

SAFETY DATA SHEET

according to the OSHA Hazard Communication Standard

HUNTSMAN

Enriching lives through innovation

AMINOETHYLPIPERAZINE-HP

Version	Revision Date:	SDS Number:	Date of last issue: 02/20/2020
3.0	04/08/2025	400001001123	Date of first issue: 11/02/2015

Print Date 06/17/2025

SECTION 1. IDENTIFICATION

Product name : AMINOETHYLPIPERAZINE-HP

Manufacturer or supplier's details

Company name of supplier : Huntsman International LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America (USA)
Telephone : TechInfo: (281) 719-7780
E-mail address : Global_Product_EHS_HPP@huntsman.com
Emergency telephone : Chemtrec: (800) 424-9300 or (703) 527-3887

Recommended use of the chemical and restrictions on use

Recommended use : Intermediate

SECTION 2. HAZARDS IDENTIFICATION

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

Acute toxicity (Oral) : Category 4
Acute toxicity (Dermal) : Category 3
Skin corrosion : Category 1B
Serious eye damage : Category 1
Skin sensitisation : Category 1
Reproductive toxicity : Category 2
Specific target organ toxicity
- repeated exposure
(Inhalation) : Category 1 (Respiratory Tract)
Short-term (acute) aquatic
hazard : Category 3
Long-term (chronic) aquatic
hazard : Category 3

Other hazards

None known.

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GHS label elements

Hazard pictograms



Signal Word

: Danger

Hazard Statements

: H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary Statements

: **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
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:
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/ shower.
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 Take off contaminated clothing and wash before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/container to an approved facility in accordance with local, regional, national and international regulations.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
2-piperazin-1-ylethylamine	140-31-8	90 - 100
Diethylenetriamine	111-40-0	0.1 - 1
trientine	112-24-3	0.1 - 1
2-(2-aminoethylamino)ethanol	111-41-1	0.1 - 1

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

SECTION 4. FIRST AID MEASURES

- General advice : Move out of dangerous area.
Consult a physician.
Show this material safety data sheet to the doctor in attendance.
Symptoms of poisoning may appear several hours later.
Treat symptomatically.
- If inhaled : Get medical attention if symptoms occur.
Consult a physician after significant exposure.
If inhaled, remove to fresh air.
Get medical attention if symptoms occur.
- In case of skin contact : Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
Take victim immediately to hospital.
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.
Keep eye wide open while rinsing.
If eye irritation persists, consult a specialist.
- If swallowed : Clean mouth with water and drink afterwards plenty of water.

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Keep respiratory tract clear.
Do NOT induce vomiting.
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 : Harmful if swallowed.
Toxic in contact with skin.
May cause an allergic skin reaction.
Causes serious eye damage.
Suspected of damaging fertility or the unborn child.
Causes damage to organs through prolonged or repeated exposure if inhaled.
Causes severe burns.

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. FIRE-FIGHTING 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
Nitrogen oxides (NO_x)

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Further information : Collect contaminated fire extinguishing water separately. This

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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 : Wear self-contained breathing apparatus for firefighting if necessary for fire-fighters

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Use personal protective equipment.
Ensure adequate ventilation.
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

Technical measures : During spraying, wear suitable respiratory equipment.

Local/Total ventilation : Ensure adequate ventilation.

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 sensitization of susceptible persons.
Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product.
Do not breathe vapors/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.

Conditions for safe storage : Prevent unauthorized access.

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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 labeled containers.

Materials to avoid : For incompatible materials please refer to Section 10 of this SDS.

Further information on storage stability : Stable under normal conditions.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Diethylenetriamine	111-40-0	TWA	1 ppm	ACGIH
		TWA	1 ppm 4 mg/m3	NIOSH REL
		TWA	1 ppm 4 mg/m3	OSHA P0

Personal protective equipment

Respiratory protection : Ensure adequate ventilation.
Suitable respiratory equipment:
Respirator with a half face mask.
Recommended Filter type:
Combined particulates and organic vapor type
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.

Filter type : Filter type A-P2 (organic vapours, particles)

Hand protection
Guideline : Use gloves approved to relevant standards e.g. EN 16523 (Europe), EN 374 (Europe), F739 (US).

Material : Polyethylene
Material : Ethyl Vinyl Alcohol Laminate (EVAL)
Material : butyl-rubber
Material : Natural Rubber
Material : Neoprene
Material : Polyvinyl alcohol or nitrile- butyl-rubber gloves
Material : PVC
Material : Hydrofluoric acid-resistant and solvent-resistant gloves (gloves made of VITON (R)).

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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	: Avoid contact with skin, eyes and clothing. When using do not eat or drink. When using do not smoke. Wash hands before breaks and immediately after handling the product.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: liquid
Color	: colorless, Clear
Odor	: ammoniacal
Odor Threshold	: No data is available on the product itself.
pH	: No data is available on the product itself.
Melting point	: -2 °F / -19 °C
Boiling point	: 432 °F / 222 °C 428.7 °F / 220.4 °C (1,013 hPa)
Flash point	: 210 °F / 99 °C Method: ISO 2719, 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	: 9.4 %(V)
Lower explosion limit / Lower flammability limit	: 1.1 %(V)
Vapor pressure	: 0.052 hPa (68 °F / 20 °C)
Relative vapor density	: 4.4

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Relative density	: 0.99
Density	: 0.98 g/cm ³ (68 °F / 20 °C)
Solubility(ies)	
Water solubility	: > 1,000 g/l completely miscible
Solubility in other solvents	: No data is available on the product itself.
Partition coefficient: n-octanol/water	: log Pow: -1.48 (68 °F / 20 °C)
Autoignition temperature	: > 572 °F / > 300 °C
Decomposition temperature	: No data is available on the product itself.
Self-Accelerating decomposition temperature (SADT)	: No data is available on the product itself.
Viscosity	
Viscosity, dynamic	: 14.1 mPa.s (68 °F / 20 °C)
Explosive properties	: No data is available on the product itself.
Oxidizing properties	: None.
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	: No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Harmful if swallowed.

Toxic in contact with skin.

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Product:

Acute oral toxicity	:	Acute toxicity estimate: 500 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 27.61 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: 866 mg/kg Method: Calculation method

Components:

2-piperazin-1-ylethylamine:

Acute oral toxicity	:	LD50 (Rabbit, male): 2,097 mg/kg Assessment: The component/mixture is moderately toxic after single ingestion.
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Acute dermal toxicity	:	LD50 (Rabbit, male): 866 mg/kg Assessment: The component/mixture is toxic after single contact with skin.
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Diethylenetriamine:

Acute oral toxicity	:	LD50 (Rat, male): 1,553 mg/kg Assessment: The component/mixture is moderately toxic after single ingestion.
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Acute inhalation toxicity	:	Acute toxicity estimate: 0.185 mg/l Test atmosphere: dust/mist Method: Expert judgment Assessment: The component/mixture is highly toxic after short term inhalation.
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LC0 (Rat, male and female): 0.07 mg/l
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
GLP: yes
Assessment: The component/mixture is highly toxic after short term inhalation.

LC100 (Rat, male and female): 0.3 mg/l
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
GLP: yes
Assessment: The component/mixture is highly toxic after short term inhalation.

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

Acute oral toxicity : LD50 (Rat, male and female): 1,716.2 mg/kg
Method: OECD Test Guideline 401
Assessment: The component/mixture is moderately toxic after single ingestion.

Acute dermal toxicity : LD50 (Rabbit, male and female): 1,465.4 mg/kg
Method: OECD Test Guideline 402
Assessment: The component/mixture is moderately toxic after single contact with skin.

2-(2-aminoethylamino)ethanol:

Acute oral toxicity : LD50 (Rat, male and female): 2,150 mg/kg
Method: OECD Test Guideline 401
GLP: no
Assessment: The component/mixture is low toxic after single ingestion.

Acute inhalation toxicity : LC0 (Rat): 51.3 mg/m3
Exposure time: 8 h
Test atmosphere: vapor
Method: OECD Test Guideline 403
GLP: no
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg

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

Skin corrosion/irritation

Causes severe burns.

Components:

2-piperazin-1-ylethylamine:

Species : Rabbit
Assessment : Causes burns.
Result : Causes burns.

Diethylenetriamine:

Species : Rabbit
Assessment : Causes burns.
Result : Causes burns.
GLP : no

trientine:

Species : reconstructed human epidermis (RhE)

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Assessment : Causes burns.
Method : OECD Test Guideline 435
Result : Corrosive after 3 minutes to 1 hour of exposure

Species : Rabbit
Assessment : Causes burns.
Method : OECD Test Guideline 404
Result : Corrosive after 3 minutes to 1 hour of exposure

2-(2-aminoethylamino)ethanol:

Species : Rabbit
Assessment : Causes burns.
Method : OECD Test Guideline 404
Result : Corrosive after 3 minutes to 1 hour of exposure
GLP : no

Serious eye damage/eye irritation

Causes serious eye damage.

Components:

2-piperazin-1-ylethylamine:

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

Diethylenetriamine:

Species : Rabbit
Result : Corrosive
Assessment : Corrosive
GLP : no

trientine:

Species : Rabbit
Result : Irreversible effects on the eye
Assessment : Risk of serious damage to eyes.
Method : OECD Test Guideline 405

2-(2-aminoethylamino)ethanol:

Species : Rabbit
Result : Irreversible effects on the eye
Assessment : Corrosive
Method : OECD Test Guideline 405
GLP : no

Respiratory or skin sensitisation

Skin sensitisation

May cause an allergic skin reaction.

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Respiratory sensitisation

Not classified due to lack of data.

Components:

2-piperazin-1-ylethylamine:

Test Type	: Maximisation Test
Exposure routes	: Skin
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: Probability or evidence of low to moderate skin sensitisation rate in humans

Diethylenetriamine:

Exposure routes	: Skin
Species	: Mouse
Assessment	: Probability or evidence of low to moderate skin sensitisation rate in humans
Method	: OECD Test Guideline 429
Result	: Probability or evidence of low to moderate skin sensitisation rate in humans
GLP	: yes
Remarks	: Causes sensitization.
Exposure routes	: Respiratory Tract
Species	: Mouse
Result	: Does not cause respiratory sensitisation.

trientine:

Exposure routes	: Skin
Species	: Guinea pig
Assessment	: Probability or evidence of skin sensitisation in humans
Method	: OECD Test Guideline 406
Result	: Probability or evidence of skin sensitisation in humans

2-(2-aminoethylamino)ethanol:

Test Type	: Local lymph node assay (LLNA)
Exposure routes	: Skin
Species	: Mouse
Assessment	: Probability or evidence of low to moderate skin sensitisation rate in humans
Method	: OECD Test Guideline 429
Result	: Probability or evidence of low to moderate skin sensitisation rate in humans
GLP	: no

Germ cell mutagenicity

Not classified due to lack of data.

Components:

2-piperazin-1-ylethylamine:

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Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: negative

Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: negative

Test Type: unscheduled DNA synthesis assay
Test system: rat hepatocytes
Metabolic activation: negative
Result: negative

Test Type: gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 490
Result: negative
GLP: yes

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Application Route: Intraperitoneal injection
Dose: 175 - 560 mg/kg
Method: OECD Test Guideline 474
Result: negative

Diethylenetriamine:

Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella tryphimurium and E. coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: without metabolic activation
Result: negative
GLP: yes

Test Type: gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: negative

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Genotoxicity in vivo : Test Type: gene mutation test
Test system: rat hepatocytes
Metabolic activation: with and without metabolic activation
Result: negative

Genotoxicity in vivo : Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Mouse (male)
Cell type: Bone marrow
Application Route: Oral
Exposure time: 5 and 28 days
Dose: 10 mL/kg
Method: OECD Test Guideline 488
Result: negative
GLP: yes

Test Type: gene mutation test
Species: Drosophila melanogaster (vinegar fly) (male)
Exposure time: 22 and 24 hours
Result: negative
GLP: yes

Test Type: Micronucleus test
Species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Oral
Dose: 85, 283 and 850 mg/kg bw
Method: OECD Test Guideline 474
Result: negative
GLP: yes

trientine:

Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella tryphimurium and E. coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive
GLP: yes

Test Type: Micronucleus test
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: negative

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Intraperitoneal injection
Dose: 0 - 600 mg/kg
Method: OECD Test Guideline 474
Result: negative

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2-(2-aminoethylamino)ethanol:

Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: no

Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: no

Genotoxicity in vivo : Application Route: Oral
Dose: 3000 mg/kg
Result: negative

Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Cell type: Bone marrow
Application Route: Oral
Dose: 0; 500; 1000; 2000 mg/kg bw
Method: OECD Test Guideline 474
Result: negative
GLP: yes

Test Type: in vivo assay
Species: Drosophila melanogaster (vinegar fly) (male)
Application Route: Oral
Exposure time: 7 d
Method: OECD Test Guideline 477
Result: negative

Carcinogenicity

Not classified due to lack of data.

Components:

Diethylenetriamine:

Species : Mouse, male
Application Route : Dermal
Dose : 56.3 mg/kg
Frequency of Treatment : 3 days/week
NOEL : 56.3 mg/kg bw/day
Result : negative
GLP : yes

trientine:

Species : Mouse, male
Application Route : Dermal
NOAEL : ≥ 50 mg/kg bw/day

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Method : OECD Test Guideline 451
Result : negative

Species : Mouse, male
Application Route : Dermal
Exposure time : 104 weeks
NOAEL : ≥ 20 mg/kg bw/day
Method : OECD Test Guideline 451
Result : negative

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

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 ingredient 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

Suspected of damaging fertility or the unborn child.

Product:

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

Components:

2-piperazin-1-ylethylamine:

Effects on fertility : Test Type: Combined Repeated Dose Toxicity Study with the
Reproduction / Developmental Toxicity Screening Test
Species: Rat, male and female
Application Route: Oral
Dose: 500/2000/8000 ppm
Duration of Single Treatment: 28 d
General Toxicity Parent: NOAEC: 8,000 ppm
General Toxicity F1: NOEL: 8,000 ppm
Method: OECD Test Guideline 422

Effects on fetal development : Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: LOAEC: 8,000 ppm
Developmental Toxicity: NOEL: 8,000 ppm
Method: OECD Test Guideline 422

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Duration of Single Treatment: 14 d
General Toxicity Maternal: NOAEL: 1,000 mg/kg body weight
Developmental Toxicity: NOEL: 1,000 mg/kg body weight
Method: OECD Test Guideline 414

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Test Type: Pre-natal
Species: Rabbit, female
Application Route: Oral
Duration of Single Treatment: 23 d
General Toxicity Maternal: NOAEL: 75 mg/kg body weight
Developmental Toxicity: NOAEL: 75 mg/kg body weight
Method: OECD Test Guideline 414

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

Diethylenetriamine:

Effects on fertility : Test Type: Reproduction / Developmental Toxicity Screening Test
Species: Rat, male and female
Application Route: Oral
Dose: 30/100/300 mg/kg bw/day
Frequency of Treatment: 7 days/week
General Toxicity Parent: NOAEL: 100 mg/kg wet weight
General Toxicity F1: NOAEL: 30 mg/kg body weight
Method: OECD Test Guideline 421
GLP: yes

Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
Dose: 0/25/100/250 mg/kg bw/day
General Toxicity Parent: NOAEL: 250 mg/kg wet weight
General Toxicity F1: NOAEL: 250 mg/kg body weight
Method: OECD Test Guideline 443
GLP: yes

Effects on fetal development : Test Type: reproductive and developmental toxicity study
Species: Rat, male and female
Application Route: Oral
General Toxicity Maternal: NOAEL: 100 mg/kg body weight
Developmental Toxicity: NOAEL: 30 mg/kg body weight
Method: OECD Test Guideline 421
Result: No adverse effects
GLP: yes

Test Type: Pre-natal
Species: Rat, females
Application Route: Oral
Dose: 0/25/100/250 milligram per kilogram
Duration of Single Treatment: 14 d
General Toxicity Maternal: NOAEL: 100 mg/kg body weight
Developmental Toxicity: NOEL: 100 mg/kg body weight
Method: OECD Test Guideline 414
GLP: yes

Test Type: Pre-natal
Species: Rabbit
Application Route: Oral

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Dose: 0, 20, 70, 200 milligram per kilogram
Duration of Single Treatment: 28 d
General Toxicity Maternal: NOAEL: 70 mg/kg body weight
Developmental Toxicity: NOAEL: 70 mg/kg body weight
Method: OECD Test Guideline 414

trientine:

Effects on fetal development : Test Type: Pre-natal
Species: Rat
Application Route: Oral
Dose: 75/325/750 mg/kg bw/day
Duration of Single Treatment: 10 d
General Toxicity Maternal: NOAEL: $\geq$ 750 mg/kg body weight
Developmental Toxicity: NOAEL: $\geq$ 750 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Test Type: Pre-natal
Species: Rabbit
Application Route: Dermal
Dose: 5/50/125 mg/kg bw/day
Duration of Single Treatment: 13 d
General Toxicity Maternal: NOAEL: 50 mg/kg body weight
Developmental Toxicity: NOAEL: $\geq$ 125 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

2-(2-aminoethylamino)ethanol:

Effects on fertility : Test Type: Reproduction / Developmental Toxicity Screening Test
Species: Rat, male and female
Application Route: Oral
Dose: 0, 50, 250, 1000 mg/kg bw/day milligram per kilogram
General Toxicity Parent: NOAEL: 250 mg/kg body weight
General Toxicity F1: NOEL: 50 mg/kg body weight
Method: OECD Test Guideline 421
Result: positive
GLP: yes

Effects on fetal development : Species: Rat, male and female
Application Route: Oral
Dose: 0, 0.2, 1, 5, 50 mg/kg bw/day
General Toxicity Maternal: NOAEL: 50 mg/kg body weight
Developmental Toxicity: LOAEL: 0.2 mg/kg body weight
Method: OECD Test Guideline 421
Result: Teratogenic effects.
GLP: yes

Test Type: Pre-natal
Species: Rat, female
Application Route: Oral
Dose: 0, 0.5, 2, 10, 50 mg/kg bw/day
General Toxicity Maternal: NOAEL: 50 mg/kg body weight

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Developmental Toxicity: NOAEL: 50 mg/kg body weight
Method: OECD Test Guideline 414
GLP: yes

Reproductive toxicity - Assessment : Clear evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments, May damage the unborn child. Suspected of damaging fertility.

STOT-single exposure

Not classified due to lack of data.

Components:

Diethylenetriamine:

Exposure routes : Inhalation
Target Organs : Respiratory Tract
Assessment : May cause respiratory irritation.

2-(2-aminoethylamino)ethanol:

Target Organs : Respiratory Tract
Assessment : The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

STOT-repeated exposure

Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Components:

2-piperazin-1-ylethylamine:

Exposure routes : Inhalation
Target Organs : Respiratory Tract
Assessment : Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:

2-piperazin-1-ylethylamine:

Species : Rat, male and female
NOAEL : 152 mg/kg/d
Application Route : oral (drinking water)
Exposure time : 28 d
Method : OECD Test Guideline 422

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

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Species	:	Rat, male and female
NOEC	:	0.2 mg/m ³
Application Route	:	Inhalation
Exposure time	:	90 d
Number of exposures	:	6h/d, 5d/w
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
NOEC	:	53.3 mg/m ³
Application Route	:	Inhalation
Exposure time	:	90 d
Number of exposures	:	6h/d, 5d/w
Method	:	OECD Test Guideline 413

Diethylenetriamine:

Species	:	Rat, male and female
NOAEL	:	70 - 80 mg/kg
LOAEL	:	530 - 620 mg/kg
Application Route	:	oral (feed)
Exposure time	:	90 days
Number of exposures	:	7 days/week
Dose	:	1000, 7500, or 15000 ppm
Method	:	OECD Test Guideline 451
GLP	:	yes

Species	:	Rat, male and female
NOEC	:	0.55 mg/l
Application Route	:	inhalation (vapor)
Exposure time	:	15 days 6 h
Number of exposures	:	7 days/week
Dose	:	0/130 ppm

Species	:	Rat, male and female
NOAEL	:	114 mg/kg
Application Route	:	Dermal
Number of exposures	:	6 days/week
Dose	:	0.4 mls of a 100 mg/cc solution

trientine:

Species	:	Rat, male and female
NOAEL	:	350 mg/kg
Application Route	:	Oral
Exposure time	:	28 d
Number of exposures	:	7 d
Dose	:	100/350/1000 mg/kg bw/day
Method	:	OECD Test Guideline 407
Target Organs	:	Lungs
Remarks	:	Information given is based on data obtained from similar substances.

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Species	:	Dog, male and female
NOAEL	:	125 mg/kg
Application Route	:	Oral
Target Organs	:	Lungs
Remarks	:	Information given is based on data obtained from similar substances.

Species	:	Dog, male and female
NOAEL	:	50 mg/kg
Application Route	:	Oral
Method	:	Subchronic toxicity
Remarks	:	Information given is based on data obtained from similar substances.

Species	:	Rat, male and female
NOAEL	:	50 mg/kg
Application Route	:	Oral
Exposure time	:	26 weeks
Dose	:	50/175/600 mg/kg bw/day
Method	:	OECD Test Guideline 408
Target Organs	:	Lungs
Remarks	:	Information given is based on data obtained from similar substances.

Species	:	Mouse, male and female
NOAEL	:	92 mg/kg, 600 ppm
Application Route	:	Oral
Exposure time	:	120/600/3000 ppm
Method	:	OECD Test Guideline 408
Remarks	:	Information given is based on data obtained from similar substances.

2-(2-aminoethylamino)ethanol:

Species	:	Rat, male and female
NOAEL	:	> 1000 mg/kg/d
Application Route	:	Skin contact
Exposure time	:	28 d
Number of exposures	:	daily
Dose	:	0, 100, 300, 1000 mg/kg bw/d
Method	:	OECD Test Guideline 410
GLP	:	yes

Species	:	Rat, male and female
NOEL	:	60 mg/kg/d
Application Route	:	oral (gavage)
Exposure time	:	28 d
Dose	:	0, 60; 250; 1000 mg/kg bw/d
Method	:	OECD Test Guideline 407
GLP	:	yes

Aspiration toxicity

Not classified due to lack of data.

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Experience with human exposure

No data available

Toxicology, Metabolism, Distribution

No data available

Neurological effects

No data available

Further information

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

2-piperazin-1-ylethylamine:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 2,190 mg/l End point: mortality Exposure time: 96 h Test Type: static test Test substance: Fresh water
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 58 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: OECD Test Guideline 202 Remarks: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Toxicity to algae/aquatic plants	:	EC50 (Selenastrum capricornutum (green algae)): > 1,000 mg/l Exposure time: 72 h Test substance: Fresh water Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50 (Bacteria): > 100 mg/l mg/kg Exposure time: 28 d Method: OECD Test Guideline 216 EC50 (activated sludge): 511 mg/l Exposure time: 2 h Test Type: static test Test substance: Fresh water Method: ISO Method, other
Toxicity to soil dwelling organisms	:	LC50 (Eisenia fetida (earthworms)): 712 mg/kg Exposure time: 56 d Method: OECD Test Guideline 222

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

Diethylenetriamine:

Toxicity to fish : LC50 (Poecilia reticulata (guppy)): 430 mg/l
End point: mortality
Exposure time: 96 h
Test Type: semi-static test
Analytical monitoring: no
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.1.
GLP: yes

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 64.6 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: Regulation (EC) No. 440/2008, Annex, C.2

EC50 (Daphnia magna (Water flea)): 16 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: DIN 38412

Toxicity to algae/aquatic plants : EbC50 (Selenastrum capricornutum (green algae)): 1,164 mg/l
Exposure time: 72 h
Test Type: static test
Analytical monitoring: no
Test substance: Fresh water
Method: OECD Test Guideline 201
GLP: yes

Toxicity to fish (Chronic toxicity) : NOEC (Gasterosteus aculeatus (threespine stickleback)): 10 mg/l
Exposure time: 28 d
Test Type: semi-static test
Analytical monitoring: no
Test substance: Fresh water
Method: OECD Test Guideline 210
GLP: yes

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
Analytical monitoring: no
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.20
GLP: yes

Toxicity to microorganisms : EC50 (Bacteria): 32.7 mg/l
Exposure time: 3 h

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Test Type: static test
Test substance: Fresh water
GLP: yes

NOEC (Bacteria): 6 mg/l
Exposure time: 3 h
Test Type: static test
Test substance: Fresh water
GLP: yes

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

Ecotoxicology Assessment

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

trientine:

Toxicity to fish : LC50 (*Poecilia reticulata* (guppy)): 570 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.1.

LC50 (*Leuciscus idus* (Golden orfe)): 200 - 500 mg/l
Exposure time: 96 h

LC50 (*Pimephales promelas* (fathead minnow)): 330 mg/l
End point: mortality
Exposure time: 96 h
Test Type: static test
Test substance: Fresh water
Method: Fish Acute Toxicity Test

Toxicity to daphnia and other aquatic invertebrates : EC50 (*Daphnia magna* (Water flea)): 31.1 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae/aquatic plants : 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

EC10 (*Selenastrum capricornutum* (green algae)): 1.34 mg/l
Exposure time: 72 h
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 201

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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

Toxicity to microorganisms : NOEC (Bacteria): $\geq$ 100 mg/l
Exposure time: 28 d
Method: OECD Test Guideline 216

EC50 (Bacteria): $>$ 100 mg/l
Exposure time: 28 h
Method: OECD Test Guideline 216

EC50 (Bacteria): 15.7 mg/l
Exposure time: 2 h
Test Type: static test
Test substance: Fresh water

NOEC (Bacteria): 1.3 mg/l
Exposure time: 2 h
Test Type: static test
Test substance: Fresh water

Toxicity to soil dwelling organisms : NOEC (Eisenia fetida (earthworms)): ca. 62.5 mg/kg
Exposure time: 56 d
Method: OECD Test Guideline 222

EC50 (Eisenia fetida (earthworms)): $>$ 1,000 mg/kg
Exposure time: 56 d
Method: OECD Test Guideline 222

Ecotoxicology Assessment

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

2-(2-aminoethylamino)ethanol:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 640 mg/l
Exposure time: 96 h
Test substance: Fresh water
Method: Calculation method
GLP: no

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

EC50 (Daphnia magna (Water flea)): 22 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water
Method: OECD Test Guideline 202
GLP: yes

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NOEC (Daphnia magna (Water flea)): 10 mg/l

End point: Immobilization

Exposure time: 48 h

Test Type: static test

Test substance: Fresh water

Method: OECD Test Guideline 202

GLP: yes

Toxicity to algae/aquatic plants : EC50 (Desmodesmus subspicatus (green algae)): 358 mg/l

Exposure time: 72 h

Test Type: static test

Analytical monitoring: no

Test substance: Fresh water

Method: DIN 38412

GLP: no

ErC10 (Desmodesmus subspicatus (green algae)): 156 mg/l

Exposure time: 72 h

Test Type: static test

Analytical monitoring: no

Test substance: Fresh water

Method: DIN 38412

GLP: no

Toxicity to microorganisms : EC50 (activated sludge): > 1,003 mg/l

Exposure time: 0.5 h

Test Type: static test

Analytical monitoring: no

Test substance: Fresh water

Method: ISO Method, other

GLP: no

EC50 (Bacteria): 134.8 mg/l

Exposure time: 17 h

Test Type: static test

Analytical monitoring: no

Test substance: Fresh water

Method: DIN 38412

GLP: no

Persistence and degradability

Components:

2-piperazin-1-ylethylamine:

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

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

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Chemical Oxygen Demand (COD) : 560 mg/l

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

Diethylenetriamine:

Biodegradability : aerobic
Inoculum: activated sludge, non-adapted
Result: Readily biodegradable.
Biodegradation: 87 %
Exposure time: 21 d
Method: OECD Test Guideline 301D
Test substance: Fresh water

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

trientine:

Biodegradability : Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 162 d
Method: OECD Test Guideline 301D
Test substance: Fresh water

aerobic
Inoculum: activated sludge
Dissolved organic carbon (DOC)
Result: Not inherently biodegradable.
Biodegradation: 20 %
Exposure time: 84 d
Method: OECD Test Guideline 302A
Test substance: Fresh water

2-(2-aminoethylamino)ethanol:

Biodegradability : aerobic
Inoculum: activated sludge
Result: Readily biodegradable.
Biodegradation: > 60 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
GLP: yes

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

Chemical Oxygen Demand (COD) : 1090 mgO₂/g

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Bioaccumulative potential

Components:

2-piperazin-1-ylethylamine:

Bioaccumulation : Species: Fish
Remarks: Does not bioaccumulate.

Partition coefficient: n-octanol/water : log Pow: -1.48 (68 °F / 20 °C)

Diethylenetriamine:

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 0.3 - 6.3
Exposure time: 42 d
Concentration: 0.2 - 2 mg/l
Test substance: Fresh water
Method: OECD Test Guideline 305C
Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: -1.58 (68 °F / 20 °C)
pH: > 12
Method: Calculation method
GLP: no

log Pow: -5.58 (68 °F / 20 °C)
pH: 7
Method: Calculation method
GLP: no

trientine:

Partition coefficient: n-octanol/water : log Pow: -2.08 - 2.90 (68 °F / 20 °C)
Method: QSAR

2-(2-aminoethylamino)ethanol:

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

Partition coefficient: n-octanol/water : log Pow: -1.46 (77 °F / 25 °C)
pH: 10.6 - 11
Method: OECD Test Guideline 107
GLP: no

Mobility in soil

Components:

2-piperazin-1-ylethylamine:

Distribution among environmental compartments : Koc: ca. 37000

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Diethylenetriamine:

Distribution among environmental compartments : Medium: Soil
Koc: 19111
Method: Sediment and Soil Adsorption Isotherm

trientine:

Distribution among environmental compartments : Koc: 3162.28, log Koc: 3.5
Method: OECD Test Guideline 106

2-(2-aminoethylamino)ethanol:

Distribution among environmental compartments : Koc: 4.2

Koc: 3.524

Other adverse effects

Product:

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

Components:

2-(2-aminoethylamino)ethanol:

Additional ecological information : No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of contents and container in accordance with all local,
regional, national and international regulations.
Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with
chemical or used container.

Contaminated packaging : Empty remaining contents.
Dispose of as unused product.
Do not re-use empty containers.

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SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	: UN 2815
Proper shipping name	: N-AMINOETHYLPIPERAZINE
Class	: 8
Subsidiary risk	: 6.1
Packing group	: III
Labels	: 8 (6.1)
Environmentally hazardous	: no

IATA-DGR

UN/ID No.	: UN 2815
Proper shipping name	: N-Aminoethylpiperazine
Class	: 8
Subsidiary risk	: 6.1
Packing group	: III
Labels	: Corrosive, Toxic
Packing instruction (cargo aircraft)	: 856
Packing instruction (passenger aircraft)	: 852

IMDG-Code

UN number	: UN 2815
Proper shipping name	: N-AMINOETHYLPIPERAZINE
Class	: 8
Subsidiary risk	: 6.1
Packing group	: III
Labels	: 8 (6.1)
EmS Code	: F-A, S-B
Marine pollutant	: no

Transport in bulk according to IMO instruments

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	: UN 2815
Proper shipping name	: N-Aminoethylpiperazine
Class	: 8
Subsidiary risk	: 6.1
Packing group	: III
Labels	: CORROSIVE, TOXIC
ERG Code	: 153
Marine pollutant	: no

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

SAFETY DATA SHEET

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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

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

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Respiratory or skin sensitization
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)
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) $\geq 0.1\%$, as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

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

DSL	: All components of this product are on the Canadian DSL
AIIC	: On the inventory, or in compliance with the inventory
ENCS	: On the inventory, or in compliance with the inventory
KECI	: On the inventory, or in compliance with the inventory
PICCS	: On the inventory, or in compliance with the inventory
IECSC	: On the inventory, or in compliance with the inventory
TCSI	: On the inventory, or in compliance with the inventory
TSCA	: All substances listed as active on the TSCA inventory

Inventories

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

TSCA - 5(a) Significant New Use Rule List of Chemicals

No substances are subject to a Significant New Use Rule.

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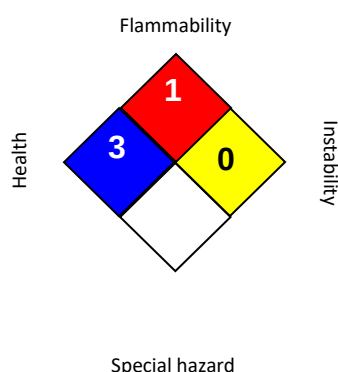
US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:

HEALTH	*	3
FLAMMABILITY		1
PHYSICAL HAZARD		0

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 : 04/08/2025

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL : USA. NIOSH Recommended Exposure Limits
OSHA P0 : USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)

ACGIH / TWA : 8-hour, time-weighted average
NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek

OSHA P0 / TWA : 8-hour time weighted average

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

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

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

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

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