing genetic defects.
Precautionary statements

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
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.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P391 Collect spillage.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents/container to an approved facility in accordance with local, regional, national and international regulations.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,4’-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane</td>
<td>25068-38-6</td>
<td>30 - 50</td>
</tr>
<tr>
<td>barium sulfate</td>
<td>7727-43-7</td>
<td>30 - 50</td>
</tr>
<tr>
<td>1,4-bis(2,3-epoxypropoxy)butane</td>
<td>2425-79-8</td>
<td>1 - 2.5</td>
</tr>
<tr>
<td>1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione</td>
<td>2451-62-9</td>
<td>1 - 2.5</td>
</tr>
<tr>
<td>quartz (SiO2)</td>
<td>14808-60-7</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

The specific chemical identity and/or exact percentage (concentration) of composition may be withheld as a trade secret.
SECTION 4. FIRST AID MEASURES

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

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

In case of skin contact: 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.

Most important symptoms and effects, both acute and delayed: None known.

Notes to physician: No information available.

SECTION 5. FIREFIGHTING MEASURES

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

Unsuitable extinguishing media: High volume water jet

Specific hazards during firefighting: Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products: Carbon oxides Nitrogen oxides (NOx)
### SECTION 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures**: Use personal protective equipment.

**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.

**Methods and materials for containment and 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.

### SECTION 7. HANDLING AND STORAGE

**Advice on protection against fire and explosion**: Normal measures for preventive fire protection.

**Advice on safe handling**: Do not breathe vapours/dust. Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. To avoid spills during handling keep bottle on a metal tray. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

**Conditions for safe storage**: 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.

**Further information on storage stability**: No decomposition if stored and applied as directed.
# SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

## Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium sulfate</td>
<td>7727-43-7</td>
<td>TWA (total dust)</td>
<td>15 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (respirable fraction)</td>
<td>5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Inhalable fraction)</td>
<td>5 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione</td>
<td>2451-62-9</td>
<td>TWA</td>
<td>0.05 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>quartz (SiO2)</td>
<td>14808-60-7</td>
<td>TWA (respirable)</td>
<td>10 mg/m³ / %SiO2+2</td>
<td>OSHA Z-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (respirable)</td>
<td>250 mppcf / %SiO2+5</td>
<td>OSHA Z-3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Respirable fraction)</td>
<td>0.025 mg/m³ (Silica)</td>
<td>ACGIH</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Respirable dust)</td>
<td>0.05 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
</tbody>
</table>

## Personal protective equipment

### Respiratory protection

- **WARNING:** This product contains quartz, which has been classified by IARC as carcinogenic for humans (Group 1), and which can cause silicosis and lung cancer following exposure to respirable dust. It is therefore important to take particular care to avoid inhalation exposure when mechanically processing cured material (e.g. grinding, sanding, sawing).

### Hand protection

**Remarks:** The suitability for a specific workplace should be discussed with the producers of the protective gloves.

### Eye protection

- Eye wash bottle with pure water
- Tightly fitting safety goggles
- Wear face-shield and protective suit for abnormal processing problems.

### Skin and body protection

- Impervious clothing
  - Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures: When using do not eat or drink. When using do not smoke. Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: paste
Colour: beige
Odour: slight
Odour Threshold: No data is available on the product itself.
Polarity: No data is available on the product itself.
Melting point/freezing point: No data available
Initial boiling point and boiling range: No data available
Flash point: > 93 °C
   Method: estimated, closed cup
Evaporation rate: No data is available on the product itself.
Flammability (solid, gas): No data is available on the product itself.
Flammability (liquids): No data is available on the product itself.
Upper explosion limit / Upper flammability limit: No data is available on the product itself.
Lower explosion limit / Lower flammability limit: No data is available on the product itself.
Vapour pressure: No data is available on the product itself.
Relative vapour density: No data is available on the product itself.
Relative density: 1.55
Density: No data is available on the product itself.
Solubility(ies)
   Water solubility: negligible
   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.
Thermal decomposition: No data is available on the product itself.
Self-Accelerating decomposition temperature (SADT): No data is available on the product itself.
Viscosity
  Viscosity, dynamic: ca. 100,000 mPa.s (25 °C)
Explosive properties: No data is available on the product itself.
Oxidizing properties: No data is available on the product itself.
Molecular weight: No data available
Particle size: No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY
Reactivity: No decomposition if stored and applied as directed.
Chemical stability: No decomposition if stored and applied as directed.
No decomposition if stored and applied as directed.
Possibility of hazardous reactions: No decomposition if stored and applied as directed.
  No decomposition if stored and applied as directed.
Conditions to avoid: No data available
Incompatible materials: No data available
Hazardous decomposition products: No data available

SECTION 11. TOXICOLOGICAL INFORMATION
Information on likely routes of exposure: No data is available on the product itself.

Acute toxicity
Acute oral toxicity - Product: Acute toxicity estimate: > 5,000 mg/kg
  Method: Calculation method
Acute inhalation toxicity - Product: Acute toxicity estimate: 29.3 mg/l
  Exposure time: 4 h
  Test atmosphere: dust/mist
  Method: Calculation method
Acute dermal toxicity - Product: Acute toxicity estimate: > 5,000 mg/kg
  Method: Calculation method
Acute toxicity (other routes of administration): No data available
Skin corrosion/irritation

**Product:**
Remarks: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation

**Product:**
Remarks: May cause irreversible eye damage.

Respiratory or skin sensitisation

**Product:**
Remarks: Causes sensitisation.

Assessment: No data available

Germ cell mutagenicity

**Components:**

4,4’-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

Genotoxicity in vitro

<table>
<thead>
<tr>
<th>Metabolic activation: with and without metabolic activation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: OECD Test Guideline 476</td>
</tr>
<tr>
<td>Result: positive</td>
</tr>
</tbody>
</table>

Concentration: 0 - 5000 ug/plate

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: positive

Barium sulfate:

Genotoxicity in vitro

<table>
<thead>
<tr>
<th>Metabolic activation: with and without metabolic activation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method: OECD Test Guideline 476</td>
</tr>
<tr>
<td>Result: negative</td>
</tr>
</tbody>
</table>

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471

Result: negative

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

Genotoxicity in vitro

<table>
<thead>
<tr>
<th>Concentration: 10 - 5000 ug/plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic activation: with and without metabolic activation</td>
</tr>
<tr>
<td>Method: OECD Test Guideline 471</td>
</tr>
<tr>
<td>Result: positive</td>
</tr>
</tbody>
</table>

Concentration: 1 - 100 µg/L

Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 473

Result: positive
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:

Genotoxicity in vitro:
- Metabolic activation: with and without metabolic activation
  Method: OECD Test Guideline 471
  Result: positive
  GLP: yes
- Metabolic activation: with and without metabolic activation
  Method: OECD Test Guideline 476
  Result: positive
  GLP: yes
- Metabolic activation: with and without metabolic activation
  Method: OECD Test Guideline 473
  Result: negative
  GLP: yes

Components:

4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

Genotoxicity in vivo:
- Cell type: Germ
  Application Route: Oral
  Method: OECD Test Guideline 478
  Result: negative
- Cell type: Somatic
  Application Route: Oral
  Dose: 0 - 5000 mg/kg
  Method: OPPTS 870.5395
  Result: negative

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

Genotoxicity in vivo:
- Test Type: In vivo micronucleus test
  Species: Mouse
  Cell type: Somatic
  Application Route: Oral
  Exposure time: 4 d
  Dose: 187.5 - 750 mg/kg
  Method: OECD Test Guideline 474
  Result: negative
- Test Type: unscheduled DNA synthesis assay
  Species: Rat
  Cell type: Liver cells
  Application Route: Oral
  Method: OECD Test Guideline 486
  Result: negative

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:

Genotoxicity in vivo:
- Cell type: Germ
  Application Route: Oral
  Method: OECD Test Guideline 483
  Result: positive
  GLP: yes
- Cell type: Somatic
  Application Route: Oral
Components:

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

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Germ cell mutagenicity- 
Assessment: In vitro tests showed mutagenic effects

Germ cell mutagenicity- 
Assessment: No data available

Carcinogenicity

Components:

4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
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

barium sulfate:
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 104 weeks
Dose: 60 - 75 mg/kg
Method: OPPTS 870.4200
Result: negative

Species: Mouse, (male and female)
Application Route: Oral
Dose: 160 - 200 mg/kg  
Method: OPPTS 870.4200  
Result: negative

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Species: Rat, (male)  
Application Route: Oral  
Exposure time: 99 weeks  
Dose: 4.36 mg/kg  
Frequency of Treatment: 24 hour  
Method: OECD Test Guideline 451  
Result: negative

Carcinogenicity - Assessment: No data available

IARC: Group 1: Carcinogenic to humans  
quartz (SiO2)

ACGIH: Suspected human carcinogen  
quartz (SiO2)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP: Known to be human carcinogen  
quartz (SiO2)

Reproductive toxicity

Components:
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
Effects on fertility: Test Type: Two-generation study  
Species: Rat, male and female  
Application Route: Oral  
Dose: >750 milligram per kilogram  
General Toxicity - Parent: No-observed-effect level: 540 mg/kg body weight  
General Toxicity F1: No-observed-effect level: 540 mg/kg body weight  
Symptoms: No adverse effects  
Method: OECD Test Guideline 416  
Result: No effects on fertility and early embryonic development were detected.

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Species: Rat, male  
Application Route: Oral  
Target Organs: Reproductive organs  
Method: OECD Test Guideline 408  
GLP: yes
Components:
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

Effects on foetal development:
Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level:
30 mg/kg body weight
Method: Other guidelines
Result: No teratogenic effects

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

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

Reproductive toxicity - Assessment: No data available

STOT - single exposure
No data available

STOT - repeated exposure

Components:
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Exposure routes: Ingestion
Target Organs: Cardio-vascular system
Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 14 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
NOEL: 10 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 5 d
Method: Subchronic toxicity
Species: Mouse, male
NOAEL: 100 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 3 d
Method: Subchronic toxicity

barium sulfate:
Species: Rat
LOEC: >= 104 mg/kg, 40 mg/m3
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 5 h
Number of exposures: 5 d
Method: Subchronic toxicity

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

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Species: Mouse, male and female
NOEC: < 100 mg/m3
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 2456 h
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:**
Remarks: No data available

### SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Components:**
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

- **Toxicity to fish:** LC50 (Oncorhynchus mykiss (rainbow trout)): 1.5 mg/l
  - Exposure time: 96 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 203

barium sulfate:

- **Toxicity to fish:** LC50: 174 mg/l
  - Exposure time: 96 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 203

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

- **Toxicity to fish:** LC50 (Brachydanio rerio (zebrafish)): 24 mg/l
  - Exposure time: 96 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 203

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:

- **Toxicity to fish:** LC50 (Brachydanio rerio (zebrafish)): > 77 mg/l
  - Exposure time: 96 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 203
  - GLP: no

**Components:**
### Components:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Toxicity to daphnia and other aquatic invertebrates</th>
<th>Toxicity to algae</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane</td>
<td>EC50 (Daphnia magna (Water flea)): 2.7 mg/l</td>
<td>EC50 (Selenastrum capricornutum (green algae)): 9.4 mg/l</td>
</tr>
<tr>
<td>Exposure time: 48 h</td>
<td>Exposure time: 72 h</td>
<td></td>
</tr>
<tr>
<td>Test Type: static test</td>
<td>Test Type: static test</td>
<td></td>
</tr>
<tr>
<td>Test substance: Fresh water</td>
<td>Test substance: Fresh water</td>
<td></td>
</tr>
<tr>
<td>barium sulfate:</td>
<td></td>
<td>EC50: &gt; 100 mg/l</td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>LC50 (Daphnia magna (Water flea)): 14.5 mg/l</td>
<td>Exposure time: 48 h</td>
</tr>
<tr>
<td>Exposure time: 48 h</td>
<td>Test Type: static test</td>
<td></td>
</tr>
<tr>
<td>Test substance: Fresh water</td>
<td>Method: OECD Test Guideline 202</td>
<td></td>
</tr>
<tr>
<td>1,4-bis(2,3-epoxypropoxy)butane:</td>
<td></td>
<td>EL50: &gt; 160 mg/l</td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>EC50 (Daphnia magna (Water flea)): 75 mg/l</td>
<td>Exposure time: 24 h</td>
</tr>
<tr>
<td>Exposure time: 24 h</td>
<td>Test Type: static test</td>
<td></td>
</tr>
<tr>
<td>Test substance: Fresh water</td>
<td>Method: OECD Test Guideline 202</td>
<td></td>
</tr>
<tr>
<td>1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:</td>
<td></td>
<td>NOEC: &gt; 1.15 mg/l</td>
</tr>
<tr>
<td>Toxicity to daphnia and other aquatic invertebrates</td>
<td>LC50 (Daphnia magna (Water flea)): &gt; 100 mg/l</td>
<td>Exposure time: 24 h</td>
</tr>
<tr>
<td>Exposure time: 24 h</td>
<td>Test Type: static test</td>
<td></td>
</tr>
<tr>
<td>Test substance: Fresh water</td>
<td>Method: OECD Test Guideline 202</td>
<td></td>
</tr>
<tr>
<td>GLP: no</td>
<td></td>
<td>Method: OECD Test Guideline 201</td>
</tr>
<tr>
<td>barium sulfate:</td>
<td>NOEC: &gt; 1.15 mg/l</td>
<td></td>
</tr>
<tr>
<td>Toxicity to algae</td>
<td>Exposure time: 72 h</td>
<td></td>
</tr>
<tr>
<td>Test Type: static test</td>
<td>Test substance: Fresh water</td>
<td></td>
</tr>
<tr>
<td>Method: OECD Test Guideline 201</td>
<td></td>
<td>Method: OECD Test Guideline 201</td>
</tr>
</tbody>
</table>
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:

Toxicity to algae: EbC50 (Desmodesmus subspicatus (green algae)): 29 mg/l
  Exposure time: 72 h
  Test Type: static test
  Test substance: Fresh water
  Method: OECD Test Guideline 201
  GLP: yes

M-Factor (Acute aquatic toxicity): No data available

Toxicity to fish (Chronic toxicity): No data available

Components:

4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

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

Barium sulfate:

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 5.8 mg/l
  Exposure time: 21 d
  Test Type: semi-static test
  Test substance: Fresh water
  Method: OECD Test Guideline 211

M-Factor (Chronic aquatic toxicity): No data available

Components:

4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:

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

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

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

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:

Toxicity to microorganisms: IC50: > 100 mg/l
  Exposure time: 3 h
  Test Type: static test
  Test substance: Fresh water
  Method: OECD Test Guideline 209
  GLP: yes
Toxicity to soil dwelling organisms: No data available

Plant toxicity: No data available

Sediment toxicity: No data available

Toxicity to terrestrial organisms: No data available

Ecotoxicology Assessment

Components:
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Acute aquatic toxicity: This product has no known ecotoxicological effects.

Chronic aquatic toxicity: No data available

Toxicity Data on Soil: No data available

Other organisms relevant to the environment: No data available

Persistence and degradability

Components:
4,4’-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
Biodegradability: Inoculum: Sewage (STP effluent)
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5%
Exposure time: 28 d
Method: OECD Test Guideline 301F

1,4-bis(2,3-epoxypropoxy)butane:
Biodegradability: Inoculum: activated sludge
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 43%
Exposure time: 28 d
Method: OECD Test Guideline 301F

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Biodegradability: Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: > 0.5 - < 1%
Exposure time: 44 d
Method: OECD Test Guideline 301B

Biochemical Oxygen Demand (BOD): No data available

Chemical Oxygen Demand (COD): No data available
BOD/COD: No data available
ThOD: No data available
BOD/ThOD: No data available
Dissolved organic carbon (DOC): No data available
Physico-chemical removability: No data available

**Components:**
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
**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

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
**Stability in water:** Degradation half life (DT50): 6.66 d (25 °C) pH: 7
   Method: OECD Test Guideline 111
   GLP: no
   Remarks: Fresh water

Photodegradation: No data available
Impact on Sewage Treatment: No data available

Bioaccumulative potential

**Components:**
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
**Bioaccumulation:** Bioconcentration factor (BCF): 31
   Remarks: Does not bioaccumulate.

**Components:**
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
**Partition coefficient: n-octanol/water:** log Pow: 3.242 (25 °C)
   pH: 7.1
   Method: OECD Test Guideline 117

1,4-bis(2,3-epoxypropoxy)butane:
**Partition coefficient: n-octanol/water:** log Pow: -0.269 (25 °C)
   pH: 6.7
   Method: OECD Test Guideline 117
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Partition coefficient: n-octanol/water : log Pow: -0.8 (95 °C)
          pH: 5 - 8
          Method: OECD Test Guideline 107

Mobility in soil
Mobility : No data available

Components:
4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane:
Distribution among environmental compartments : Koc: 445

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

1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Distribution among environmental compartments : Koc: 31.7
          Method: OECD Test Guideline 121
          Koc: 50.1
          Method: OECD Test Guideline 121

Stability in soil : No data available

Other adverse effects
Environmental fate and pathways : No data available

Components:
1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione:
Results of PBT and vPvB assessment : This substance/mixture contains components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB).

Endocrine disrupting potential : No data available

Adsorbed organic bound halogens (AOX) : No data available

Hazardous to the ozone layer
Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
          Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological : An environmental hazard cannot be excluded in the event of
SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : 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

International Regulations

IATA
UN/ID No. : UN 3082
Proper shipping name : Environmentally hazardous substance, liquid, n.o.s.
(BISPHENOL A EPOXY RESIN, BUTANEDIOLDIGLYCIDYL ETHER)
Class : 9
Packing group : III
Labels : Miscellaneous
Packing instruction (cargo aircraft) : 964
Packing instruction (passenger aircraft) : 964

IMDG
UN number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(BISPHENOL A EPOXY RESIN, BUTANEDIOLDIGLYCIDYL ETHER)
Class : 9
Packing group : III
Labels : 9
EmS Code : F-A, S-F
Marine pollutant : yes
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations

DOT Classification
UN/ID/NA number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN)
Class : 9
Packing group : III
Labels : CLASS 9
ERG Code : 171
Marine pollutant : yes (BISPHENOL A EPOXY RESIN, BUTANEDIOLDIGLYCIDYL ETHER)
Remarks : Above applies only to containers over 119 gallons or 450 liters. Not regulated if shipped in packages less than or equal to 119 gallons (450 liters).

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

SARA 311/312 Hazards : Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitisation
Germ cell mutagenicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

California Prop. 65
WARNING: This product can expose you to chemicals including methanol, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The components of this product are reported in the following inventories:
CH INV : The formulation contains substances listed on the Swiss Inventory, On the inventory, or in compliance with the inventory
DSL : All components of this product are on the Canadian DSL
AICS : On the inventory, or in compliance with the inventory
NZIoC : On the inventory, or in compliance with the inventory
ENCS : Not in compliance with the inventory
KECI : Not in compliance with the inventory
SECTION 16. OTHER INFORMATION

Further information

NFPA:  

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Health</th>
<th>Special hazard.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>*</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

HMIS® IV:  

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/'" represents the absence of a chronic hazard.

Revision Date : 09/06/2017

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
OSHA Z-1 : USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
OSHA Z-3 : USA. Occupational Exposure Limits (OSHA) - Table Z-3 Mineral Dusts
ACGIH / TWA : 8-hour, time-weighted average
OSHA Z-1 / TWA : 8-hour time weighted average
OSHA Z-3 / TWA : 8-hour time weighted average

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.

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IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN
PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN
INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.
SECTION 1. IDENTIFICATION

Product name : ARALDITE® 2014 B US

Manufacturer or supplier’s details
Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
           The Woodlands,
           TX  77387
           United States of America (USA)
Telephone : Non-Emergency: (800) 257-5547
E-mail address of person responsible for the SDS : MSDS@huntsman.com
Emergency telephone number : Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use
Recommended use : Hardener

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200
Skin irritation : Category 2
Serious eye damage : Category 1
Skin sensitisation : Category 1
Reproductive toxicity : Category 1B
Chronic aquatic toxicity : Category 3

GHS label elements
Hazard pictograms :

Signal word : Danger
Hazard statements : H315 Causes skin irritation.
                      H317 May cause an allergic skin reaction.
                      H318 Causes serious eye damage.
                      H360F May damage fertility.
                      H412 Harmful to aquatic life with long lasting effects.

Precautionary statements : Prevention:
                          P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
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.
P333 + P313 IF skin irritation or rash occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

Storage:
P405 Store locked up.

Disposal:
P501 Dispose of contents/container to an approved facility in accordance with local, regional, national and international regulations.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substance / Mixture</th>
<th>Mixture</th>
</tr>
</thead>
</table>

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium sulfate</td>
<td>7727-43-7</td>
<td>30 - 50</td>
</tr>
<tr>
<td>Fatty acids, C18-unsatd., dimers, polymers with tall-oil fatty acids and triethylenetetramine</td>
<td>68082-29-1</td>
<td>20 - 30</td>
</tr>
<tr>
<td>Polyaminoamide</td>
<td>ACCN # 255120</td>
<td>5 - 10</td>
</tr>
<tr>
<td>N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine</td>
<td>10563-29-8</td>
<td>5 - 9.65</td>
</tr>
<tr>
<td>2,2’-iminodi(ethylamine)</td>
<td>111-40-0</td>
<td>3 - 5</td>
</tr>
<tr>
<td>4,4’-isopropylidenediphenol</td>
<td>80-05-7</td>
<td>1 - 2.5</td>
</tr>
<tr>
<td>Triethylenetetramine</td>
<td>112-24-3</td>
<td>1 - 2.5</td>
</tr>
<tr>
<td>N-[2-(1-piperazinyl)ethyl]ethylenediamine</td>
<td>24028-46-4</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

The specific chemical identity and/or exact percentage (concentration) of composition may be withheld as a trade secret.
SECTION 4. FIRST AID MEASURES

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

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

In case of skin contact : 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.

Most important symptoms and effects, both acute and delayed : None known.

Notes to physician : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

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

Unsuitable extinguishing media : High volume water jet

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
SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
- Use personal protective equipment.

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.

Methods and materials for containment and 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.

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion
- Normal measures for preventive fire protection.

Advice on safe handling
- Do not breathe vapours/dust.
- Avoid exposure - obtain special instructions before use.
- Avoid contact with skin and eyes.
- For personal protection see section 8.
- Smoking, eating and drinking should be prohibited in the application area.
- To avoid spills during handling keep bottle on a metal tray.
- Dispose of rinse water in accordance with local and national regulations.
- Persons susceptible to skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used.

Conditions for safe storage
- 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.

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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>barium sulfate</td>
<td>7727-43-7</td>
<td>TWA (total dust)</td>
<td>15 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (respirable fraction)</td>
<td>5 mg/m³</td>
<td>OSHA Z-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA (Inhalable fraction)</td>
<td>5 mg/m³</td>
<td>ACGIH</td>
</tr>
<tr>
<td>2,2'-iminodi(ethylamine)</td>
<td>111-40-0</td>
<td>TWA</td>
<td>1 ppm</td>
<td>ACGIH</td>
</tr>
</tbody>
</table>

Personal protective equipment

Respiratory protection: No personal respiratory protective equipment normally required.

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

Hand protection Remarks: The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection: Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

Skin and body protection: Impervious clothing
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures: When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: paste

Colour: grey

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

pH : No data is available on the product itself.

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

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

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

Flash point : > 199 °F / > 93 °C
   Method: estimated, closed cup

Evaporation rate : No data is available on the product itself.

Flammability (solid, gas) : No data is available on the product itself.

Flammability (liquids) : No data is available on the product itself.

Upper explosion limit / Upper flammability limit : No data is available on the product itself.

Lower explosion limit / Lower flammability limit : No data is available on the product itself.

Vapour pressure : No data is available on the product itself.

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

Relative density : 1.57

Density : No data is available on the product itself.

Solubility(ies)
   Water solubility : < 0.1 g/l (68 °F / 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.

Thermal decomposition : No data is available on the product itself.

Self-Accelerating decomposition temperature (SADT) : No data is available on the product itself.

Viscosity
   Viscosity, dynamic : thixotropic

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

Oxidizing properties : No data is available on the product itself.
SECTION 10. STABILITY AND REACTIVITY

Reactivity : No decomposition if stored and applied as directed.
Chemical stability : No decomposition if stored and applied as directed.
Possibility of hazardous reactions : No decomposition if stored and applied as directed.
Conditions to avoid : No data available
Incompatible materials : No data available
Hazardous decomposition products : None known.
Hazardous decomposition products : carbon monoxide
: carbon dioxide
: Nitrogen oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : No data is available on the product itself.

Acute toxicity
Acute oral toxicity - Product : Acute toxicity estimate : > 5,000 mg/kg
Method: Calculation method

Acute inhalation toxicity - Product : Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity - Product : Acute toxicity estimate : > 5,000 mg/kg
Method: Calculation method

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

Skin corrosion/irritation
Product:
Result: Skin irritation
Remarks: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation
Product:
Remarks: May cause irreversible eye damage.

**Respiratory or skin sensitisation**

**Product:**
Remarks: Causes sensitisation.

**Assessment:**
No data available

**Germ cell mutagenicity**

**Components:**

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

- **N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:**
  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
  Method: OECD Test Guideline 476
  Result: negative

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

- **Components:**

  - **2,2’-imino(diethylamine):**
    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:
barium sulfate:
Species: Rat, male and female
Application Route: Oral
Exposure time: 104 weeks
Dose: 60 - 75 mg/kg
Method: OPPTS 870.4200
Result: negative

Species: Mouse, male and female
Application Route: Oral
Dose: 160 - 200 mg/kg
Method: OPPTS 870.4200
Result: negative

N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Species: Mouse, male
Application Route: Dermal
Exposure time: 20 month(s)
Frequency of Treatment: 3 daily
Result: negative

2,2'-iminodi(ethylamine):
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 days/week
Method: OECD Test Guideline 451
Result: negative

Species: Mouse, male
Application Route: Dermal
Exposure time: 104 weeks
Dose: 16.8 mg/kg
Frequency of Treatment: 3 days/week
Method: OECD Test Guideline 451

Carcinogenicity - Assessment: No data available

IARC
No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH
No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

OSHA
No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

NTP
No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Components:
N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
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.

2,2’-iminodi(ethylamine):
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
Method: OECD Test Guideline 416
Result: Embryotoxic effects and adverse effects on the offspring were detected.

Components:
N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Effects on foetal development:
Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level:
15 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 15 mg/kg body weight
Embryo-fetal toxicity: No observed adverse effect level: 15 mg/kg body weight
Method: OECD Test Guideline 422
Result: No effects on fertility and early embryonic development were detected.

2,2'-iminodi(ethylamine):
Species: Rat
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

4,4'-isopropylidenediphenol:
Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level:
< 160 mg/kg body weight
Method: OECD Test Guideline 416
Result: No teratogenic effects

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

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

Components:
N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Reproductive toxicity - Assessment: No evidence of adverse effects on sexual function and fertility, or on development, based on animal experiments.

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

STOT - single exposure
Components:
2,2’-iminodi(ethylamine):
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:**
barium sulfate:
Species: Rat
LOEC: >= 104 mg/kg, 40 mg/m3
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 5 h
Number of exposures: 5 d
Method: Subchronic toxicity

N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Species: Rat, male and female
NOEC: 550 ppm
Application Route: Ingestion
Test atmosphere: vapour
Exposure time: 3 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Mouse, male
NOAEL: >= 56.3 mg/kg/d
Application Route: Skin contact
Exposure time: 20 h
Number of exposures: 3 d
Method: Chronic toxicity

2,2’-iminodi(ethylamine):
Species: Rat, male and female
NOEC: 70 - 80 mg/m3
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 mg/kg/d
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 mg/m3  
Application Route: Ingestion  
Test atmosphere: dust/mist  
Exposure time: 2,160 h  
Number of exposures: 7 d  
Method: Subchronic toxicity

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

Triethylenetetramine:  
Species: Rat, male and female  
NOAEL: 50 mg/kg/d  
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:
Remarks: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
barium sulfate:
Toxicity to fish: LC50: 174 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Toxicity to fish: LC50 (Brachydanio rerio (zebrafish)): > 100 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

2,2'-iminodi(ethylamine):
Toxicity to fish: LC50: 430 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water

4,4'-isopropylidenediphenol:
Toxicity to fish: LC50 (Oncorhynchus mykiss (rainbow trout)): 7.5 mg/l
Exposure time: 96 h

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: Fish Acute Toxicity Test

Components:
barium sulfate:
Toxicity to daphnia and other aquatic invertebrates: LC50 (Daphnia magna (Water flea)): 14.5 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Toxicity to daphnia and other aquatic invertebrates
EC50 (Daphnia magna (Water flea)): 9.2 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

2,2'-iminodi(ethylamine):
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

4,4'-isopropylidenediphenol:
Toxicity to daphnia and other aquatic invertebrates
EC50: 3.9 - 10.2 mg/l
Exposure time: 48 h
(Ceriodaphnia dubia (Water flea)):

Triethylenetetramine:
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

Components:
barium sulfate:
Toxicity to algae
EC50: > 100 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

NOEC: > 1.15 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

N'-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Toxicity to algae
ErC50 (Selenastrum capricornutum (green algae)): 21 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

2,2'-iminodi(ethylamine):
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

4,4'-isopropylidenediphenol:
Toxicity to algae:
EC50 (Selenastrum capricornutum (green algae)): 2.5 - 3.1 mg/l
Exposure time: 96 h

Triethylenetetramine:
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

Components:
2,2'-iminodi(ethylamine):
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 201

Components:
barium sulfate:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 5.8 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

Components:
2,2'-iminodi(ethylamine):
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
NOEC (Daphnia magna (Water flea)): 5.6 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water

Components:
Triethylenetetramine:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):
EC10 (Daphnia magna (Water flea)): 1.9 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 202
Components:
4,4'-isopropyldenediphenol:
M-Factor (Chronic aquatic toxicity) : 1

Components:
N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Toxicity to microorganisms : EC50 (Pseudomonas putida): 181 mg/l
Exposure time: 16 h
Test Type: static test
Test substance: Fresh water
Method: DIN 38 412 Part 8

Triethylenetetramine:
Toxicity to microorganisms : EC50 (activated sludge): 800 mg/l
Exposure time: 0.5 h
Test Type: static test
Test substance: Fresh water

Components:
2,2’-iminodi(ethylamine):
Toxicity to soil dwelling organisms : EC50 (Eisenia fetida (earthworms)): > 1,000 mg/kg
Exposure time: 56 d
Method: OECD Test Guideline 222

Plant toxicity : No data available
Sediment toxicity : No data available
Toxicity to terrestrial organisms : No data available

Ecotoxicology Assessment
Acute aquatic toxicity - Product : This product has no known ecotoxicological effects.
Chronic aquatic toxicity - Product : Harmful to aquatic life with long lasting effects.
Toxicity Data on Soil : No data available
Other organisms relevant to the environment : No data available

Persistence and degradability
Components:
N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 100 %
Exposure time: 28 d
Method: ISO Method, other

2,2’-iminodi(ethylamine):
Biodegradability : Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: 87 %
Exposure time: 21 d
Method: OECD Test Guideline 301D

4,4’-isopropylidenediphenol:
Biodegradability

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

Triethylenetetramine:
Biodegradability

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: Inherent Biodegradability: Modified SCAS Test

Biochemical Oxygen Demand (BOD)

: No data available

Chemical Oxygen Demand (COD)

: No data available

BOD/COD

: No data available

ThOD

: No data available

BOD/ThOD

: No data available

Dissolved organic carbon (DOC)

: No data available

Physico-chemical removability

: No data available

Stability in water

: No data available

**Components:**

2,2’-iminodi(ethylamine):

Photodegradation

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

Impact on Sewage Treatment

: No data available
Bioaccumulative potential

**Components:**

2,2’-iminodi(ethylamine):

- **Bioaccumulation**
  - Species: Cyprinus carpio (Carp)
  - Bioconcentration factor (BCF): 0.3 - 6.3
  - Exposure time: 42 d
  - Test substance: Fresh water
  - Method: flow-through test
  - Remarks: Bioaccumulation is unlikely.

**Components:**

N’-(3-aminopropyl)-N,N-dimethylpropane-1,3-diamine:

- **Partition coefficient: n-octanol/water**
  - log Pow: 0.5
  - log Pow: -0.56 (77 °F / 25 °C)
  - pH: 11.6
  - Method: OECD Test Guideline 107

2,2’-iminodi(ethylamine):

- **Partition coefficient: n-octanol/water**
  - log Pow: -1.58 (68 °F / 20 °C)
  - pH: 7

Triethylenetetramine:

- **Partition coefficient: n-octanol/water**
  - log Pow: -2.65 (68 °F / 20 °C)
  - Method: OECD Test Guideline 117

**Mobility in soil**

- **Mobility**
  - No data available

**Components:**

2,2’-iminodi(ethylamine):

- **Distribution among environmental compartments**
  - Koc: 19111

Triethylenetetramine:

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

**Stability in soil**

- No data available

**Other adverse effects**

- **Environmental fate and pathways**
  - No data available

- **Results of PBT and vPvB assessment**
  - No data available

- **Endocrine disrupting potential**
  - No data available

- **Adsorbed organic bound halogens (AOX)**
  - No data available
Hazardous to the ozone layer

Ozone-Depletion Potential: Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information - Product: An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life with long lasting effects.

Global warming potential (GWP): No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues: 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

International Regulations

IATA
Not regulated as dangerous goods

IMDG
Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations

DOT Classification
Not regulated as dangerous goods
SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 311/312 Hazards:
- Skin corrosion or irritation
- Serious eye damage or eye irritation
- Respiratory or skin sensitisation
- Reproductive toxicity

SARA 313:
The following components are subject to reporting levels established by SARA Title III, Section 313:

4,4’-isopropylidenediphenol
80-05-7
\(>= 1 - < 5\%\)

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

California Prop. 65
WARNING: This product can expose you to chemicals including 4,4’-isopropylidenediphenol, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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

CH INV: The formulation contains substances listed on the Swiss inventory, on the inventory, or in compliance with the inventory

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

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

NZIoC: Not in compliance with the inventory

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

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

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

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

TCI: 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), REACH (European Union), ENCS (Japan), ISHL (Japan), KECl (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

TSCA - 5(a) Significant New Use Rule List of Chemicals
No substances are subject to a Significant New Use Rule.

US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)
No substances are subject to TSCA 12(b) export notification requirements.
SECTION 16. OTHER INFORMATION

Further information

NFPA 704:

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Physical Hazard</th>
<th>Health</th>
<th>Special hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
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HMIS® IV:

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<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The “*” represents a chronic hazard, while the “/” represents the absence of a chronic hazard.

Revision Date: 05/14/2018

ACGIH: USA. ACGIH Threshold Limit Values (TLV)

OSHA Z-1: USA. Occupational Exposure Limits (OSHA) - Table Z-1

ACGIH / TWA: 8-hour, time-weighted average

OSHA Z-1 / TWA: 8-hour time weighted average

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