SAFETY DATA SHEET

EPOCAST® 50-A1 US

SECTION 1. IDENTIFICATION

Product name : EPOCAST® 50-A1 US

Manufacturer or supplier's details
Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : 2795 Slough Avenue Mississauga, ON L4T 1G2, Canada
Telephone : +1 905 678 9150
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 : Epoxy constituents

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the Hazardous Products Regulations
Skin irritation : Category 2
Eye irritation : Category 2A
Skin sensitisation : Category 1
Reproductive toxicity : Category 2
Acute aquatic toxicity : Category 2
Chronic aquatic toxicity : Category 2

GHS label elements
Hazard pictograms :

Signal word : Warning
Hazard statements : H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H361 Suspected of damaging fertility or the unborn child.
H411 Toxic 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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 IF skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 IF eye irritation persists: 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 waste disposal plant.

**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>Bisphenol A epoxy resin</td>
<td>25068-38-8</td>
<td>30 - 50</td>
</tr>
<tr>
<td>epoxy phenol novolac resin</td>
<td>28034-14-4</td>
<td>30 - 50</td>
</tr>
<tr>
<td>Silsesquioxanes, Ph, hydroxy-terminated</td>
<td>18118-39-0</td>
<td>10 - 20</td>
</tr>
<tr>
<td>tris(methyl(phenyl) phosphate</td>
<td>1330-78-5</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Phenol, 4-nonyl, branched</td>
<td>84852-15-3</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

### SECTION 4. 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 : Induce vomiting immediately and call a physician.
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.
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 use a solid water stream as it may scatter and spread fire.
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.

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.

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary.
SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
- Use personal protective equipment.
- Evacuate personnel to safe areas.
- Ensure adequate ventilation.
- In case of inadequate ventilation wear respiratory protection.

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.
- 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.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters:
Contains no substances with occupational exposure limit values.

Personal protective equipment:
Respiratory protection:
- In the case of vapour formation use a respirator with an approved filter.
- Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.
- Respirator selection must be based on known or anticipated
exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hand protection
Material: butyl-rubber
Break through time: > 8 h

Material: Nitrile rubber
Material: Neoprene
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).

Eye protection
Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.
Ensure that eyewash stations and safety showers are close to the workstation location.

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: liquid

Colour: light yellow

Odour: slight

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

pH: No data is available on the product itself.

Melting point/freezing point: No data available

Boiling point: > 200 °C

Flash point: > 95 °C
   Method: closed cup

Evaporation rate: No data is available on the product itself.
<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Flammability (liquids)</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>&lt; 1.5 hPa (20 °C)</td>
</tr>
<tr>
<td>Relative vapour density</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Relative density</td>
<td>1.21</td>
</tr>
<tr>
<td>Density</td>
<td>1.2 g/cm³ (25 °C)</td>
</tr>
<tr>
<td>Solubility (gas)</td>
<td></td>
</tr>
<tr>
<td>Water solubility</td>
<td>partly soluble (20 °C)</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>&gt; 200 °C</td>
</tr>
<tr>
<td>Self-Accelerating decomposition temperature (SADT)</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Viscosity</td>
<td></td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>7,770 mPa.s (20 °C)</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>No data available</td>
</tr>
<tr>
<td>Particle size</td>
<td>No data is available on the product itself.</td>
</tr>
</tbody>
</table>

**SECTION 10. STABILITY AND REACTIVITY**

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reactivity</td>
<td>Stable under recommended storage conditions.</td>
</tr>
<tr>
<td>Chemical stability</td>
<td>No decomposition if stored and applied as directed.</td>
</tr>
<tr>
<td>Possibility of hazardous reactions</td>
<td>Stable under normal conditions.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>No data available</td>
</tr>
<tr>
<td>Incompatible materials</td>
<td>Strong acids and strong bases</td>
</tr>
<tr>
<td></td>
<td>Strong oxidizing agents</td>
</tr>
<tr>
<td>Hazardous decomposition</td>
<td>Burning produces noxious and toxic fumes.</td>
</tr>
</tbody>
</table>
SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Acute toxicity

Components:

Bisphenol A epoxy resin:
Acute oral toxicity Components: LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 420
Assessment: The substance or mixture has no acute oral toxicity

Epoxide phenol novolac resin:
Acute oral toxicity Components: LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 420
Assessment: The substance or mixture has no acute oral toxicity

Tris(methylphenyl) phosphate:
Acute oral toxicity Components: LD50 (Rat): > 20,000 mg/kg

Phenol, 4-nonyl, branched:
Acute oral toxicity Components: LD50 (Rat, male and female): 1,412 mg/kg

Acute inhalation toxicity - Product:
Acute toxicity estimate: > 40 mg/l
Exposure time: 4 h
Test atmosphere: vapour
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: May cause skin irritation and/or dermatitis.
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Version 1.0 Revision Date: 04/06/2017 SDS Number: 400001008922 Date of last issue: - Date of first issue: 04/06/2017

Serious eye damage/eye irritation

Components:
Bisphenol A epoxy resin:
Species: Rabbit
Result: Irritating to eyes.
Assessment: Mild eye irritant
Method: OECD Test Guideline 405

epoxy phenol novolac resin:
Species: Rabbit
Result: Irritating to eyes.
Method: OECD Test Guideline 405

tris(methylphenyl) phosphate:
Species: Rabbit
Result: No eye irritation
Assessment: No eye irritation

Phenol, 4-nonyl-, branched:
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation

Product:
Remarks: Causes sensitisation.

Components:
Phenol, 4-nonyl-, branched:
Assessment: Causes severe skin burns and eye damage.

Germ cell mutagenicity

Components:
Bisphenol A epoxy resin:
Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Concentration: 0 - 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

epoxy phenol novolac resin:
Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
Result: positive

Concentration: 0 - 5000 ug/plate
Metabolic activation: with and without metabolic activation
Result: positive

tris(methylphenyl) phosphate:
Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
Result: negative
Components:

Bisphenol A epoxy resin:
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

epoxy phenol novolac resin:
Genotoxicity in vivo

: Cell type: Germ
  Application Route: Oral
  Result: negative

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

Components:

Bisphenol A epoxy resin:
Germ cell mutagenicity-Assessment

: Weight of evidence does not support classification as a germ cell mutagen.

tris(methylphenyl) phosphate:
Germ cell mutagenicity-Assessment

: In vitro tests did not show mutagenic effects

Germ cell mutagenicity-Assessment

: No data available

Carcinogenicity

Components:

Bisphenol A epoxy resin:
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

epoxy phenol novolac resin:  
Species: Rat, (male and female)  
Application Route: Oral  
Exposure time: 24 month(s)  
Dose: 15 mg/kg  
Frequency of Treatment: 7 daily  
Method: OECD Test Guideline 453  
Result: negative

Species: Mouse, (male)  
Application Route: Dermal  
Exposure time: 24 month(s)  
Dose: 1 mg/kg  
Frequency of Treatment: 3 daily  
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 daily  
Method: OECD Test Guideline 453  
Result: negative

Components:
tris(methylphenyl) phosphate:  
Carcinogenicity -  
Assessment  
ACGIH  
Animal testing did not show any carcinogenic effects.

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.

Reproductive toxicity

Components:
Bisphenol A epoxy resin:  
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.

epoxy phenol novolac resin:
Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

tris(methylphenyl) phosphate:
Species: Rat, male and female
Application Route: Oral
Target Organs: Testes
Method: OECD Test Guideline 415
Target Organs: Ovary

Components:
Bisphenol A epoxy resin:
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

epoxy phenol novolac resin:
Species: Rabbit, female
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level: 30 mg/kg body weight
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

tris(methylphenyl) phosphate:

Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No-observed-effect level: 20 mg/kg body weight
Method: OPPTS 870.3700
Result: Teratogenic effects

Phenol, 4-nonyl-, branched:

Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 75 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Components:

tris(methylphenyl) phosphate:
Reproductive toxicity - Assessment:
Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Phenol, 4-nonyl-, branched:
Reproductive toxicity - Assessment:
Suspected human reproductive toxicant

STOT - single exposure
No data available

STOT - repeated exposure
No data available

Repeated dose toxicity

Components:

Bisphenol A epoxy resin:
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

epoxy phenol novolac resin:
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

tris(methylphenyl) phosphate:
Species: Rat, male and female
NOEL: 1000 mg/kg
Application Route: Ingestion
Exposure time: 2,160 h
Method: Subchronic toxicity

Phenol, 4-nonyl-, branched:
Species: Rat, male and female
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 672 h
Number of exposures: 7 d
Method: Subacute toxicity

Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 2,160 h
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Version 1.0  Revision Date: 04/06/2017  SDS Number: 400001008922  Date of last issue: -  Date of first issue: 04/06/2017

Number of exposures: 7 d
Method: Subchronic toxicity

Components:
Phenol, 4-nonyl-, branched:
Repeated dose toxicity - Assessment: Causes severe skin burns and eye damage.

Aspiration toxicity
No data available

Experience with human exposure
General Information: No data available

Inhalation: No data available
Skin contact: No data available
Eye contact: No data available
Ingestion: No data available

Toxicology, Metabolism, Distribution
No data available

Neurological effects
No data available

Further information
Product:
Remarks: No data available

Other health hazards
No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:
Bisphenol A epoxy resin: LC50 (Oncorhynchus mykiss (rainbow trout)): 1.5 mg/l
Toxicity to fish: Exposure time: 96 h
Test Type: static test
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<table>
<thead>
<tr>
<th>Test substance:</th>
<th>Fresh water</th>
<th>Method: OECD Test Guideline 203</th>
</tr>
</thead>
</table>

#### epoxy phenol novolac resin:

**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

#### tris(methylphenyl) phosphate:

**Toxicity to fish**

- **LC50 (Oncorhynchus mykiss (rainbow trout)):** 0.6 mg/l
  - Exposure time: 96 h

#### Phenol, 4-nonyl-, branched:

**Toxicity to fish**

- **LC50 (Pimephales promelas (fathead minnow)):** 0.128 mg/l
  - Exposure time: 96 h
  - Test Type: flow-through test
  - Test substance: Fresh water
  - Method: ASTM Method, other

  - **LC50 (Lepomis macrochirus (Bluegill sunfish)):** 0.209 mg/l
    - Exposure time: 96 h
    - Test Type: flow-through test
    - Test substance: Fresh water
    - Method: ASTM Method, other

  - **LC50 (Oncorhynchus mykiss (rainbow trout)):** 0.221 mg/l
    - Exposure time: 96 h
    - Test Type: flow-through test
    - Test substance: Fresh water
    - Method: ASTM Method, other

#### Components:

**Bisphenol A epoxy resin:**

**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

**epoxy phenol novolac resin:**

**Toxicity to daphnia and other aquatic invertebrates**

- **EC50 (Daphnia magna (Water flea)):** 1.7 mg/l
  - Exposure time: 48 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 202

- **EC50 (Daphnia magna (Water flea)):** 2.7 mg/l
  - Exposure time: 48 h
  - Test Type: static test
  - Test substance: Fresh water

**tris(methylphenyl) phosphate:**

**Toxicity to daphnia and other aquatic invertebrates**

- **EC50 (Daphnia magna (Water flea)):** 0.146 mg/l
  - Exposure time: 48 h
Phenol, 4-nonyl-, branched:
Toxicity to daphnia and other aquatic invertebrates
  EC50 (Daphnia magna (Water flea)): 0.065 mg/l
  Exposure time: 48 h
  Test Type: static test
  Test substance: Fresh water
  Method: ASTM Method, other

  EC50 (Daphnia magna (Water flea)): 0.14 mg/l
  Exposure time: 48 h
  Test Type: static test
  Test substance: Fresh water

Components:
Epoxy phenol novolac resin:
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

  EC50 (Selenastrum capricornutum (green algae)): 9.4 mg/l
  Exposure time: 72 h
  Test Type: static test
  Test substance: Fresh water

Tris(methylphenyl) phosphate:
Toxicity to algae
  ErC50: 0.4042 mg/l
  Exposure time: 72 h

Phenol, 4-nonyl-, branched:
Toxicity to algae
  EbC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): 1.3 mg/l
  Exposure time: 72 h
  Test Type: static test
  Test substance: Fresh water

  ErC50 (Selenastrum capricornutum (green algae)): 0.41 mg/l
  Exposure time: 96 h
  Test Type: static test
  Test substance: Fresh water
  Method: Algal Toxicity, Tiers I and II

Components:
Phenol, 4-nonyl-, branched:
M-Factor (Acute aquatic toxicity)
  10

Components:
Epoxy phenol novolac resin:
Toxicity to fish (Chronic toxicity)
  GLP: yes

Tris(methylphenyl) phosphate:
Toxicity to fish (Chronic toxicity)
  NOEC (Other): 0.01 mg/l
## Components:

### Bisphenol A epoxy resin:

<table>
<thead>
<tr>
<th>Toxicity to fish (Chronic toxicity)</th>
<th>NOEC (Oncorhynchus mykiss (rainbow trout)): 0.006 mg/l Exposure time: 91 d Test Type: flow-through test Test substance: Fresh water</th>
</tr>
</thead>
</table>

### Bisphenol A epoxy resin:

<table>
<thead>
<tr>
<th>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</th>
<th>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</th>
</tr>
</thead>
</table>

### Epoxy phenol novolac resin:

<table>
<thead>
<tr>
<th>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</th>
<th>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</th>
</tr>
</thead>
</table>

### Tris(methylphenyl) phosphate:

<table>
<thead>
<tr>
<th>Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)</th>
<th>NOEC (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d</th>
</tr>
</thead>
</table>

### Components:

### Bisphenol A epoxy resin:

<table>
<thead>
<tr>
<th>Toxicity to microorganisms</th>
<th>IC50 (activated sludge): &gt; 100 mg/l Exposure time: 3 h Test Type: static test Test substance: Fresh water</th>
</tr>
</thead>
</table>

### Epoxy phenol novolac resin:

<table>
<thead>
<tr>
<th>Toxicity to microorganisms</th>
<th>IC50 (activated sludge): &gt; 100 mg/l Exposure time: 3 h Test Type: static test Test substance: Fresh water</th>
</tr>
</thead>
</table>

### Tris(methylphenyl) phosphate:

<table>
<thead>
<tr>
<th>Toxicity to microorganisms</th>
<th>EC50 (activated sludge): &gt; 1,000 mg/l Exposure time: 3 h</th>
</tr>
</thead>
</table>

### Phenol, 4-nonyl-, branched:

<table>
<thead>
<tr>
<th>Toxicity to microorganisms</th>
<th>EC50 (activated sludge): 950 mg/l Exposure time: 3 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 209</th>
</tr>
</thead>
</table>
Components:
Phenol, 4-nonyl-, branched:
Toxicity to soil dwelling organisms: EC10: 3.44 mg/kg
Exposure time: 504 h
EC50 (Other): 906.7 mg/kg
Exposure time: 4 Weeks
Test substance: Synthetic

Plant toxicity: No data available
Sediment toxicity: No data available

Components:
Phenol, 4-nonyl-, branched:
Toxicity to terrestrial organisms: EC10: 63.2 mg/kg
Exposure time: 672 h
Test substance: Synthetic

Ecotoxicology Assessment
Acute aquatic toxicity: No data available
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:
Bisphenol A epoxy resin:
Biodegradability: Inoculum: Sewage (STP effluent)
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

epoxy phenol novolac resin:
Biodegradability: Inoculum: Sewage (STP effluent)
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

tris(methylphenyl) phosphate:
Biodegradability: Result: Not readily biodegradable.
Biodegradation: 24.2 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Phenol, 4-nonyl-, branched:
## Biodegradability
- **Inoculum**: activated sludge
  - **Concentration**: 13 mg/l
  - **Result**: Inherently biodegradable.
  - **Biodegradation**: ca. 48.2 %
  - **Exposure time**: 35 d
  - **Method**: OECD Test Guideline 301B

- **Inoculum**: Sediment
  - **Concentration**: 2
  - **Result**: Inherently biodegradable.
  - **Biodegradation**: 100 %
  - **Exposure time**: 63 - 84 d
  - **Method**: Anaerobic Biodegradability in the Subsurface

- **Inoculum**: Marine water
  - **Concentration**: 11
  - **Biodegradation**: 50 %
  - **Exposure time**: 56 - 112 d
  - **Method**: OECD Test Guideline 309

## 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:

#### Bisphenol A epoxy resin:
- **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

#### Epoxy phenol novolac resin:
- **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

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

Bioaccumulative potential

Components:
Bisphenol A epoxy resin:
Bioaccumulation: Bioconcentration factor (BCF): 31
Remarks: Does not bioaccumulate.

epoxy phenol novolac resin:
Bioaccumulation: Bioconcentration factor (BCF): 31
Remarks: Does not bioaccumulate.

Phenol, 4-nonyl-, branched:
Bioaccumulation: Species: Lepomis macrochirus (Bluegill sunfish);
Bioconcentration factor (BCF): 231
Remarks: Does not bioaccumulate.
Species: Pimephales promelas (fathead minnow);
Bioconcentration factor (BCF): 740
Remarks: Bioaccumulation is unlikely.

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

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

tris(methylphenyl) phosphate:
Partition coefficient: n-octanol/water: log Pow: 5.93

Phenol, 4-nonyl-, branched:
Partition coefficient: n-octanol/water: log Pow: 5.4 (23 °C)
pH: 5.7
Method: OECD Test Guideline 117
Mobility in soil
Mobility : No data available

Components:
Diphenol A epoxy resin:
Distribution among environmental compartments: Koc: 445
Epoxy phenol novolac resin:
Distribution among environmental compartments: Koc: 445
Tris(methylphenyl) phosphate:
Distribution among environmental compartments: Koc: 4.31 Method: OECD Test Guideline 121
Phenol, 4-nonyl-, branched:
Distribution among environmental compartments: Koc: 23000 - 489000
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 : Not applicable

Additional ecological information - Product : An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Toxic 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

TDG
UN number: UN 3062
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(BISPHENOL A EPOXY RESIN, EPOXY PHENOL NOVOLAC RESIN)
Class: 9
Packing group: III
Labels: 9

IATA
UN/ID No.: UN 3062
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s.
(BISPHENOL A EPOXY RESIN, EPOXY PHENOL NOVOLAC RESIN)
Class: 9
Packing group: III
Labels: Miscellaneous
Packing instruction (cargo aircraft): 964
Packing instruction (passenger aircraft): 964

IMDG
UN number: UN 3062
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(BISPHENOL A EPOXY RESIN, EPOXY PHENOL NOVOLAC RESIN)
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

TDG
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EPOCAST® 50-A1 US

Version: 1.0    Revision Date: 04/06/2017    SDS Number: 400001008922    Date of last issue: -

Class: 9
Packing group: III
Labels: 9
ERG Code: 171
Marine pollutant: yes

UN number: UN 3062
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, EPOXY PHENOL NOVOLAC RESIN)

SECTION 15. REGULATORY INFORMATION

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: Not in compliance with the inventory
PICCS: Low volume exemption
IECSC: On the inventory, or in compliance with the inventory
TCSI: Not 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), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

Canada. CEPA 1999 Significant New Activity (SNAc) List
No substances are subject to a Significant New Activity Notification.
SECTION 16. OTHER INFORMATION

Further information

NFPA:

HMIS® IV:

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 : 04/06/2017

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HARDENER 946 US

Version: 1.0
Revision Date: 01/25/2016
SDS Number: 400001010584
Date of last issue: -
Date of first issue: 01/25/2016

SECTION 1. IDENTIFICATION

Product name: HARDENER 946 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
Telephone: Non-Emergency: (800) 257-5547
E-mail address of person responsible for the SDS: MSDS@huntsman.com
Emergency telephone: 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
Acute toxicity (Inhalation): Category 2
Acute toxicity (Dermal): Category 4
Skin corrosion: Category 1B
Serious eye damage: Category 1
Skin sensitization: Category 1
Reproductive toxicity: Category 2
Specific target organ systemic toxicity - single exposure: Category 3 (Respiratory system)
Acute aquatic toxicity: Category 2
Chronic aquatic toxicity: Category 2

GHS Label element
Hazard pictograms: 

SDS_CA-AM – EN – 400001010584 1/20

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HARDENER 946 US

Version: 1.0
Revision Date: 01/25/2016
SDS Number: 400001010584
Date of last issue: -
Date of first issue: 01/25/2016

Signal Word: Danger

Hazard Statements: H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.
H411 Toxic 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.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 Wear respiratory protection.
Response:
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
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 or doctor/ physician.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 IF skin irritation or rash occurs: Get medical advice/ attention.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture: Mixture
Hazardous ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylenetriamine</td>
<td>111-40-0</td>
<td>30 - 60</td>
</tr>
<tr>
<td>4,4'-isopropylidenediphenol</td>
<td>80-05-7</td>
<td>30 - 60</td>
</tr>
<tr>
<td>Monoethanolamine</td>
<td>141-43-5</td>
<td>7 - 13</td>
</tr>
</tbody>
</table>

SECTION 4. FIRST AID MEASURES

If inhaled: Move to fresh air. Keep patient warm and at rest. If symptoms persist, call a physician.

In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. If symptoms persist, call a physician.

In case of eye contact: Immediately flush eye(s) with plenty of water. Remove contact lenses. Seek medical advice.

If swallowed: Rinse mouth with water. Do NOT induce vomiting. Consult a physician if necessary.

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

SECTION 5. FIRE-FIGHTING MEASURES

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

Unsuitable extinguishing media: None known.

Specific hazards during fire fighting: Do not use a solid water stream as it may scatter and spread fire. 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.

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

Personal precautions, protective equipment and emergency procedures

- Use personal protective equipment.
- Ensure adequate ventilation.

Environmental precautions

- Prevent product from entering drains.
- Do not allow contact with soil, surface or ground water.

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

- 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.

Conditions for safe storage

- Keep containers tightly closed in a cool, well-ventilated place.
- Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Materials to avoid

- Strong acids
- Strong bases
- Strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Personal protective equipment

Respiratory protection

- Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.
- Combined particulates and organic vapor type

Hand protection

Material: butyl-rubber
Break through time: > 8 h
Nitrile rubber
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).

Eye protection:
Safety glasses

Skin and body protection:
Protective suit

Hygiene measures:
Handle in accordance with good industrial hygiene and safety
practice.
When using do not eat, drink or smoke.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
liquid

Color:
amber

Odor:
amine-like

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

pH:
No data is available on the product itself.

Boiling point:
207 °C

Flash point:
> 100 °C
Method: Pensky-Martens closed cup, closed cup

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

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

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

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

Vapor pressure:
< 1.3 hPa (20 °C)

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

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

Density:
1.05 g/cm3 (25 °C)
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Date of first issue: 01/25/2016

Solubility(ies)
Water solubility : partly soluble (20 °C)

Solubility in other solvents : No data is available on the product itself.
Partition coefficient: n-octanol/water
Autoignition temperature : No data is available on the product itself.
Thermal decomposition : No data is available on the product itself.
Viscosity
Viscosity, dynamic : 400 mPa.s (25 °C)
Self-Accelerating decomposition temperature (SADT) : No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Stable under recommended storage conditions.
Chemical stability : No decomposition if stored and applied as directed.
Possibility of hazardous reactions : Stable under normal conditions.
Conditions to avoid : None known.
Incompatible materials : Strong acids and strong bases
                      : Strong oxidizing agents
Hazardous decomposition products : Carbon oxides
                                : Nitrogen oxides (NOx)
                                : Burning produces obnoxious and toxic fumes.

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity
Ingredients:
Diethyleneetriamine: LD50 (Rat, male): 1,620 mg/kg
                                GLP: no
Acute oral toxicity
Ingredients: 4,4'-isopropylienediphenol: LD50 (Rat, male and female): > 2,000 - < 5,000 mg/kg
                                  Method: OECD Test Guideline 401
                                  Assessment: The substance or mixture has no acute oral toxicity
Monoethanolamine:
SAFETY DATA SHEET

HARDENER 946 US

Version: 1.0
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Date of last issue: -
Date of first issue: 01/25/2016

Acute oral toxicity:
Ingredients: LD50 (Rat, male and female): 1,089 mg/kg
Method: OECD Test Guideline 401

Ingredients:
Diethylenetriamine:
Acute inhalation toxicity: LC50 (Rat, male and female): 0.185 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

4,4'-isopropylidenediphenol:
Acute inhalation toxicity: LC50 (Rat, male and female): > 170 mg/m3
Exposure time: 6 h
Test atmosphere: dust/mist

Monoethanolamine:
Acute inhalation toxicity: LC50 (Rat, male and female): > 1.3 mg/l
Exposure time: 6 h
Test atmosphere: vapor
Assessment: The component/mixture is moderately toxic after short term inhalation.

Ingredients:
Diethylenetriamine:
Acute dermal toxicity: LD50 (Rabbit): 1,045 mg/kg
GLP: no

4,4'-isopropylidenediphenol:
Acute dermal toxicity: LD50 (Rabbit, male): ca. 6,400 mg/kg

Monoethanolamine:
Acute dermal toxicity: LD50 (Rabbit, male and female): 2,504 mg/kg
Method: OECD Test Guideline 402
Assessment: The component/mixture is moderately toxic after single contact with skin.

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

Skin corrosion/irritation

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

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

Monoethanolamine:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Causes burns.

**Serious eye damage/eye irritation**

**Ingredients:**
- Diethylenetriamine:
  - Species: Rabbit
  - Result: Corrosive
  - Assessment: Corrosive
- 4,4'-isopropylidenediphenol:
  - Species: Rabbit
  - Result: Irreversible effects on the eye
  - Assessment: Severe eye irritation
  - Method: OECD Test Guideline 405
- Monoethanolamine:
  - Species: Rabbit
  - Result: Corrosive
  - Assessment: Corrosive

**Respiratory or skin sensitization**

**Ingredients:**
- Diethylenetriamine:
  - Routes of exposure: Skin
  - Species: Mouse
  - Method: OECD Test Guideline 429
  - Result: May cause sensitization by skin contact.
  - Remarks: Causes sensitization.

  Routes of exposure: Respiratory Tract
  Species: Mouse
  Result: Does not cause respiratory sensitization.

- 4,4'-isopropylidenediphenol:
  - Routes of exposure: Skin
  - Species: Mouse
  - Method: OECD Test Guideline 429
  - Result: Does not cause skin sensitization.

  Routes of exposure: Skin
  Species: Humans
  Assessment: May cause sensitization by skin contact.
  Result: Causes sensitization.

- Monoethanolamine:
  - Routes of exposure: Skin
**Species:** Guinea pig  
**Result:** Does not cause skin sensitization.

**Assessment:** No data available

### Germ cell mutagenicity

**Ingredients:**

| Ingredient                        | Genotoxicity in vitro | Metabolic activation: with and without metabolic activation | Method: OECD Test Guideline 471 | Result: | Metabolic activation: with and without metabolic activation | Method: OECD Test Guideline 476 | Result: | Metabolic activation: negative  
Result: |
|----------------------------------|-----------------------|----------------------------------------------------------|--------------------------------|---------|----------------------------------------------------------|--------------------------------|---------|----------------------------------------------------------|
| 4,4'-isopropylidenediphenol:     |                       | Metabolic activation: with and without metabolic activation | OECD Test Guideline 471      | negative| Metabolic activation: with and without metabolic activation | OECD Test Guideline 476      | negative| Metabolic activation: negative  
Result: |
| Genotoxicity in vitro           |                       | Metabolic activation: with and without metabolic activation | OECD Test Guideline 476      | negative| Metabolic activation: negative  
Result: |
| Monoethanolamine:                |                       | Metabolic activation: with and without metabolic activation | OECD Test Guideline 474      | negative| Application Route: Oral  
Result: negative |
| Genotoxicity in vitro           |                       | Cell type: Somatic                                        | OECD Test Guideline 474      | negative| Application Route: Oral  
Result: negative |
| Diethylenetriamine:              |                       | Dose: 85 - 850 mg/kg                                       | OECD Test Guideline 474      | negative| Application Route: Oral  
Result: negative |
| Genotoxicity in vivo            |                       | Dose: 375 - 1500 mg/kg                                     | OECD Test Guideline 474      | negative| Application Route: Oral  
Result: negative |
| 4,4'-isopropylidenediphenol:     |                       | Method: OECD Test Guideline 474                           | OECD Test Guideline 474      | negative| Application Route: Oral  
Result: negative |

### Carcinogenicity

**Ingredients:**

| Ingredient                        | Genotoxicity in vivo | Application Route: Dermal | Dose: 56.3 mg/kg | Frequency of Treatment: 3 daily  
Result: |
|----------------------------------|----------------------|---------------------------|------------------|----------------------------------|
| Diethylenetriamine:              | Species: Mouse, (male) | Dose: 56.3 mg/kg          | Frequency of Treatment: 3 daily  
Result: |
| Genotoxicity in vivo            | Application Route: Dermal | Dose: 56.3 mg/kg          | Frequency of Treatment: 3 daily  
Result: |
4,4'-isopropylidenediphenol:
Species: Rat, (male and female)
Application Route: Oral
Exposure time: 103 weeks
Frequency of Treatment: 7 daily
Result: negative

Carcinogenicity - Assessment: No data available

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

Reproductive toxicity

Ingredients:
Diethylenetriamine:
Effects on fertility: Species: Rat, male and female
Application Route: Oral
General Toxicity Parent: NOAEL (No observed adverse effect level): 30 mg/kg wet weight
Method: OECD Test Guideline 421

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.

Monoethanolamine:
Species: Rat, male and female
Application Route: Oral
Target Organs: Reproductive organs
Method: OECD Test Guideline 416

Ingredients:
Diethylenetriamine:
Effects on fetal development: Species: Rat
Application Route: Oral
General Toxicity Maternal: NOAEL (No observed adverse effect level): 100 mg/kg body weight
Method: OECD Test Guideline 421

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

Monoethanolamine:
Species: Rat  
Application Route: Oral  
General Toxicity Maternal: NOAEL (No observed adverse effect level): 120 mg/kg body weight  
Method: OECD Test Guideline 414  
Result: No teratogenic effects.

Species: Rat  
Application Route: Dermal  
General Toxicity Maternal: NOAEL (No observed adverse effect level): 75 mg/kg body weight  
Method: OECD Test Guideline 414  
Result: No teratogenic effects.

**Ingredients:**

4,4'-isopropylidenediphenol:

Reproductive toxicity - Assessment: Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

**STOT-single exposure**

**Ingredients:**

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.

Monoethanolamine:

Routes of exposure: Inhalation  
Target Organs: Respiratory Tract  
Assessment: May cause respiratory irritation.

**STOT-repeated exposure**

No data available

**Repeated dose toxicity**

**Ingredients:**

Diethylenetriamine:  
Species: Rat, male and female  
NOEC: 70 - 80 mg/m3  
Application Route: Ingestion  
Test atmosphere: vapor  
Exposure time: 360 h  
Number of exposures: 7 d  
Method: Subchronic toxicity  
Species: Rat, male and female
NOAEL (No observed adverse effect level): 114 mg/kg/d
Application Route: Skin contact
Exposure time: 9,600 h
Number of exposures: 6 d
Method: Chronic toxicity

4,4'-isopropylidenadiphenol:
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 (Lowest observed adverse effect level): 600 mg/kg
Application Route: Ingestion
Exposure time: 672 h
Number of exposures: 7 d
Method: Subchronic toxicity

Monoethanolamine:
Species: Rat, male and female
NOEC: 300 mg/m3
Application Route: Ingestion
Test atmosphere: vapor
Exposure time: 672 h
Number of exposures: 7 d
Method: OECD Test Guideline 412

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
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Toxicology, Metabolism, Distribution
No data available

Neurological effects
No data available

Further information
Ingestion: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:
Diethylenetriamine: 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

Monoethanolamine: Toxicity to fish : LC50 (Cyprinus carpio (Carp)): 349 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water

Ingredients:
Diethylenetriamine: 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)):

Monoethanolamine: Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 65 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
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**Ingredients:**

**Diethylenetriamine:**
- **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

**Monoethanolamine:**
- **Toxicity to algae**
  - ErC50 (Selenastrum capricornutum (green algae)): 2.5 mg/l
  - Exposure time: 72 h
  - Test substance: Fresh water
  - Method: OECD Test Guideline 201

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

**Ingredients:**

**Diethylenetriamine:**
- **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

**4,4’-isopropylidenediphenol:**
- **Toxicity to fish (Chronic toxicity)**
  - NOEC (Pimephales promelas (fathead minnow)): 0.016 mg/l
  - Exposure time: 444 d
  - Test Type: flow-through test
  - Test substance: Fresh water
  - Method: Fish Life Cycle Toxicity
  - Remarks: Toxic to aquatic organisms.

**Monoethanolamine:**
- **Toxicity to fish (Chronic toxicity)**
  - NOEC (Oryzias latipes (Orange-red killifish)): 1.2 mg/l
  - Exposure time: 30 d
  - Test substance: Fresh water
  - Method: OECD Test Guideline 210

**Ingredients:**

**Diethylenetriamine:**
- **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
Monoethanolamine:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 0.85 mg/l
Exposure time: 21 d
Test substance: Fresh water
Method: OECD Test Guideline 211

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

Toxicity to bacteria: No data available

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

Monoethanolamine:
Acute aquatic toxicity: Harmful to aquatic life.

Ingredients:
4,4'-isopropylidenediphenol:
Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.

Toxicity Data on Soil: No data available

Other organisms relevant to the environment: No data available

Further information: No data available

Persistence and degradability
Ingredients:
Diethylenetriamine:
Biodegradability: Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: 87 %
Exposure time: 21 d
Method: OECD Test Guideline 301D
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4,4'-isopropylidenediphenol:  
**Biodegradability**  
Result: Not readily biodegradable.  
Biodegradation: 1 - 2 %  
Exposure time: 28 d

Monoethanolamine:  
**Biodegradability**  
Inoculum: activated sludge  
Concentration: 20 mg/l  
Result: Readily biodegradable.  
Biodegradation: > 90 %  
Exposure time: 21 d  
Method: OECD Test Guideline 301A

**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

**Ingredients:**

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

**Monoethanolamine:**  
**Photodegradation**  
Test Type: Air  
Rate constant: 35.844  
Degradation (direct photolysis): 50 %

**Impact on Sewage Treatment**  
No data available

**Bioaccumulative potential**

**Ingredients:**

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

Ingredients:
Diethylenetriamine:
Partition coefficient: n-octanol/water : log Pow: -1.58 (20 °C)
                         pH: 7
Monoethanolamine:
Partition coefficient: n-octanol/water : log Pow: -1.31 (25 °C)

Mobility in soil
Mobility : No data available

Ingredients:
Diethylenetriamine:
Distribution among environmental compartments : Koc: 19111.
Monoethanolamine:
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 : Not applicable

Additional ecological information : No data available
Global warming potential (GWP) : No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Can be landfilled or incinerated, when in compliance with local regulations.
Where possible recycling is preferred to disposal or incineration.
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 Regulation

TDG
UN number: UN 2735
Proper shipping name: AMINES, LIQUID, CORROSIVE, N.O.S.
(DIETHYLENE TRIAMINE, ETHANOLAMINE)
Class: 8
Packing group: II
Labels: 8

IATA
UN/ID No.: UN 2735
Proper shipping name: Amine, liquid, corrosive, n.o.s.
(DIETHYLENE TRIAMINE, ETHANOLAMINE)
Class: 8
Packing group: II
Labels: Corrosive
Packing instruction (cargo aircraft): 855
Packing instruction (passenger aircraft): 851

IMDG
UN number: UN 2735
Proper shipping name: AMINES, LIQUID, CORROSIVE, N.O.S.
(DIETHYLENE TRIAMINE, ETHANOLAMINE)
Class: 8
Packing group: II
Labels: 8
EmS Code: F-A, S-B
Marine pollutant: yes

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

Domestic regulation
SAFETY DATA SHEET

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TDG
UN number: UN 2735
Proper shipping name: AMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENE TRIAMINE, ETHANOLAMINE)
Class: 8
Packing group: II
Labels: 8
ERG Code: 153
Marine pollutant: yes(4,4'-ISOPROPY利NEDIPHENOL)

SECTION 15. REGULATORY INFORMATION

TSCA - 5(a) Significant New Use Rule List of Chemicals: Not relevant

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

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

- CH INV: The mixture contains substances listed on the Swiss Inventory
- TSCA: On TSCA 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: On the inventory, or in compliance with the inventory
- ISHL: On the inventory, or in compliance with the inventory
- KECI: On the inventory, or in compliance with the inventory
- PICCS: On the inventory, or in compliance with the inventory
- IECSC: On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

Further information

NFPA:

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Special hazard.

HMIS III:

- HEALTH: 3
- FLAMMABILITY: 1
- PHYSICAL HAZARD: 1

0 = not significant, 1 = Slight, 2 = Moderate, 3 = High, 4 = Extreme, * = Chronic

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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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