



Safety Data Sheet Morricite Hardener 23-2511

Version 1.0
Date: 10/06/2021

1. Product and Company Identification

Product Name : Morricite Hardener 23-2511
Material Number : 23-2511
Product Use Description : Hardener for epoxy resin
Manufacturer/ Importer/Distributor : Master Terrazzo Technologies
8000 Bristol Pike-Levittown, PA
P.O. Box 226
Bristol, PA 19007
Telephone : 1-215-949-1474
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Emergency telephone Number : Chemtel-800-255-3924
Contract #MIS0004752

2. Hazards Identification

Hazard classification

GHS classification in accordance with 29 CFR 1910.1200

Acute toxicity - Category 4 - Oral

Skin corrosion - Category 1B

Serious eye damage - Category 1

Skin sensitisation - Sub-category 1A

Reproductive toxicity - Category 1B

Effects on or via lactation

Label elements

Hazard pictograms



Signal Word: **Danger**

Hazards

Harmful if swallowed.

Causes severe skin burns and eye damage.

May cause an allergic skin reaction.

May damage fertility or the unborn child.

May cause harm to breast-fed children.

Precautionary statements

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

Avoid contact during pregnancy/ while nursing.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.
 Contaminated work clothing should not be allowed out of the workplace.
 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
 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.
 IF exposed or concerned: Get medical advice/ attention.
 If skin irritation or rash occurs: Get medical advice/ attention.
 Wash contaminated clothing before reuse.

Storage

Store locked up.

Disposal

Dispose of contents/ container to an approved waste disposal plant.

Other hazards

No data available

3. Composition/ Information on Ingredients

This product is a mixture.

Component	CASRN	Concentration
Triethylenetetramine mixture	112-24-3	>=35.0-<-45.0%
Polyoxypropylene diamine	9046-10-0	>=25.0-<=35.0%
4-Nonylphenol, branched	84852-15-3	>=25.0-<=35.0%
Aminoethylethanolamine	111-41-1	<1.0%
Aminoethylpiperazine	140-31-8	<0.5%
Dinonylphenol	1323-65-5	<0.5%
Diethylenetriamine	111-40-0	<0.5%
Tetraethylenepentamine mixture	112.57-2	<0.5%
Phenol	108-95-2	<0.1%
Nonene	27215-95-8	<0.1%

4. First Aid Measures

Description of first aid measures

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Immediate continued and thorough washing in flowing water for at least 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash clothing before reuse. Properly dispose of leather items such as shoes, belts, and watchbands. Suitable emergency safety shower facility should be immediately available.

Eye contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.

Most important symptoms and effects, both acute and delayed:

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

5. Fire-Fighting Measures

Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture

Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep personnel out of low areas. Keep upwind of spill. Ventilate area of leak or spill. Refer to section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Collect in suitable and properly labeled containers. Absorb with materials such as: Sand. See Section 13, Disposal Considerations, for additional information.

7. Handling and Storage

Precautions for safe handling: Do not get in eyes, on skin, or on clothing. Avoid prolonged or repeated contact with skin. Avoid breathing vapor. Do not swallow. Keep container closed. Wash thoroughly after handling. Use with adequate ventilation. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Store in a cool, dry place. Avoid contact with metals such as: Brass. Bronze. Copper. Copper alloys.

Storage stability

Storage temperature:

0 - 30 °C (32 - 86 °F)

Shelf life: Use within

12 Month

8. Exposure Controls/ Personal Protection

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Triethylenetetramine	US WEEL	TWA	1 ppm
	US WEEL	TWA	Absorbed via skin
Aminoethylethanolamine	Dow IHG	TWA	0.05 mg/m ³
	Dow IHG	TWA	SKIN, DSEN
Diethylenetriamine	ACGIH	TWA	1 ppm
	OSHA P0	TWA	4 mg/m ³ 1 ppm
	ACGIH	TWA	Absorbed via skin
Tetraethylenepentamine mixture	US WEEL	TWA	5 mg/m ³
	US WEEL	TWA	SKIN, DSEN
Phenol	ACGIH	TWA	5 ppm
	OSHA Z-1	TWA	19 mg/m ³ 5 ppm
	ACGIH	TWA	SKIN, BEI
	CAR PEL	PEL	19 mg/m ³ 5 ppm
	OSHA Z-1	TWA	Absorbed via skin
	OSHA P0	TWA	19 mg/m ³ 5 ppm

Exposure limits have not been established for those substances listed in the composition, if any have been disclosed.

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
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Phenol	108-95-2	Phenol	Urine	End of shift (as soon as possible after exposure ceases)	100 mg/g 250 mg/g Creatinine	ACGIH BEI
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Exposure controls

Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Styrene/butadiene rubber. Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. Avoid gloves made of: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Respiratory protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

9. Physical and Chemical Properties
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Appearance**Physical state**

Liquid.

Color

yellow

Odor

Amine.

Odor Threshold

No test data available

pH

Not applicable

Melting point/range

Not applicable

Freezing point

No test data available

Boiling point (760 mmHg)

148 °C (298 °F) Literature (triethylenetetramine)

Flash point

127 °C (261 °F) Literature

Evaporation Rate (Butyl Acetate = 1)

No test data available

Flammability (solid, gas)

Not applicable to liquids

Lower explosion limit

No test data available

Upper explosion limit

No test data available

Vapor Pressure

8 mmHg at 20 °C (68 °F) Literature (based on major component)

Relative Vapor Density (air = 1)

No data available

Relative Density (water = 1)

0.96 at 25 °C (77 °F) Literature

Water solubility

slightly soluble

Partition coefficient: n-octanol/water

No data available

Auto-ignition temperature

No test data available

Decomposition temperature

No test data available

Dynamic Viscosity	25 - 85 mPa.s at 25 °C (77 °F) ASTM D 445
Kinematic Viscosity	No data available
Explosive properties	No data available
Oxidizing properties	No data available
Softening point	No data available
Molecular weight	No data available
Pour point	No data available
Volatile Organic Compounds	No test data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. Stability and Reactivity

Reactivity: No data available

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Reaction with carbon dioxide may form an amine carbamate. Smoke may be generated depending on vapor pressure of mixture. Product absorbs carbon dioxide from the air.

Incompatible materials: Avoid contact with oxidizing materials. Avoid contact with: Acids. Acrylates. Alcohols. Aldehydes. Halogenated hydrocarbons. Ketones. Nitrites. Avoid contact with metals such as: Brass. Bronze. Copper. Copper alloys.

Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Ammonia. Hydrocarbons. Volatile amines. Phenolics. Aromatic compounds.

11. Toxicological Information

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Low toxicity if swallowed. Swallowing may result in gastrointestinal irritation or ulceration. Swallowing may result in burns of the mouth and throat.

As product: Single dose oral LD50 has not been determined.
LD50, Rat, 1,462 mg/kg Calculated.

Acute dermal toxicity

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

Acute inhalation toxicity

At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation.

As product: The LC50 has not been determined.

Skin corrosion/irritation

Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.

Serious eye damage/eye irritation

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Sensitization

A component in this mixture has caused allergic skin reactions in humans.

For respiratory sensitization:

No data available

Specific Target Organ Systemic Toxicity (Single Exposure)

Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Based on information for component(s):

In animals, effects have been reported on the following organs:

Liver.

Carcinogenicity

Based on information for component(s): Kidney effects and/or tumors have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans.

Teratogenicity

Contains component(s) which caused birth defects in laboratory animals. Contains component(s) which have been toxic to the fetus in lab animal tests.

Reproductive toxicity

In a three-generation reproduction study in rats, nonylphenol did not interfere with standard reproductive parameters. However, some additional endpoints which are considered markers of potential reproductive toxicity were affected at higher doses that produced systemic toxicity to the parent animals.

Mutagenicity

Contains component(s) which were negative in some in vitro genetic toxicity studies and positive in others. Genetic toxicity studies in animals were negative for component(s) tested.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

COMPONENTS INFLUENCING TOXICOLOGY:**Triethylenetetramine mixture****Acute dermal toxicity**

LD50, Rabbit, 1,465 mg/kg

Acute inhalation toxicity

The LC50 has not been determined.

Polyoxypropylene diamine**Acute dermal toxicity**

LD50, Rabbit, male and female, 2,980 mg/kg

Acute inhalation toxicity

At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation. Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs. Excessive exposure may cause lung injury.

The LC50 has not been determined.

4-Nonylphenol, branched**Acute dermal toxicity**

LD50, Rabbit, 2,031 - 2,831 mg/kg

Acute inhalation toxicity

LC50, Mouse, female, vapour, > 3.636 mg/l

Aminoethylethanolamine**Acute dermal toxicity**

LD50, Rat, > 2,000 mg/kg No deaths occurred at this concentration.

Acute inhalation toxicity

At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation. Based on the available data, narcotic effects were not observed.

The LC50 has not been determined.

Aminoethylpiperazine**Acute dermal toxicity**

LD50, Rabbit, 866 mg/kg

Acute inhalation toxicity

The LC50 has not been determined. 8 Hour, vapour, No deaths occurred following exposure to a saturated atmosphere.

Dinonylphenol**Acute dermal toxicity**

LD50, Rabbit, > 8,000 mg/kg

Acute inhalation toxicity

The LC50 has not been determined.

Diethylenetriamine**Acute dermal toxicity**

LD50, Rabbit, 1,045 mg/kg

Acute inhalation toxicity

Prolonged exposure to aerosol/mist may cause serious adverse effects, even death. Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs.

LC50, Rat, 4 Hour, dust/mist, > 0.07 - < 0.3 mg/l

Tetraethylenepentamine mixture**Acute dermal toxicity**

LD50, Rabbit, 1,260 mg/kg

Acute inhalation toxicity

At room temperature, exposure to vapor is minimal due to low volatility. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

The LC50 has not been determined. Rat, 8 Hour, vapour, No deaths occurred following exposure to a saturated atmosphere.

Phenol**Acute dermal toxicity**

LD50, Rat, female, 660 mg/kg OECD Test Guideline 402

Acute inhalation toxicity

Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs. Prolonged excessive exposure may cause adverse effects. May cause pulmonary edema (fluid in the lungs.) May cause central nervous system effects. Effects may be delayed.

LC50, Rat, 4 Hour, dust/mist, > 1.13 mg/l

12. Ecological Information

Ecotoxicological information appears in this section when such data is available.

Toxicity**Triethylenetetramine mixture****Acute toxicity to fish**

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 330 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 31.1 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

EC50, Pseudokirchneriella subcapitata (green algae), semi-static test, 72 Hour, Growth rate inhibition, 20 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

EC50, Bacteria, 16 Hour, 680 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 1.9 mg/l

Polyoxypropylene diamine**Acute toxicity to fish**

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50, Fish, semi-static test, 96 Hour, > 15 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 80 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Algae, static test, 72 Hour, Growth rate, 15 mg/l, OECD Test Guideline 201 or Equivalent

EC10, Algae, static test, 72 Hour, Growth rate, 1.4 mg/l, OECD Test Guideline 201

Toxicity to bacteria

EC50, activated sludge, Respiration inhibition, 3 Hour, 750 mg/l, OECD Test Guideline 209

NOEC, activated sludge, Respiration inhibition, 3 Hour, 310 mg/l, OECD Test Guideline 209

4-Nonylphenol, branched**Acute toxicity to fish**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

LC50, Fish, static test, 96 Hour, 0.05 mg/l, EPA-660-75-009

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), semi-static test, 48 Hour, 0.0844 mg/l, Other guidelines

Acute toxicity to algae/aquatic plants

EC50, Algae (Scenedesmus subspicatus), static test, 72 Hour, Growth rate, 0.33 mg/l, Other guidelines

Chronic toxicity to fish

NOEC, Pimephales promelas (fathead minnow), flow-through test, 33 d, survival, 0.0074 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.024 mg/l

Aminoethylethanolamine**Acute toxicity to fish**

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50, Pimephales promelas (fathead minnow), 96 Hour, 640 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 22 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Desmodesmus subspicatus (green algae), 72 Hour, Growth rate inhibition, 353.6 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

EC50, Bacteria, 16 Hour, > 5,000 mg/l

Aminoethylpiperazine

Acute toxicity to fish

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 2,190 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 58 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, > 1,000 mg/l, OECD Test Guideline 201 or Equivalent

Dinonylphenol

Acute toxicity to fish

No relevant data found.

Diethylenetriamine

Acute toxicity to fish

Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50, Poecilia reticulata (guppy), semi-static test, 96 Hour, 430 mg/l

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 16 mg/l, DIN 38412

Acute toxicity to algae/aquatic plants

ErC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate inhibition, 1,164 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

EC50, Bacteria, static test, 16 Hour, > 5,000 mg/l

Chronic toxicity to fish

NOEC, Fish, semi-static test, 28 d, growth, > 10 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 5.6 mg/l

MATC (Maximum Acceptable Toxicant Level), Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 7.95 mg/l

Toxicity to soil-dwelling organisms

EC50, Eisenia fetida (earthworms), 28 d, 979 mg/kg

Tetraethylenepentamine mixture

Acute toxicity to fish

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

LC50, *Poecilia reticulata* (guppy), semi-static test, 96 Hour, 420 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), static test, 48 Hour, 24.1 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, *Pseudokirchneriella subcapitata* (green algae), static test, 72 Hour, Growth rate inhibition, 6.8 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

EC50, activated sludge, static test, 1 Hour, 1,600 mg/l

Phenol

Acute toxicity to fish

Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

LC50, *Oncorhynchus mykiss* (rainbow trout), flow-through test, 96 Hour, 8.9 mg/l

Acute toxicity to aquatic invertebrates

LC50, *Ceriodaphnia dubia* (water flea), 48 Hour, 4.3 - 20 mg/l

Acute toxicity to algae/aquatic plants

EC50, *Pseudokirchneriella subcapitata* (microalgae), static test, 96 Hour, Growth inhibition (cell density reduction), 61.1 mg/l, Other guidelines

Toxicity to bacteria

EC50, activated sludge, 110 - 800 mg/l

Chronic toxicity to fish

MATC (Maximum Acceptable Toxicant Level), *Pimephales promelas* (fathead minnow), 28 d, 2.56 mg/l

NOEC, *Cyprinus carpio* (Carp), semi-static test, 60 d, survival, 0.077 mg/l

Nonene

Acute toxicity to fish

No relevant data found.

Persistence and degradability

Triethylenetetramine mixture

Biodegradability: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%).

10-day Window: Fail

Biodegradation: 0 %

Exposure time: 20 d

Method: OECD Test Guideline 301D or Equivalent

Theoretical Oxygen Demand: 3.40 mg/mg

Chemical Oxygen Demand: 1.94 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	5.000%
20 d	2.5-11%

Polyoxypropylene diamine

Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.

10-day Window: Fail

Biodegradation: 0 %

Exposure time: 28 d

Method: OECD Test Guideline 301B

4-Nonylphenol, branched

Biodegradability: Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

10-day Window: Fail

Biodegradation: 48.2 %

Exposure time: 35 d

Method: OECD Test Guideline 301B or Equivalent

Theoretical Oxygen Demand: 3.29 mg/mg

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitization: OH radicals

Atmospheric half-life: 0.207 d

Method: Estimated.

Aminoethylethanolamine

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

Biodegradation: > 97 %

Exposure time: 28 d

Method: OECD Test Guideline 301F or Equivalent

Theoretical Oxygen Demand: 2.77 mg/m

Chemical Oxygen Demand: 1,070 mg/g

Aminoethylpiperazine

Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.

10-day Window: Fail

Biodegradation: 0 %

Exposure time: 28 d

Theoretical Oxygen Demand: 3.34 mg/mg

Chemical Oxygen Demand: 1.84 mg/mg

Photodegradation

Atmospheric half-life: 0.05 d

Method: Estimated.

Dinonylphenol

Biodegradability: No relevant data found.

Diethylenetriamine

Biodegradability: Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability). Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

10-day Window: Not applicable

Biodegradation: > 80%

Exposure time: 30 d

Method: OECD Test Guideline 302A or Equivalent

Theoretical Oxygen Demand: 3.42 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	23.000%
10 d	46.000%
20 d	70.000%

Photodegradation

Sensitization: OH radicals

Atmospheric half-life: 0.87 Hour

Method: Estimated.

Tetraethylenepentamine mixture

Biodegradability: Material is not readily biodegradable according to OECD/EEC guidelines.

10-day Window: Fail

Biodegradation: 0 %

Exposure time: 28 d

Method: OECD Test Guideline 301A or Equivalent

10-day Window: Not applicable

Biodegradation: 17 %

Exposure time: 84 d

Method: OECD Test Guideline 302A or Equivalent

Theoretical Oxygen Demand: 3.39 mg/mg

Chemical Oxygen Demand: 1.54 - 1.88 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
20 d	0-12%

Photodegradation

Atmospheric half-life: 0.41 Hour

Method: Estimated.

Phenol

Biodegradability: Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Not applicable

Biodegradation: 62 %

Exposure time: 100 Hour

Method: OECD Test Guideline 301C or Equivalent

10-day Window: Not applicable

Biodegradation: 85 %

Exposure time: 14 d

Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 2.38 mg/mg

Photodegradation

Test Type: Half-life (indirect photolysis)

Sensitization: OH radicals

Atmospheric half-life: 3.8 Hour

Method: Estimated.

Nonene

Biodegradability: No relevant data found.

Bioaccumulative potential

Triethylenetetramine mixture

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): -2.65 Estimated.

Polyoxypropylene diamine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 1.34 Measured

4-Nonylphenol, branched

Bioaccumulation: Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).

Partition coefficient: n-octanol/water(log Pow): 5.4 at 23 °C OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)

Bioconcentration factor (BCF): 271 Pimephales promelas (fathead minnow) 20 d Measured

Aminoethylethanolamine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): -1.46 Measured

Bioconcentration factor (BCF): < 3.7 Cyprinus carpio (Carp) 42 d Measured

Aminoethylpiperazine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): -1.48 Measured

Dinonylphenol

Bioaccumulation: No relevant data found.

Diethylenetriamine

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): -1.58 at 20 °C Estimated.

Bioconcentration factor (BCF): < 0.3 Measured

Tetraethylenepentamine mixture

Bioaccumulation: No bioconcentration is expected because of the relatively high water solubility.

Partition coefficient: n-octanol/water(log Pow): -3.16 Estimated.

Phenol

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).

Partition coefficient: n-octanol/water(log Pow): 1.47 at 30 °C Measured

Bioconcentration factor (BCF): 10 - 39 Carassius auratus (goldfish) Measured

Nonene

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient: n-octanol/water(log Pow): 4.55

Bioconcentration factor (BCF): 465

Mobility in soil

Triethylenetetramine mixture

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 4.1 - 310 Estimated.

Polyoxypropylene diamine

No relevant data found.

4-Nonylphenol, branched

Expected to be relatively immobile in soil (Koc > 5000).

Partition coefficient (Koc): > 5000 Estimated.

Aminoethylethanolamine

Potential for mobility in soil is very high (Koc between 0 and 50).

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Partition coefficient (Koc): 3.5 Estimated.

Aminoethylpiperazine

Expected to be relatively immobile in soil (Koc > 5000).

Partition coefficient (Koc): 37000 Estimated.

Dinonylphenol

No relevant data found.

Diethylenetriamine

Expected to be relatively immobile in soil (Koc > 5000).

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Partition coefficient (Koc): 19111 Estimated.

Tetraethylenepentamine mixture

Potential for mobility in soil is very high (Koc between 0 and 50).

Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Partition coefficient (Koc): 3.6 - 1098 Estimated.

Phenol

Potential for mobility in soil is high (Koc between 50 and 150).

Partition coefficient (Koc): 27 - 91 Estimated.

Nonene

Potential for mobility in soil is low (Koc between 500 and 2000).

Partition coefficient (Koc): 796

13. Disposal Considerations

Disposal methods: AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

14. Transport Information

DOT

UN/ID No. : UN1760
 Proper shipping name : Corrosive liquids, n.o.s.(Triethylenetetramine mixture, 4-Nonylphenol, branched)
 Class or Division : 8
 Packing group : II

Classification for SEA transport (IMO-IMDG):

UN/ID No. : UN1760
 Proper shipping name : Corrosive liquids, n.o.s.(Triethylenetetramine mixture, 4-Nonylphenol, branched)
 Class or Division : 8
 Packing group : II

Classification for AIR transport (IATA/ICAO):

UN/ID No. : UN1760
 Proper shipping name : Corrosive liquids, n.o.s.(Triethylenetetramine mixture, 4-Nonylphenol, branched)
 Class or Division : 8
 Packing group : II

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Acute toxicity (any route of exposure)
 Skin corrosion or irritation
 Serious eye damage or eye irritation
 Reproductive toxicity
 Respiratory or skin sensitization

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

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

Components	CASRN
4-Nonylphenol, branched	84852-15-3

Pennsylvania Right To Know

The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	CASRN
Triethylenetetramine mixture	112-24-3

California Prop. 65

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

United States TSCA Inventory (TSCA)

All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. Other Information**Product Literature**

Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure. Additional information on this and other products may be obtained by visiting our web page.

Hazard Rating System**NFPA**

Health	Flammability	Instability
3	1	0

Revision

Identification Number: / 010000001924 / 1015 / Issue Date: 03-28-2019 / Version: 1.1

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Absorbed via skin	Absorbed via skin
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
CAL PEL	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Dow IHG	Dow Industrial Hygiene Guideline
OSHA P0	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
PEL	Permissible exposure limit
SKIN, BEI	Absorbed via Skin, Biological Exposure Indice
SKIN, DSEN	Absorbed via Skin, Skin Sensitizer
TWA	8-hour time weighted average
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO -

International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

BLUE CUBE OPERATIONS LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

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