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ARALDITE® LY 8601 US

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SECTION 1. IDENTIFICATION

Product name : ARALDITE® LY 8601 US

Manufacturer or supplier's details

Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America (USA)
Telephone : Non-Emergency: (800) 257-5547

E-mail address of person responsible for the SDS : Global_Product_EHS_AdMat@huntsman.com

Emergency telephone number : Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use

Recommended use : Adhesives

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitisation : Category 1

Reproductive toxicity : Category 2

Short-term (acute) aquatic hazard : Category 2

Long-term (chronic) aquatic hazard : 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.

H361d Suspected of damaging 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 must 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 facility in accordance with local, regional, national and international regulations.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane	1675-54-3	70 - 90
Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.	68609-97-2	10 - 20
p-tert-butylphenyl 1-(2,3-epoxy)propyl ether	3101-60-8	5 - 10
1-isopropyl-2,2-dimethyltrimethylene diisobutyrate	6846-50-0	5 - 10

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

Both 25068-38-6 and 1675-54-3 can be used to describe the epoxy resin which is produced through the reaction of bisphenol A and epichlorohydrin

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. Treat symptomatically. Get medical attention if symptoms occur.
If inhaled	:	If inhaled, remove to fresh air. Get medical attention if symptoms occur.
In case of skin contact	:	If skin irritation persists, call a physician. If on skin, rinse well with water. If on clothes, remove clothes.
In case of eye contact	:	Immediately flush eye(s) with plenty of water. Remove contact lenses. 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. 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.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing If potential for exposure exists refer to Section 8 for specific personal protective equipment. Avoid inhalation, ingestion and contact with skin and eyes. No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
Notes to physician	:	Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2)

Dry chemical

Unsuitable extinguishing media	:	Exercise caution when using a high volume water jet as it may scatter and spread fire
Specific hazards during firefighting	:	Do not allow run-off from fire fighting to enter drains or water courses.
Hazardous combustion products	:	Carbon oxides Halogenated compounds
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. Refer to protective measures listed in sections 7 and 8.
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	:	Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitisation of susceptible persons. Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product. 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.

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. Keep in properly labelled containers.
Materials to avoid	:	For incompatible materials please refer to Section 10 of this SDS.
Recommended storage temperature	:	36 - 104 °F / 2 - 40 °C
Further information on storage stability	:	Stable under normal conditions.

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.
Respiratory protection	:	General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.
Hand protection		
Remarks	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. The suitability for a specific workplace should be discussed with the producers of the protective gloves.
Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	light blue
Odour	:	epoxy-like
Odour Threshold	:	No data is available on the product itself.
pH	:	No data is available on the product itself.
Freezing point	:	No data is available on the product itself.
Melting point	:	No data is available on the product itself.
Boiling point	:	> 626 °F / > 330 °C
Flash point	:	> 199.99 °F / > 93.33 °C Method: estimated, closed cup
Evaporation rate	:	No data is available on the product itself.
Flammability (solid, gas)	:	No data is available on the product itself.
Flammability (liquids)	:	No data is available on the product itself.
Upper explosion limit / Upper flammability limit	:	No data is available on the product itself.
Lower explosion limit / Lower flammability limit	:	No data is available on the product itself.
Vapour pressure	:	No data is available on the product itself.
Relative vapour density	:	No data is available on the product itself.
Relative density	:	1.1
Density	:	No data is available on the product itself.
Solubility(ies)		
Water solubility	:	insoluble
Solubility in other solvents	:	No data is available on the product itself.

Partition coefficient: n-octanol/water	:	No data is available on the product itself.
Auto-ignition temperature	:	No data is available on the product itself.
Thermal decomposition	:	No data is available on the product itself.
Self-Accelerating decomposition temperature (SADT)	:	No data is available on the product itself.
Viscosity	:	No data is available on the product itself.
Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.
Particle size	:	No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	No hazards to be specially mentioned.
Conditions to avoid	:	None known.
Incompatible materials	:	None known.
Hazardous decomposition products	:	carbon dioxide carbon monoxide Halogenated compounds

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Components:

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

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 Remarks: No mortality observed at this dose.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Acute oral toxicityComponents : LD50 (Rat, male): ca. 26.8 g/kg
Method: Other guidelines

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Acute oral toxicityComponents : LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 425
Assessment: The substance or mixture has no acute oral toxicity

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Acute oral toxicityComponents : LD50 (Rat, female): > 2,000 mg/kg
Method: OECD Test Guideline 425
Assessment: The substance or mixture has no acute oral toxicity

Components:

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

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Acute inhalation toxicity : LC50 (Rat): > 5.3 mg/l
Exposure time: 6 h
Test atmosphere: vapour

Components:

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

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Acute dermal toxicity : (Rabbit, male): > 4,000 mg/kg, 4,5 ml/kg
Assessment: The substance or mixture has no acute dermal toxicity

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Acute dermal toxicity : LD50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Acute dermal toxicity : LD50 (Rabbit, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

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

Skin corrosion/irritation

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Species: Rabbit
Exposure time: 4 h
Assessment: Irritating to skin.
Method: OECD Test Guideline 404
Result: Irritating to skin.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Species: Rabbit
Exposure time: 24 h
Method: Acute Dermal Toxicity
Result: Irritating to skin.

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Species: Rat
Assessment: No skin irritation
Method: OECD Test Guideline 402
Result: No skin irritation

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation

Components:

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

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Species: Rabbit
Result: No eye irritation
Assessment: No eye irritation
Method: OECD Test Guideline 405

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Respiratory or skin sensitisation

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Test Type: Local lymph node assay (LLNA)
Exposure routes: Skin
Species: Mouse
Method: OECD Test Guideline 429
Result: The product is a skin sensitiser, sub-category 1B.

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Exposure routes: Skin
Species: Mouse
Method: OECD Test Guideline 429
Result: The product is a skin sensitiser, sub-category 1A.

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Exposure routes: Skin
Species: Humans
Result: Does not cause skin sensitisation.

Assessment: No data available

Germ cell mutagenicity

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: without metabolic activation
Result: positive

Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
Result: negative

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Genotoxicity in vitro : Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 471
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Concentration: 0,5 - 5.000 µg/mL
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether**:**
Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Concentration: 50 ug/plate
Metabolic activation: negative
Method: OECD Test Guideline 473
Result: positive

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

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate**:**
Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Concentration: 100 - 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: Directive 67/548/EEC, Annex, B.13/14
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Method: OECD Test Guideline 476
Result: negative

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane**:**
Genotoxicity in vivo : Test Type: in vivo assay
Species: Mouse (male)
Cell type: Germ
Application Route: Oral
Dose: 3333, 10000 mg/kg
Result: negative

Test Type: gene mutation test
Species: Rat (male)
Cell type: Somatic
Application Route: Oral
Dose: 50,250,500,1000 mg/kg bw/day
Method: OECD Test Guideline 488
Result: negative

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

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Exposure time: 24 hr, 48 hr, and 72 hr
Method: OECD Test Guideline 474
Result: negative

Germ cell mutagenicity-Assessment : No data available

Carcinogenicity

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane**:**
Species: Rat, male
Application Route: Oral
Exposure time: 24 month(s)
Dose: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment: 7 days/week
NOAEL: 15 mg/kg bw/day

Method: OECD Test Guideline 453
Result: negative
Target Organs: Digestive organs

Species: Mouse, male
Application Route: Dermal
Exposure time: 24 month(s)
Dose: 0, 0.1, 10, 100 mg/kg bw/day
Frequency of Treatment: 3 days/week
NOEL: 0.1 mg/kg body weight

Method: OECD Test Guideline 453
Result: negative
Target Organs: Digestive organs

Species: Rat, female
Application Route: Dermal
Exposure time: 24 month(s)
Dose: 0.1, 100, 1000 mg/kg bw/day
Frequency of Treatment: 5 days/week
NOEL: 100 mg/kg body weight

Method: OECD Test Guideline 453
Result: negative

Species: Rat, female
Application Route: Oral
Exposure time: 24 month(s)
Dose: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment: 7 days/week
NOAEL: 100 mg/kg bw/day

Method: OECD Test Guideline 453

Result: negative
Target Organs: Digestive organs

Species: Rat, females
Application Route: Oral
Exposure time: 24 month(s)
Dose: 0, 2, 15, or 100 mg/kg bw/day
Frequency of Treatment: 7 days/week
NOEL: 2 mg/kg bw/day

Method: OECD Test Guideline 453
Result: negative
Target Organs: Digestive organs

Carcinogenicity - Assessment : No data available

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

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

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

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

Reproductive toxicity

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane**:**
Effects on fertility : Test Type: Two-generation study
Species: Rat, male and female
Application Route: Oral
Dose: 0, 50, 180, 540 or 750 milligram per kilogram
Duration of Single Treatment: 238 d
Frequency of Treatment: 1 daily
General Toxicity - Parent: No-observed-effect level: 540 mg/kg body weight
General Toxicity F1: No-observed-effect level: 750 mg/kg body weight
Symptoms: No adverse effects
Method: OECD Test Guideline 416
Result: No effects on fertility and early embryonic development were detected.

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.**:**
Species: Rat, male and female
Application Route: Dermal
Duration of Single Treatment: 13 Weeks
Frequency of Treatment: 5 days/week

General Toxicity - Parent: No observed adverse effect level: 100 mg/kg body weight
Method: OECD Test Guideline 411

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 421

Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 422
Result: Animal testing did not show any effects on fertility.

Components:

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

Effects on foetal development : Species: Rabbit, female
Application Route: Dermal
Dose: 0, 30, 100 or 300 milligram per kilogram
Duration of Single Treatment: 28 d
Frequency of Treatment: 1 daily
General Toxicity Maternal: No observed adverse effect level: 30 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 300 mg/kg body weight
Method: Other guidelines
Result: No teratogenic effects

Test Type: Pre-natal
Species: Rabbit, female
Application Route: Oral
Dose: 0, 20, 60 or 180 milligram per kilogram
Duration of Single Treatment: 13 d
Frequency of Treatment: 1 daily
General Toxicity Maternal: No observed adverse effect level: 60 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 180 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0, 60, 180 and 540 milligram per kilogram
Duration of Single Treatment: 10 d
Frequency of Treatment: 1 daily
General Toxicity Maternal: No observed adverse effect level: 180 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: > 540 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

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

Species: Rat, female

Application Route: Dermal
Duration of Single Treatment: 6 h
General Toxicity Maternal: No observed adverse effect level: 200 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 200 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Species: Rabbit, female
Application Route: Oral
Dose: 40, 125, 375 milligram per kilogram
General Toxicity Maternal: No observed adverse effect level: 375 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 375 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Species: Rat, females
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 343 mg/kg body weight
Developmental Toxicity: No observed adverse effect level: 343 mg/kg body weight
Method: OECD Test Guideline 414

Components:

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Reproductive toxicity - Assessment : Some evidence of adverse effects on development, based on animal experiments.

STOT - single exposure

No data available

STOT - repeated exposure

No data available

Repeated dose toxicity

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Species: Rat, male and female
NOAEL: 50 mg/kg
Application Route: oral (gavage)
Exposure time: 14 Weeks
Number of exposures: 7 d
Dose: 0, 50, 250, 1000 mg/kg/day
Method: OECD Test Guideline 408

Species: Rat, male and female
NOAEL: >= 10 mg/kg
Application Route: Skin contact

Exposure time: 13 Weeks
Number of exposures: 5 d
Dose: 0, 10, 100, 1000 mg/kg/day
Method: OECD Test Guideline 411

Species: Mouse, male
NOAEL: 100 mg/kg
Application Route: Skin contact
Exposure time: 13 Weeks
Number of exposures: 3 d
Dose: 0, 1, 10, 100 mg/kg/day
Method: OECD Test Guideline 411

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

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate**:**
Species: Rat, male and female
NOAEL: 150 - 750 mg/kg/d
Application Route: Ingestion
Exposure time: 13 Weeks
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Rat, male and female
NOEL: 30 mg/kg
Application Route: Ingestion
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

Ingestion: No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

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

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 2 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

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

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 7.5 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 203

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Toxicity to fish : EC50 (Lepomis macrochirus (Bluegill sunfish)): >= 6 mg/l
Exposure time: 96 h
Test Type: flow-through test
Test substance: Fresh water
Method: OECD Test Guideline 203
Remarks: No-observed-effect level

Components:

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

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1.8 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water

Method: OECD Test Guideline 202

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

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): ca. 67.9 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.46 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Remarks: Aquatic toxicity is unlikely due to low solubility.

Components:

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

Toxicity to algae/aquatic plants	:	EC50: 11 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: EPA-660/3-75-009 NOEC: 4.2 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: EPA-660/3-75-009

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

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:

Toxicity to algae/aquatic plants	:	EbC50 (Selenastrum capricornutum (green algae)): ca. 9 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 201

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Toxicity to algae/aquatic plants	:	ErC50 (Selenastrum capricornutum (green algae)): > 7.49 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 201

Remarks: Aquatic toxicity is unlikely due to low solubility.

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

Components:

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Toxicity to fish (Chronic toxicity) : GLP: yes

Components:

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

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.7 mg/l
Exposure time: 21 d
Test Type: flow-through test
Test substance: Fresh water
Method: OECD Test Guideline 211
Remarks: Aquatic toxicity is unlikely due to low solubility.

EC50 (Daphnia magna (Water flea)): >= 1.3 mg/l
Exposure time: 21 d
Test Type: flow-through test
Test substance: Fresh water

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

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Toxicity to microorganisms : IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Toxicity to microorganisms : IC50 (activated sludge): > 100 mg/l
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Toxicity to microorganisms : EC50: > 1,000 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 209

Toxicity to soil dwelling : No data available

organisms

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

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Chronic aquatic toxicity : Toxic to aquatic life with long lasting effects.

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Toxicity Data on Soil : No data available

Other organisms relevant to the environment : No data available

Persistence and degradability

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Biodegradability : Test Type: aerobic
Inoculum: activated sludge, non-adapted
Concentration: 20 mg/l
Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Biodegradability : Test Type: aerobic
Inoculum: activated sludge
Concentration: 5 mg/l
Result: Not readily biodegradable.
Biodegradation: ca. 1.1 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Biodegradability	:	Inoculum: activated sludge Concentration: 10 mg/l Result: Readily biodegradable. Biodegradation: 70.73 % Exposure time: 28 d Method: OECD Test Guideline 310
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:

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

Stability in water	:	Degradation half life(DT50): 4.83 d (77 °F / 25 °C) pH: 4 Method: OECD Test Guideline 111 Remarks: Fresh water Degradation half life(DT50): 7.1 d (77 °F / 25 °C) pH: 9 Method: OECD Test Guideline 111 Remarks: Fresh water Degradation half life(DT50): 3.58 d (77 °F / 25 °C) pH: 7 Method: OECD Test Guideline 111 Remarks: Fresh water

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:

Stability in water	:	Degradation half life(DT50): ca. 17 d (77 °F / 25 °C) pH: 7 Method: OECD Test Guideline 111 Remarks: Fresh water Degradation half life(DT50): ca. 7.98 d (77 °F / 25 °C) pH: 4 Method: OECD Test Guideline 111 Remarks: Fresh water Degradation half life(DT50): ca. 10.8 d (77 °F / 25 °C) pH: 9 Method: OECD Test Guideline 111 Remarks: Fresh water

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:

Stability in water	:	Degradation half life(DT50): 1.48 - 14.75 yr (68 °F / 20 °C) pH: 7.5

Method: No information available.

Photodegradation : No data available

Impact on Sewage Treatment : No data available

Bioaccumulative potential

Components:

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

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Bioaccumulation : Species: Lepomis macrochirus (Bluegill sunfish)
Bioconcentration factor (BCF): 1.95
Exposure time: 23 d
Test substance: Fresh water
Method: flow-through test
Remarks: Bioaccumulation is unlikely.

Components:

2,2'-[(1-methylethylidene)bis(4,1-phenyleneoxymethylene)]bisoxirane:
Partition coefficient: n-octanol/water : log Pow: 3.242 (77 °F / 25 °C)
pH: 7.1
Method: OECD Test Guideline 117

Oxirane, mono[(C12-14-alkyloxy)methyl] derivs.:
Partition coefficient: n-octanol/water : log Pow: 3.77 (68 °F / 20 °C)
Method: OECD Test Guideline 107

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Partition coefficient: n-octanol/water : log Pow: 3.59 (68 °F / 20 °C)
pH: 7
Method: OECD Test Guideline 107

1-isopropyl-2,2-dimethyltrimethylene diisobutyrate:
Partition coefficient: n-octanol/water : log Pow: 4.04 - 4.91 (77 °F / 25 °C)
pH: 7

Mobility in soil

Mobility : No data available

Components:

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

p-tert-butylphenyl 1-(2,3-epoxy)propyl ether:
Distribution among environmental compartments : OECD Test Guideline 121
Koc: ca. 755, log Koc: ca. 2.88
Method: OECD Test Guideline 121

Stability in soil : No data available

Other adverse effects

Environmental fate and pathways	:	No data available
Results of PBT and vPvB assessment	:	No data available
Endocrine disrupting potential	:	No data available
Adsorbed organic bound halogens (AOX)	:	No data available

Hazardous to the ozone layer

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information - Product	:	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. 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. Dispose of as hazardous waste in compliance with local and national regulations. Dispose of contents/ container to an approved waste disposal plant.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA

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

IMDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, Butylphenylglycidylether)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

DOT Classification

UN/ID/NA number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (BISPHENOL A EPOXY RESIN, Butylphenylglycidylether)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(BISPHENOL A EPOXY RESIN, Butylphenylglycidylether)
Remarks	:	Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
1-chloro-2,3-epoxypropane	106-89-8	100	*

*: Calculated RQ exceeds reasonably attainable upper limit.

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

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

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

California Prop. 65

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

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

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 : Not in compliance with the inventory

KECI : Not in compliance with the inventory

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

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

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

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

Inventories

AICS (Australia), AIIC (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

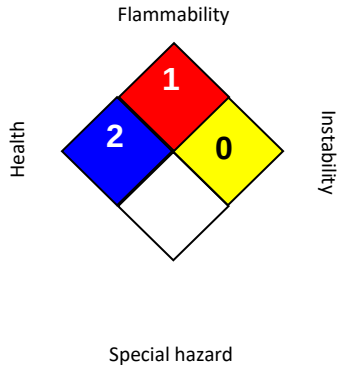
TSCA - 5(a) Significant New Use Rule List of Chemicals
No substances are subject to a Significant New Use Rule.

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

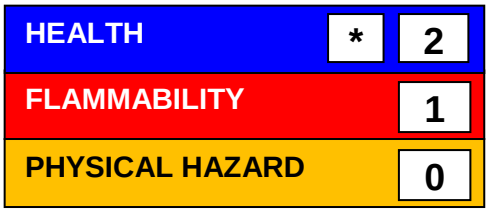
SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



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 : 08/25/2020

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

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

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

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

ARALDITE® LY 8601 US

Version	Revision Date:	SDS Number:	Date of last issue: 11/27/2018
2.0	08/25/2020	400001012746	Date of first issue: 01/19/2018

Print Date 08/27/2020

NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.

ARADUR® 8602 US

Version	Revision Date:	SDS Number:	Date of last issue: 12/17/2016
1.2	04/03/2017	400001012747	Date of first issue: 12/04/2015

SECTION 1. IDENTIFICATION

Product name : ARADUR® 8602 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 (Inhalation) : Category 3

Skin corrosion : Category 1B

Serious eye damage : Category 1

Respiratory sensitisation : Category 1

Skin sensitisation : Category 1

Reproductive toxicity : Category 1B

Specific target organ toxicity - single exposure : Category 3 (Respiratory system)

Specific target organ toxicity - repeated exposure : Category 2

Acute aquatic toxicity : Category 1

Chronic aquatic toxicity : Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H331 Toxic if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very 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.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
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.
P284 Wear respiratory 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.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it 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 facility in accordance with local, regional, national and international regulations.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
2,2'-iminodi(ethylamine)	111-40-0	25 - 27
Polyoxypropylene diamine	9046-10-0	23 - 25
2-(heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol	27136-73-8	17 - 19
Polyoxypropylenediamine	9046-10-0	15 - 17
Phenol, 4-nonyl-, branched	84852-15-3	9 - 11
Triethanolamine	102-71-6	3 - 5
piperazine	110-85-0	1 - 3
Aminoethylpiperazine	140-31-8	0.1 - 1
2-(2-aminoethylamino)ethanol	111-41-1	0.1 - 1

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.
Symptoms of poisoning may appear several hours later.
Do not leave the victim unattended.

If inhaled : Call a physician or poison control centre immediately.
If unconscious, place in recovery position and seek medical advice.

In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
If on skin, rinse well with water.
If on clothes, remove clothes.

In case of eye contact : Small amounts splashed into eyes can cause irreversible tissue damage and blindness.
In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Continue rinsing eyes during transport to hospital.

Remove contact lenses.
Protect unharmed eye.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.

If swallowed : Keep respiratory tract clear.
Do NOT induce vomiting.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

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

SECTION 5. FIREFIGHTING MEASURES

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

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

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 : Standard procedure for chemical fires.

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
Ensure adequate ventilation.
Evacuate personnel to safe areas.

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.

Normal measures for preventive fire protection.

Advice on safe handling : Avoid formation of aerosol.
Do not breathe vapours/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
For personal protection see section 8.

Conditions for safe storage : Prevent unauthorized access.
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.

Materials to avoid : No special restrictions on storage with other products.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
2,2'-iminodi(ethylamine)	111-40-0	TWA	1 ppm	ACGIH
Triethanolamine	102-71-6	TWA	5 mg/m3	ACGIH
piperazine	110-85-0	TWA (Inhalable fraction and vapor)	0.03 ppm (as piperazine)	ACGIH
		TWA (Inhalable fraction and vapor)	0.03 ppm (piperazine)	ACGIH

Personal protective equipment

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

Hand protection
Remarks : The suitability for a specific workplace should be discussed

with the producers of the protective gloves.

Eye protection	:	Eye wash bottle with pure water Tightly fitting safety goggles Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Impervious clothing Choose body protection according to the amount and concentration of the dangerous substance at the work place.
Hygiene measures	:	General industrial hygiene practice.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	amber, clear
Odour	:	amine-like
Odour Threshold	:	No data is available on the product itself.
pH	:	No data is available on the product itself.
Freezing point	:	No data is available on the product itself.
Melting point		No data is available on the product itself.
Boiling point		No data is available on the product itself.
Flash point	:	> 93 °C Method: estimated, closed cup
Evaporation rate	:	No data is available on the product itself.
Flammability (solid, gas)	:	No data is available on the product itself.
Flammability (liquids)	:	No data is available on the product itself.
Upper explosion limit	:	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.
Relative vapour density	:	No data is available on the product itself.
Relative density	:	0.96
Density	:	No data is available on the product itself.
Solubility(ies)		
Water solubility	:	partly soluble

Solubility in other solvents	:	No data is available on the product itself.
Partition coefficient: n-octanol/water	:	No data is available on the product itself.
Auto-ignition temperature	:	No data is available on the product itself.
Thermal decomposition	:	No data is available on the product itself.
Self-Accelerating decomposition temperature (SADT)	:	No data is available on the product itself.
Viscosity	:	No data is available on the product itself.
Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.
Particle size	:	No data is available on the product itself.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Stable under recommended storage conditions. No decomposition if stored and applied as directed.
Chemical stability	:	No decomposition if stored and applied as directed. No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	No hazards to be specially mentioned. No decomposition if stored and applied as directed.
Conditions to avoid	:	No data available No data available

SECTION 11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Acute oral toxicity - Product	:	Acute toxicity estimate : 1,633 mg/kg Method: Calculation method
Acute inhalation toxicity - Product	:	Acute toxicity estimate: 0.71 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity - Product	:	Acute toxicity estimate : 2,604 mg/kg Method: Calculation method

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

Skin corrosion/irritation

Product:

Remarks: The product is not considered as being a skin irritant.

Remarks: Extremely corrosive and destructive to tissue.

Serious eye damage/eye irritation

Product:

Remarks: According to the classification criteria of the European Union, the product is not considered as being an eye irritant.

Remarks: May cause irreversible eye damage.

Respiratory or skin sensitisation

Product:

Remarks: No data available

Remarks: Causes sensitisation.

Components:

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

Germ cell mutagenicity

Components:

Polyoxypropylene diamine**:**
Genotoxicity in vitro : Concentration: 0 - 10000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

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

Triethanolamine**:**
Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Concentration: 0 - 1500 µg/L
Metabolic activation: with and without metabolic activation

Method: OECD Test Guideline 476
Result: negative

piperazine:
Genotoxicity in vitro : Concentration: 0 - 10000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Concentration: 0 - 110 µg/L
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Concentration: 0 - 500 µg/L
Metabolic activation: Metabolic activation
Method: OECD Test Guideline 476
Result: positive

Concentration: 0 - 500 µg/L
Metabolic activation: negative
Method: OECD Test Guideline 476
Result: negative

Aminoethylpiperazine:
Genotoxicity in vitro : Concentration: 5000 ug/plate
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

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

Metabolic activation: negative
Method: OECD Test Guideline 482
Result: negative

2-(2-aminoethylamino)ethanol:
Genotoxicity in vitro : Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

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

Components:

2,2'-iminodi(ethylamine):
Genotoxicity in vivo : Cell type: Somatic
Application Route: Oral
Dose: 85 - 850 mg/kg
Method: OECD Test Guideline 474
Result: negative

Application Route: Oral
Result: negative

Polyoxypropylene diamine:
Genotoxicity in vivo : Application Route: Oral
Dose: 500 mg/kg
Method: OECD Test Guideline 474
Result: negative

piperazine:
Genotoxicity in vivo : Dose: 5000 mg/kg
Result: negative

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

2-(2-aminoethylamino)ethanol:
Genotoxicity in vivo : Application Route: Oral
Dose: 3000 mg/kg
Result: negative

Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Application Route: Oral
Exposure time: 7 d
Method: OECD Test Guideline 477
Result: negative

Carcinogenicity

Components:

2,2'-iminodi(ethylamine):
Species: Mouse, (male)
Application Route: Dermal
Dose: 56.3 mg/kg
Frequency of Treatment: 3 daily
Result: negative

Triethanolamine:
Species: Rat, (male and female)
Application Route: Dermal
Exposure time: 103 weeks
Dose: 250 mg/kg
Frequency of Treatment: 5 daily
Method: OECD Test Guideline 451
Result: negative

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

Components:

2,2'-iminodi(ethylamine):
Effects on fertility : Species: Rat, male and female
Application Route: Oral
General Toxicity - Parent: No observed adverse effect level: 30 mg/kg wet weight
Method: OECD Test Guideline 421
Result: positive

Polyoxypropylene diamine:
Species: Rat, male and female
Application Route: Dermal
Method: OECD Test Guideline 421
Result: Animal testing did not show any effects on fertility.

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

piperazine:
Species: Rat, male and female
Application Route: Oral
General Toxicity F1: No observed adverse effect level: 125 mg/kg body weight
Method: OECD Test Guideline 416
Result: positive

2-(2-aminoethylamino)ethanol:
Species: Rat
Application Route: Oral
Dose: 250 milligram per kilogram
Method: OECD Test Guideline 421

Components:

2,2'-iminodi(ethylamine):
Effects on foetal development : Species: Rat
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 100 mg/kg body weight
Method: OECD Test Guideline 421
Result: No adverse effects

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

Triethanolamine:

Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: > 1,000 mg/kg body weight
Method: OECD Test Guideline 421
Result: No teratogenic effects

Species: Rat
Application Route: Dermal
General Toxicity Maternal: No observed adverse effect level: 75 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: 10 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

piperazine:

Species: Rat, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 420 mg/kg body weight
Result: No teratogenic effects

2-(2-aminoethylamino)ethanol:

Species: Rat, male and female
Application Route: Oral
Dose: 250 milligram per kilogram
General Toxicity Maternal: No observed adverse effect level: 250 mg/kg body weight
Method: OECD Test Guideline 421
Result: Teratogenic effects

Components:

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

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

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

2-(2-aminoethylamino)ethanol:
Reproductive toxicity - : Clear evidence of adverse effects on sexual function and

Assessment	fertility, and/or on development, based on animal experiments

STOT - single exposure

Components:

2,2'-iminodi(ethylamine):
Target Organs: Respiratory Tract
Assessment: May cause respiratory irritation.

STOT - repeated exposure

Product:

Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

2,2'-iminodi(ethylamine):
Species: Rat, male and female
: 70 - 80 mg/m3
Application Route: Ingestion
Test atmosphere: vapour
Exposure time: 360 h
Number of exposures: 7 d
Method: Subchronic toxicity

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

Polyoxypropylene diamine:
Species: Rat, male and female
NOAEL: 250 mg/kg/d
Application Route: Skin contact
Exposure time: 2,160 h
Number of exposures: 5 d
Method: Subchronic toxicity

Species: Rat, male and female
NOAEL: 239 mg/kg/d
Application Route: Ingestion
Exposure time: 744 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
Number of exposures: 7 d
Method: Subchronic toxicity

Triethanolamine**:**
Species: Rat, male and female
: 1000 mg/kg, 500 mg/m3
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 672 h
Method: OECD Test Guideline 412

Species: Rat, male and female
: 125 - 500 mg/kg, 420 mg/m3
Application Route: Skin contact
Test atmosphere: dust/mist
Exposure time: 2,160 h
Number of exposures: 6 h
Method: Subchronic toxicity

piperazine**:**
Species: Rat, male and female
NOAEL: 627 mg/kg/d
Application Route: Ingestion
Exposure time: 2,160 h
Number of exposures: 7 d
Method: Subchronic toxicity

Species: Humans
LOAEL: 30 mg/kg/d
Application Route: Ingestion
Exposure time: 168 h
Method: Subacute toxicity

Aminoethylpiperazine**:**
Species: Rat, male and female
NOAEL: 152 mg/kg/d
Application Route: Oral
Exposure time: 28 d
Method: OECD Test Guideline 422

Species: Rat, male and female
NOAEL: > 1000 mg/kg/d
Application Route: Skin contact
Exposure time: 29 d
Number of exposures: 6h/application, 5d/week
Method: OECD Test Guideline 410

Species: Rat, male and female
: 0.2 mg/m3
Application Route: Inhalation
Exposure time: 90 d
Number of exposures: 6h/d, 5d/week
Method: OECD Test Guideline 413
Target Organs: Respiratory Tract
Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.

Species: Rat, male and female
: 53.3 mg/m3
Application Route: Inhalation
Exposure time: 90 d
Number of exposures: 6h/d, 5d/week
Method: OECD Test Guideline 413

2-(2-aminoethylamino)ethanol**:**
Species: Rat, male and female
NOAEL: > 1000 mg/kg/d
Application Route: Skin contact
Exposure time: 672 h
Number of exposures: 5 d
Method: Subacute toxicity

Species: Rat, male and female
NOAEL: 60 mg/kg/d
Application Route: Ingestion
Exposure time: 672 h
Number of exposures: 5 d
Method: Subacute 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

Remarks: No data available

Other health hazards

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

2,2'-iminodi(ethylamine)**:**

Toxicity to fish : LC50: 430 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.1.

Polyoxypropylene diamine**:**

Toxicity to fish : EC50 (Oncorhynchus mykiss (rainbow trout)): > 15 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 203

LC50: 772.14 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Marine water
Method: OECD Test Guideline 203

2-(heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol**:**

Toxicity to fish : LC50 (Brachydanio rerio (zebrafish)): 0.33 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

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

Triethanolamine:
Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 11,800 mg/l
Exposure time: 96 h
Test Type: flow-through test
Test substance: Fresh water

piperazine:
Toxicity to fish : LC50 (Poecilia reticulata (guppy)): > 1,800 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.1.

Aminoethylpiperazine:
Toxicity to fish : LC50: 2,190 mg/l
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water

2-(2-aminoethylamino)ethanol:
Toxicity to fish : LC50: 640 mg/l
Exposure time: 96 h
Test substance: Fresh water

Components:

2,2'-iminodi(ethylamine):
Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 32 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water

Polyoxypropylene diamine:
Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 80 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202

EC50 (Acartia tonsa): 418.34 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Marine water

Phenol, 4-nonyl-, branched:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.085 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
Method: Directive 67/548/EEC, Annex V, C.2.

Triethanolamine:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Ceriodaphnia dubia (Water flea)): 609.88 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water

piperazine:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 21 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.2.

Aminoethylpiperazine:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 58 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202
Remarks: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

2-(2-aminoethylamino)ethanol:

Toxicity to daphnia and other aquatic invertebrates : EC50: 140 mg/l
Exposure time: 48 h

Components:

2,2'-iminodi(ethylamine):

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

Polyoxypropylene diamine:

Toxicity to algae : ErC50 (Selenastrum capricornutum (green algae)): 15 mg/l
Exposure time: 72 h
Test Type: static test

Test substance: Fresh water
Method: OECD Test Guideline 201

ErC10 (Selenastrum capricornutum (green algae)): 1.4 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

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

Triethanolamine**:**
Toxicity to algae : ErC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): 512 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: DIN 38412

piperazine**:**
Toxicity to algae : NOECr (Selenastrum capricornutum (green algae)): > 1,000 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 201

Aminoethylpiperazine**:**
Toxicity to algae : EC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l
Exposure time: 72 h
Test substance: Fresh water
Method: OECD Test Guideline 201

2-(2-aminoethylamino)ethanol**:**
Toxicity to algae : EC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)): 353.6 mg/l
Exposure time: 72 h
Test Type: static test
Test substance: Fresh water

Components:

2-(heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol**:**
M-Factor (Acute aquatic : 1

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

Components:

2,2'-iminodi(ethylamine):
Toxicity to fish (Chronic toxicity) : NOEC: 10 mg/l
Exposure time: 28 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 210

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:

2,2'-iminodi(ethylamine):
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 5.6 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.20

Triethanolamine:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 16 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water

piperazine:
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 12.5 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

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

Components:

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

Triethanolamine:
Toxicity to microorganisms : EC50 (activated sludge): > 1,000 mg/l
Exposure time: 3 h

Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 209

Components:

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

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

Aminoethylpiperazine:
Toxicity to soil dwelling organisms : LC50 (Eisenia fetida (earthworms)): 712 mg/kg
Exposure time: 56 d
Method: OECD Test Guideline 222

NOEC (Eisenia fetida (earthworms)): 500 mg/kg
Exposure time: 56 d
Method: OECD Test Guideline 222

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

Components:

2,2'-iminodi(ethylamine):
Acute aquatic toxicity : This product has no known ecotoxicological effects.

Components:

Polyoxypropylene diamine:
Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

2-(heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol:
Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Polyoxypropylenediamine:
Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Toxicity Data on Soil : No data available

Other organisms relevant to the environment : No data available

Persistence and degradability

Components:

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

Polyoxypropylene diamine:
Biodegradability : Inoculum: Mixture
Result: Not biodegradable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2-(heptadecenyl)-4,5-dihydro-1H-imidazole-1-ethanol:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: < 20 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

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

Triethanolamine:
Biodegradability : Inoculum: activated sludge
Concentration: 5.7 mg/l
Result: Readily biodegradable.
Biodegradation: ca. 100 %
Exposure time: 5 d

piperazine:
Biodegradability : Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: 70.2 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

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

2-(2-aminoethylamino)ethanol:
Biodegradability : Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: > 60 %
Exposure time: 28 d

Result: Readily biodegradable.
Method: OECD Test Guideline 301F

Biodegradation: 4 %

Biodegradation: 20 - 70 %
Method: OECD Test Guideline 302B

Biodegradation: > 60 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Components:

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

2-(2-aminoethylamino)ethanol:
Biochemical Oxygen Demand (BOD) : 66.3 - 109.6 %
Incubation time: 28 d
Method: OECD Test Guideline 301F

Components:

Triethanolamine:
Chemical Oxygen Demand (COD) : 1600 mgO2/g
Aminoethylpiperazine:
Chemical Oxygen Demand (COD) : 560 mg/l
2-(2-aminoethylamino)ethanol:
Chemical Oxygen Demand (COD) : 1090 mgO2/g
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:

Polyoxypropylene diamine**:**
Stability in water : Degradation half life(DT50): 12 Months (25 °C) pH: 6.5
Method: No information available.
Remarks: Fresh water

Components:

2,2'-iminodi(ethylamine)**:**
Photodegradation : Test Type: Air
Rate constant: 500000
Degradation (direct photolysis): 50 %

Polyoxypropylene diamine**:**
Photodegradation : Test Type: Air

piperazine**:**
Photodegradation : Test Type: Air
Rate constant: < .00001
Degradation (direct photolysis): 50 %

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

Test Type: Water

Impact on Sewage Treatment : No data available

Bioaccumulative potential

Components:

2,2'-iminodi(ethylamine)**:**
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 0.3 - 6.3
Exposure time: 42 d
Test substance: Fresh water
Method: flow-through test
Remarks: Bioaccumulation is unlikely.

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.

Triethanolamine:
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): < 3.9
Exposure time: 42 d
Test substance: Fresh water
Method: flow-through test

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

2-(2-aminoethylamino)ethanol:
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 2.1 - 3.7
Remarks: Does not bioaccumulate.

Components:

2,2'-iminodi(ethylamine):
Partition coefficient: n-octanol/water : log Pow: -1.58 (20 °C)
pH: 7

Polyoxypropylene diamine:
Partition coefficient: n-octanol/water : log Pow: 1.34 (25 °C)

Phenol, 4-nonyl-, branched:
Partition coefficient: n-octanol/water : log Pow: 5.4 (23 °C)
pH: 5.7
Method: OECD Test Guideline 117

Triethanolamine:
Partition coefficient: n-octanol/water : log Pow: -2.3 (25 °C)
pH: 7.1

piperazine:
Partition coefficient: n-octanol/water : log Pow: -1.17

log Pow: -1.24 (25 °C)

Aminoethylpiperazine:
Partition coefficient: n-octanol/water : log Pow: -1.48 (20 °C)

2-(2-aminoethylamino)ethanol:
Partition coefficient: n-octanol/water : log Pow: -1.4 (25 °C)

Mobility in soil

Mobility : No data available

Components:

2,2'-iminodi(ethylamine):

Distribution among environmental compartments	:	Koc: 19111

Phenol, 4-nonyl-, branched:

Distribution among environmental compartments	:	Koc: 23000 - 489000

Triethanolamine:

Distribution among environmental compartments	:	Koc: 18

piperazine:

Distribution among environmental compartments	:	Koc: 507Method: OECD Test Guideline 106

Aminoethylpiperazine:

Distribution among environmental compartments	:	Koc: ca. 37000

2-(2-aminoethylamino)ethanol:

Distribution among environmental compartments	:	Koc: 4.2 Koc: 3.524
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	:	There is no data available for this product. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.
Global warming potential (GWP)	:	No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Offer surplus and non-recyclable solutions to a licensed

disposal company.

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.
Empty containers should be taken to an approved waste handling site for recycling or disposal.

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. (DIETHYLENE TRIAMINE, POLYOXYPROPYLENEDIAMINE)
Class	:	8
Packing group	:	II
Labels	:	8

IATA

UN/ID No.	:	UN 2735
Proper shipping name	:	Polyamines, liquid, corrosive, n.o.s. (DIETHYLENE TRIAMINE, POLYOXYPROPYLENEDIAMINE)
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	:	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENE TRIAMINE, POLYOXYPROPYLENEDIAMINE)
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.

National Regulations

TDG

UN number	:	UN 2735
Proper shipping name	:	POLYAMINES, LIQUID, CORROSIVE, N.O.S. (DIETHYLENE TRIAMINE, POLYOXYPROPYLENEDIAMINE)
Class	:	8
Packing group	:	II
Labels	:	8
ERG Code	:	153
Marine pollutant	:	yes(POLYOXYPROPYLENEDIAMINE)

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, Not in compliance with the inventory
DSL	:	All components of this product are on the Canadian DSL
AICS	:	Not in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
ENCS	:	Not in compliance with the inventory
KECI	:	Not in compliance with the inventory
PICCS	:	Not in compliance with the inventory
IECSC	:	Not 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)

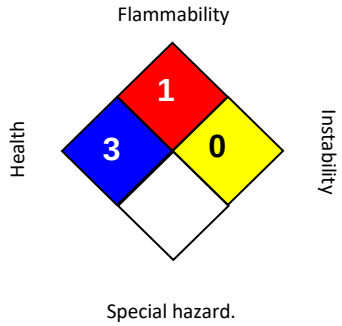
Canada. CEPA 1999 Significant New Activity (SNAc) List

No substances are subject to a Significant New Activity Notification.

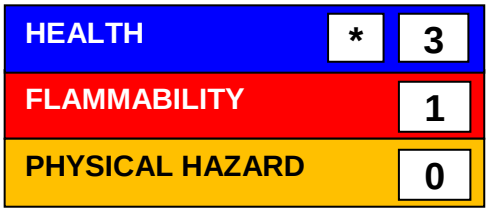
SECTION 16. OTHER INFORMATION

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

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

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

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