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.
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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.
P332 + P313 IF respiratory tract irritation: 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

Hazardous / Mixture : Mixture

<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>25063-38-6</td>
<td>30 - 50</td>
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<tr>
<td>epoxy phenol novolac resin</td>
<td>28064-14-4</td>
<td>30 - 50</td>
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<tr>
<td>Silsesquioxanes, Ph, hydroxy-terminated</td>
<td>181136-39-0</td>
<td>10 - 20</td>
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<tr>
<td>tris(methylphenyl) phosphate</td>
<td>1330-78-5</td>
<td>10 - 20</td>
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<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.
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Flammability (solid, gas): No data is available on the product itself.
Flammability (liquids): No data is available on the product itself.
Upper explosion limit: No data is available on the product itself.
Lower explosion limit: No data is available on the product itself.
Vapour pressure: < 1.5 hPa (20 °C)
Relative vapour density: No data is available on the product itself.
Relative density: 1.21
Density: 1.2 g/cm³ (25 °C)
Solubility (gas): No data is available on the product itself.
Water solubility: partly soluble (20 °C)
Solubility in other solvents: No data is available on the product itself.
Partition coefficient: n-octanol/water: No data is available on the product itself.
Auto-ignition temperature: No data is available on the product itself.
Decomposition temperature: > 200 °C
Self-Accelerating decomposition temperature (SADT): No data is available on the product itself.
Viscosity
Viscosity, dynamic: 7,770 mPa.s (20 °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: 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: No data available
Incompatible materials: Strong acids and strong bases
Strong oxidizing agents
Hazardous decomposition: Burning produces noxious and toxic fumes.
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products
Carbon dioxide (CO2)
Carbon monoxide
Oxides of phosphorus
Halogenated compounds

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Acute toxicity

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

epoxy phenol novolac resin:
Acute oral toxicityComponents: 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 toxicityComponents: LD50 (Rat): > 20,000 mg/kg

Phenol, 4-nonyl-, branched:
Acute oral toxicityComponents: 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.
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: negative

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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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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Test substance: Fresh water
Method: OECD Test Guideline 203

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
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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 substance: Fresh water

Components:
Bisphenol A epoxy 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

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

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):
NOEC (Other): 0.01 mg/l
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<table>
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<td>1.0</td>
<td>04/06/2017</td>
<td>400001008922</td>
<td></td>
<td>04/06/2017</td>
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**Components:**

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

**Epoxylphenol novolac resin:**
- **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

**Tris(methylphenyl) phosphate:**
- **Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):**
  - NOEC (Daphnia magna (Water flea)): 0.1 mg/l
  - Exposure time: 21 d
  - Test Type: No data available
  - Test substance: Fresh water

**Components:**

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

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

**Tris(methylphenyl) phosphate:**
- **Toxicity to microorganisms:**
  - EC50 (activated sludge): > 1,000 mg/l
  - Exposure time: 3 h

**Phenol, 4-nonyl-, branched:**
- **Toxicity to microorganisms:**
  - EC50 (activated sludge): 950 mg/l
  - Exposure time: 3 h
  - Test Type: static test
  - Test substance: Fresh water
  - Method: OECD Test Guideline 209

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Exposure time: 28 d

**Phenol, 4-nonyl-, branched:**
- **Toxicity to fish (Chronic toxicity):**
  - NOEC (Oncorhynchus mykiss (rainbow trout)): 0.006 mg/l
  - Exposure time: 91 d
  - Test Type: flow-through test
  - Test substance: Fresh water
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

tri(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**: 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**: 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
\[ \log \text{P}_{\text{ow}}: 3.242 (25 \degree \text{C}) \]
\[ \text{pH}: 7.1 \]
Method: OECD Test Guideline 117

Epoxy phenol novolac resin:
Partition coefficient: n-octanol/water
\[ \log \text{P}_{\text{ow}}: 3.242 (25 \degree \text{C}) \]
\[ \text{pH}: 7.1 \]
Method: OECD Test Guideline 117

Tris(methylphenyl) phosphate:
Partition coefficient: n-octanol/water
\[ \log \text{P}_{\text{ow}}: 5.93 \]

Phenol, 4-nonyl-, branched:
Partition coefficient: n-octanol/water
\[ \log \text{P}_{\text{ow}}: 5.4 (23 \degree \text{C}) \]
\[ \text{pH}: 5.7 \]
Method: OECD Test Guideline 117
Mobility in soil
Mobility : No data available

Components:
- Bisphenol 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 NOVOCAL 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 NOVOCAL 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 NOVOCAL 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
SAFETY DATA SHEET

EPOCAST® 50-A1 US

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

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  ERG Code: 171  Marine pollutant: yes (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), KECl (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:

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</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 : 04/06/2017

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 WARRANT, EXPRESS OR OTHERWISE.

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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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SAFETY DATA SHEET

HARDENER 9816 US

Version 1.0  Revision Date: 05/12/2017  SDS Number: 400001010314  Date of last issue: -  Date of first issue: 05/12/2017

SECTION 1. IDENTIFICATION

Product name : HARDENER 9816 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 : Hardener

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the Hazardous Products Regulations
Acute toxicity (Oral) : Category 4
Acute toxicity (Dermal) : Category 4
Skin corrosion : Category 1C
Serious eye damage : Category 1
Skin sensitisation : Category 1

GHS label elements
Hazard pictograms :

Signal word : Danger
Hazard statements : H302 + H312 Harmful if swallowed or in contact with skin
                   H314 Causes severe skin burns and eye damage.
                   H317 May cause an allergic skin reaction.

Precautionary statements : Prevention:
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P272 Contaminated work clothing should not be allowed out of the workplace.
SAFETY DATA SHEET

HARDENER 9816 US

Version: 1.0  Revision Date: 05/12/2017  SDS Number: 400001010314  Date of last issue: -  Date of first issue: 05/12/2017

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
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.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it 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

Substance / Mixture : Substance

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Concentration (% w/w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>trientine</td>
<td>112-24-3</td>
<td>5 - 7</td>
</tr>
</tbody>
</table>

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 : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If on skin, rinse well with water.
If on clothes, remove clothes.
In case of eye contact:
- Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
- In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- Continue rinsing eyes during transport to hospital.
- Remove contact lenses.
- Protect unharmed eye.
- Keep eye wide open while rinsing.
- If eye irritation persists, consult a specialist.
If swallowed:
- Keep respiratory tract clear.
- Do NOT induce vomiting.
- Do not give milk or alcoholic beverages.
- Never give anything by mouth to an unconscious person.
- If symptoms persist, call a physician.
- Take victim immediately to hospital.
Most important symptoms and effects, both acute and delayed:
- None known.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media:
- No data is available on the product itself.

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.
- No data is available on the product itself.

Hazardous combustion products:
- No data is available on the product itself.
- No hazardous combustion products are known

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
SAFETY DATA SHEET

HARDENER 9816 US

Version 1.0  Revision Date: 05/12/2017  SDS Number: 400001010314  Date of last issue: -
Date of first issue: 05/12/2017

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.
: Observe label precautions.
: Electrical installations / working materials must comply with the technological safety standards.

Materials to avoid
: Strong acids
: Strong bases
: Strong oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSOAL PROTECTION

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

Personal protective equipment
Hand protection
Material : butyl-rubber
Break through time : > 8 h
# SAFETY DATA SHEET

## HARDENER 9816 US

<table>
<thead>
<tr>
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<tr>
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<td>-</td>
<td>05/12/2017</td>
</tr>
</tbody>
</table>

- **Material**: Solvent-resistant gloves (butyl-rubber)
- **Material**: Nitrile rubber
- **Break through time**: 10 - 480 min
- **Material**: Neoprene gloves
- **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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>liquid</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>amber</td>
</tr>
<tr>
<td><strong>Odour</strong></td>
<td>amine-like</td>
</tr>
<tr>
<td><strong>Odour Threshold</strong></td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td><strong>Freezing point</strong></td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td><strong>Melting point</strong></td>
<td>No data is available on the product itself.</td>
</tr>
<tr>
<td><strong>Boiling point</strong></td>
<td>No data is available on the product itself.</td>
</tr>
</tbody>
</table>
| **Flash point**               | > 100 °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**     | No data is available on the product itself.|
| **Lower explosion limit**     | No data is available on the product itself.|
| **Vapour pressure**           | No data is available on the product itself.|

SDS_CA-AM – EN – 400001010314

Distributed By
Freeman Manufacturing & Supply Co.
www.freemansupply.com  800-321-8511 FREEMAN
Relative vapour density : No data is available on the product itself.
Relative density : 1.02
Density : 1.02 g/cm³ (25 °C)
Solubility(ies)
   Water solubility : practically insoluble (20 °C)
   Solubility in other solvents : No data is available on the product itself.
Partition coefficient: n-octanol/water
   Auto-ignition temperature : No data is available on the product itself.
Decomposition temperature : > 200 °C
Self-Accelerating decomposition temperature (SADT) : No data is available on the product itself.
Viscosity
   Viscosity, dynamic : 250 mPa.s (25 °C)
Explosive properties : No data is available on the product itself.
Oxidizing properties : No data is available on the product itself.
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.
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 : Carbon oxides
   Burning produces noxious and toxic fumes.
   Nitrogen oxides (NOx)

SECTION 11. TOXICOLOGICAL INFORMATION
Information on likely routes of exposure : No data is available on the product itself.
Acute toxicity
Acute oral toxicity - Product : Assessment: The component/mixture is moderately toxic after single ingestion.

Acute inhalation toxicity : No data available

Acute dermal toxicity - Product : Assessment: The component/mixture is moderately toxic after single contact with skin.

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

Skin corrosion/irritation

Product:
Species: Rabbit
Result: Corrosive, category 1C - where responses occur after exposures between 1 hour and 4 hours and observations up to 14 days.

Remarks: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation

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

Remarks: May cause irreversible eye damage.

Respiratory or skin sensitisation

Product:
Result: May cause sensitisation by skin contact.

Remarks: Causes sensitisation.

Assessment: No data available

Germ cell mutagenicity

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

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

**Components:**
trientine:
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

**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.

Reproductive toxicity

Effects on fertility : No data available

**Components:**
trientine:
Effects on foetal development : 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

Reproductive toxicity -
Assessment : No data available

**STOT - single exposure**
No data available

**STOT - repeated exposure**
No data available
Repeated dose toxicity

**Components:**
- trientine:
  - 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

**Other health hazards**
No data available
SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:
trientine:
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:
trientine:
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:
trientine:
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

M-Factor (Acute aquatic toxicity) : No data available
Toxicity to fish (Chronic toxicity) : No data available

Components:
trientine:
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

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

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

- **Trientine**
  - **Biodegradability**
    - Inoculum: activated sludge
    - Result: Not readily biodegradable.
    - Biodegradation: 0%
    - Exposure time: 162 d
    - Method: OECD Test Guideline 301D

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

Bioaccumulative potential
Bioaccumulation: No data available

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

Mobility in soil
Mobility: No data available

Components:
triente:
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: Not applicable

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

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues: Do not dispose of waste into sewer.
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 2735
Proper shipping name : POLYAMINES, LIQUID, CORROSIVE, N.O.S. 
                       (N-[2-(imidazolidin-1-yl)ethyl]ethylenediamine)
Class                 : 8
Packing group        : III
Labels                : 8

IATA
UN/ID No.             : UN 2735
Proper shipping name : Polyamines, liquid, corrosive, n.o.s. 
                       (N-[2-(imidazolidin-1-yl)ethyl]ethylenediamine)
Class                 : 8
Packing group        : III
Labels                : Corrosive
Packing instruction (cargo aircraft) : 856
Packing instruction (passenger aircraft) : 852

IMDG
UN number             : UN 2735
Proper shipping name : POLYAMINES, LIQUID, CORROSIVE, N.O.S. 
                       (N-[2-(imidazolidin-1-yl)ethyl]ethylenediamine)
Class                 : 8
Packing group        : III
Labels                : 8
EmS Code              : F-A, S-B
Marine pollutant     : no

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

National Regulations

TDG
UN number             : UN 2735
Proper shipping name : POLYAMINES, LIQUID, CORROSIVE, N.O.S.
(N-[2-(imidazolidin-1-yl)ethyl]ethylenediamine)

Class: 8
Packing group: III
Labels: 8
ERG Code: 153
Marine pollutant: no

SECTION 15. REGULATORY INFORMATION

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

- CH INV: On the inventory, or in compliance with the inventory
- DSL: This product contains one or several components listed in the Canadian NDSL.
- AICS: On the inventory, or in compliance with the inventory
- NZIoC: On the inventory, or in compliance with the inventory
- ENCS: Low volume exemption, On the inventory, or in compliance with the inventory
- KECI: Not in compliance with the inventory
- PICCS: Not in compliance with the inventory
- IECSC: Low volume exemption, 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.

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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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