

1. Product and Company Identification

Name of the product	MP-203 Hardener
Identifier of the product	MP-203 Hardener
Uses recommended and restrictions	Hardener
Data of the manufacturer	Sigma Inks (USA) 12800 Brookprinter place, Poway, CA 92064 USA Telephone: (888) 424-9300 Website: www.sigmainks.com Contact to the distributor: www.printexusa.com
Number of emergencies	Chemtrec (And.Or.): (800) 424-9300 Chemtrec (Out of And.Or.): (703) 527-3887

2. Hazard Identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 4), H332
Serious eye damage (Category 1), H318
Skin sensitization (Category 1), H317
Short-term (acute) aquatic hazard (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Identification of the substance or mix
Pictogram

MP-203 Hardener



Signal word

Danger

Hazard statement(s)

H317
H318
H332
H401

May cause an allergic skin reaction.
Causes serious eye damage.
Harmful if inhaled.
Toxic to aquatic life.

Precautionary statement(s)

P261
P271
P272
P273
P280
P302 + P352

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Use only outdoors or in a well-ventilated area.
Contaminated work clothing must not be allowed out of the workplace.
Avoid release to the environment.
Wear protective gloves/ eye protection/ face protection.
IF ON SKIN: Wash with plenty of soap and water.

P304 + P340 + P312

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

P305 + P351 + P338 + P310

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

P333 + P313

If skin irritation or rash occurs: Get medical advice/ attention.

P363

Wash contaminated clothing before reuse.

P501

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

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS – none

3. Composition/information on Ingredients

Chemical identity of the substance	Common or synonymous name	Number CAS	Impurities and additives	Percentage
N-(3-(Trimethoxy silyl) propyl)-1,2-ethanediamine	N-(3-(trimethoxy silyl) propyl)ethylenediamine	1760-24-3	-	>= 76.5 - <= 84.5 %
N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine	-	74956-86-8	-	>= 6.3 - <= 7.7 %
N,N'-bis(3-(trimethoxy silyl)propyl)-1,2-ethane diamine	-	68845-16-9	-	>= 6.3 - <= 7.7 %
Oligomers of ethylenediamine propyl) trimethoxy silane	-	Not available	-	<= 4.0 %
Methanol	-	67-56-1	-	<= 0.8 %
Ethylenediamine	-	107-15-3	-	<= 0.7 %

4. First aid measures

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Nitrogen oxides (NOx), silicon oxides

Combustible.

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. Accidental release measures

6.1 Personal precautions, protective equipment, and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.



7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

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.
Storage class (TRGS 510): 10: Combustible liquids.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. Exposure controls/personal protection

8.1 Control parameters

If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
N-(3-(Trimethoxy silyl) propyl)-1,2-ethanediamine	Dow IHG		See Further information
	Further information: Skin Sensitizer		
Methanol	ACGIH	TWA	200 ppm
	Further information: headache: Headache; nausea: Nausea; dizziness: Dizziness;		
	eye dam: Eye damage; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section); Skin: Danger of cutaneous absorption		
	ACGIH	STEL	250 ppm
	Further information: headache: Headache; nausea: Nausea; dizziness: Dizziness;		
	eye dam: Eye damage; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section); Skin: Danger of cutaneous absorption		
	OSHA Z-1	TWA	260 mg/m3 200 ppm
	Further information: (b): The value in mg/m3 is approximate.		
	OSHA P0	STEL	325 mg/m3 250 ppm
	Further information: X: Skin notation		
Ethylenediamine	OSHA P0	TWA	260 mg/m3 200 ppm
	Further information: X: Skin notation		
	Dow IHG	TWA	5 ppm
	Further information: SKIN, DSEN, RSEN: Absorbed via Skin, Skin Sensitizer,		

	Respiratory sensitizer		
	ACGIH	TWA	10 ppm
	Further information: A4: Not classifiable as a human carcinogen; Skin: Danger of cutaneous absorption		
	OSHA Z-1	TWA	25 mg/m ³ 10 ppm
	Further information: (b): The value in mg/m ³ is approximate.		
	OSHA P0	TWA	25 mg/m ³ 10 ppm

The following substance(s), which have Occupational Exposure Limit(s) (OEL), may be formed during handling or processing: Methanol

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Methanol	67-56-1	Methanol	Urine	End of shift (As soon as possible after exposure ceases)	15 mg/l	ACGIH BEI

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Face shield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.2 mm

Break through time: 60 min

Material tested: Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. Physical and chemical properties

Appearance

Physical state	liquid
Color	Colorless to pale yellow
Odor	amine-like
Odor Threshold	No data available
pH	No data available
Melting point/range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	$\geq 128.33\text{ }^{\circ}\text{C}$ ($\geq 262.99\text{ }^{\circ}\text{F}$)
Flash point	Seta closed cup $85.0\text{ }^{\circ}\text{C}$ ($185.0\text{ }^{\circ}\text{F}$)
Evaporation Rate (Butyl Acetate = 1)	No data available
Flammability (solid, gas)	Not applicable
Flammability (liquids)	Ignitable (see flash point)
Lower explosion limit	No data available
Upper explosion limit	No data available
Vapor Pressure	No data available
Relative Vapor Density (air = 1)	No data available
Relative Density (water = 1)	1.03

Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	310 °C (590 °F)
Decomposition temperature	No data available
Kinematic Viscosity	5 cSt at 25 °C (77 °F)
Explosive properties	Not explosive
Oxidizing properties	The substance or mixture is not classified as oxidizing.
Molecular weight	No data available
Particle size	Not applicable

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

10. Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

May react with strong oxidizing agents. When heated to temperatures above 150 °C (300 °F) in the presence of air, the product can form formaldehyde vapors. Safe handling conditions can be maintained by keeping vapor concentrations within the occupational exposure limit for formaldehyde. Vapors can form explosive mixture with air. Combustible liquid.

10.4 Conditions to avoid

Heat, flames, and sparks.

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx), silicon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. Toxicological information

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

Information on likely routes of exposure

Inhalation, Eye contact, Skin contact, Ingestion.

Acute toxicity (represents short term exposures with immediate effects - no chronic/delayed effects known unless otherwise noted)

Acute oral toxicity

Low toxicity if swallowed. Small amounts swallowed incidentally because of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Based on product testing:

LD50, Rat, male and female, 2,295 mg/kg

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

LD50, Rat, male and female, 2,295 mg/kg OPPTS 870.1100

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Single dose oral LD50 has not been determined.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Single dose oral LD50 has not been determined.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

For similar material(s): LD50, Rat, male and female, 2,295 mg/kg OPPTS 870.1100

Methanol

Methanol is highly toxic to humans and may cause central nervous system effects, visual disturbances up to blindness, metabolic acidosis, and degenerative damage to other organs including liver, kidney, and heart. Effects may be delayed. LD50, Rat, > 5,000 mg/kg

Lethal Dose, Humans, 340 mg/kg Estimated. Lethal

Dose, Humans, 29 - 237 ml Estimated.

Ethylenediamine

LD50, Rat, male and female, 866 mg/kg

Acute dermal toxicity

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

Based on product testing:

LD50, Rabbit, male and female, > 2,000 mg/kg No deaths occurred at this concentration.

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

The dermal LD50 has not been determined.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

The dermal LD50 has not been determined.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Methanol

Effects of methanol are the same as observed via oral and inhalation exposure and include central nervous system (CNS) depression, visual impairment up to blindness, metabolic acidosis, with effects on organ systems such as liver, kidneys and heart, even death. LD50, Rabbit, 15,800 mg/kg

Ethylenediamine

LD50, Rabbit, male, 560 mg/kg

Acute inhalation toxicity

Prolonged excessive exposure to mist may cause adverse effects. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

LC50, Rat, male and female, 4 Hour, dust/mist, > 1.49 - < 2.44 mg/l

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

LC50, Rat, 4 Hour, dust/mist, 1.49 - 2.44 mg/l OECD Test Guideline 403

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

The LC50 has not been determined.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

The LC50 has not been determined.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

LC50, Rat, 4 Hour, dust/mist, 1.49 - 2.44 mg/l OECD Test Guideline 403

Methanol

Easily attainable vapor concentrations may cause serious adverse effects, even death. At lower concentrations: May cause respiratory irritation and central nervous system depression. Symptoms may include headache, dizziness, and drowsiness, progressing to incoordination and unconsciousness. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death. Effects may be delayed.

LC50, Rat, 4 Hour, vapour, 3 mg/l

Ethylenediamine

LC50, Rat, male, 4 Hour, vapour, 14.7 mg/l Estimated.

Skin corrosion/irritation

Based on product testing:

Brief contact may cause slight skin irritation with local redness. May cause drying and flaking of the skin. Effects may be slow to heal.

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

Brief contact may cause moderate skin irritation with local redness.

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Brief contact may cause skin irritation with local redness.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Brief contact may cause skin irritation with local redness.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Brief contact may cause moderate skin irritation with local redness.

Methanol

Prolonged contact may cause slight skin irritation with local redness.

Ethylenediamine

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

Classified as corrosive to the skin according to DOT guidelines.

Serious eye damage/eye irritation

Based on product testing:

May cause severe eye irritation. May cause slight corneal injury.

May cause permanent impairment of vision.

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

May cause severe eye irritation.

May cause slight corneal injury.

May cause permanent impairment of vision.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

May cause severe eye irritation.

May cause slight corneal injury.

May cause permanent impairment of vision.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Methanol

May cause eye irritation.

Ethylenediamine

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

Vapor may cause eye irritation experienced as mild discomfort and redness.

Sensitization

For skin sensitization:

Contains component(s) which have caused allergic skin sensitization in guinea pigs.

For respiratory sensitization:

A component in this mixture may cause an allergic respiratory response.

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Skin contact may cause an allergic skin reaction.

For respiratory sensitization:

No relevant data found.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Skin contact may cause an allergic skin reaction.

For respiratory sensitization:

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Ethylenediamine

Has caused allergic skin reactions in humans.

Individuals who have had an allergic skin reaction to similar materials may have an allergic skin reaction to this product.

The similar material(s)

is/are:

Triethylenetetramine

(TETA).

Has demonstrated the potential for contact allergy in mice.

Has caused allergic skin reactions when tested in guinea pigs.

May cause allergic respiratory reaction.

Specific Target Organ Systemic Toxicity (Single Exposure)

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

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

Available data are inadequate to determine single exposure specific target organ toxicity.

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

May cause respiratory irritation.

Route of Exposure: Inhalation

Target Organs: Respiratory system

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

May cause respiratory irritation.

Route of Exposure: Inhalation

Target Organs: Respiratory system

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Available data are inadequate to determine single exposure specific target organ toxicity.

Methanol

Causes damage to organs.

Route of Exposure: Oral

Target Organs: Eyes, Central nervous system

Ethylenediamine

Material is corrosive. Material is not classified as a respiratory irritant; however, upper respiratory tract irritation or corrosivity may be expected.

Aspiration Hazard

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

Information for components:

Methanol

May be harmful if swallowed and enters airways.

Ethylenediamine

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Chronic toxicity (represents longer term exposures with repeated dose resulting in chronic/delayed effects - no immediate effects known unless otherwise noted)

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Contains component(s) which have been reported to cause effects on the following organs in animals:
Respiratory tract.
No relevant data found.

Information for components:

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Methanol

Methanol is highly toxic to humans and may cause central nervous system effects, visual disturbances up to blindness, metabolic acidosis, and degenerative damage to other organs including liver, kidney, and heart.

Ethylenediamine

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

Carcinogenicity

No relevant data found.

Teratogenicity

Methanol has caused birth defects in mice at doses nontoxic to the mother as well as slight behavioral effects in offspring of rats.

Information for components:

Methanol

Methanol has caused birth defects in mice at doses nontoxic to the mother as well as slight behavioral effects in offspring of rats.

Ethylenediamine

Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive toxicity

Contains component(s) which did not interfere with reproduction in animal studies.

Mutagenicity

In vitro genetic toxicity studies were negative.

12. Ecological information

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

Toxicity

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine Acute toxicity to fish

Material is toxic to aquatic organisms (LC50/EC50/IC50 between 1 and 10 mg/L in the most sensitive species).

For the hydrolysis product(s)

LC50, zebra fish (*Brachydanio rerio*), 96 Hour, 597 mg/l

Acute toxicity to aquatic invertebrates

For the hydrolysis product(s)

EC50, *Daphnia magna* (Water flea), 48 Hour, 81 mg/l

Acute toxicity to algae/aquatic plants

For the hydrolysis product(s)

ErC50, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, Growth rate inhibition, 8.8 mg/l

For the hydrolysis product(s)

NOEC, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, Growth rate inhibition, 3.1 mg/l

Toxicity to bacteria

For the hydrolysis product(s)

EC50, *Pseudomonas putida*, 16 Hour, Growth inhibition, 67 mg/l

Chronic toxicity to aquatic invertebrates

For the hydrolysis product(s)

NOEC, *Daphnia magna* (Water flea), semi-static test, 21 d, number of offspring, > 1 mg/l

Toxicity to Above Ground Organisms

Material is moderately toxic to birds on an acute basis (LD50 between 51 and 500 mg/kg).

Toxicity to soil-dwelling organisms

NOEC, *Eisenia fetid* (earthworms), 14 d, \geq 1,000 mg/kg

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Acute toxicity to fish

No relevant data found.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Acute toxicity to fish

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Acute toxicity to fish

Material is toxic to aquatic organisms (LC50/EC50/IC50 between 1 and 10 mg/L in the most sensitive species).

Based on data from similar materials
LC50, Danio rerio (zebra fish), 96 Hour, 597 mg/l, Directive 67/548/EEC, Annex V, C.1.

Acute toxicity to aquatic invertebrates

Based on data from similar materials
EC50, Daphnia sp. (water flea), 48 Hour, 81 mg/l

Acute toxicity to algae/aquatic plants

Based on data from similar materials
ErC50, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, Growth rate inhibition, 8.8 mg/l

Based on data from similar materials
NOEC, *Pseudokirchneriella subcapitata* (green algae), 72 Hour, Growth rate inhibition, 3.1 mg/l

Toxicity to bacteria

Based on data from similar materials
EC50, *Pseudomonas putida*, 16 Hour, Growth rate, 67 mg/l

Chronic toxicity to aquatic invertebrates

Based on data from similar materials
NOEC, *Daphnia magna* (Water flea), semi-static test, 21 d, number of offspring, > 1 mg/l

Toxicity to Above Ground Organisms

Material is moderately toxic to birds on an acute basis (LD50 between 51 and 500 mg/kg).

Toxicity to soil-dwelling organisms

NOEC, *Eisenia fetid* (earthworms), 14 d, $\geq 1,000$ mg/kg

Methanol

Acute toxicity to fish

Material is practically non-toxic to aquatic organisms on an acute basis
(LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Bluegill sunfish (*Lepomis macrochirus*), flow-through test, 96 Hour, 15,400 mg/l

Acute toxicity to aquatic invertebrates

LC50, *Daphnia magna* (Water flea), 48 Hour, > 10,000 mg/l

Acute toxicity to algae/aquatic plants

ErC50, *Pseudokirchneriella subcapitata* (green algae), 96 Hour, Growth rate, 22,000 mg/l,
OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

IC50, activated sludge, 3 Hour, Respiration rates. > 1,000 mg/l, OECD Test Guideline 209

Chronic toxicity to fish

NOEC, *Oryzias latipes* (Orange-red killifish), 200 Hour, 15,800 mg/l

Ethylenediamine

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, 640 mg/l

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 16.7 mg/l

Acute toxicity to algae/aquatic plants

EC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate inhibition, 645 mg/l

EbC50, Pseudokirchneriella subcapitata (green algae), 96 Hour, Biomass, 151 mg/l, Method Not Specified.

Toxicity to bacteria

EC50, Bacteria, 16 Hour, 500 - 1,000 mg/l

Chronic toxicity to fish

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

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.16 mg/l

Persistence and degradability

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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: 39 %

Exposure time: 28 d

Method: OECD Test Guideline 301A or Equivalent

Theoretical Oxygen Demand: 2.39 mg/mg

Estimated. **Chemical Oxygen Demand:** 1.76 mg/mg

Estimated. **Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	23 %
10 d	30 %
20 d	29 %

Stability in Water (1/2-life)

Hydrolysis, half-life, 0.025 Hour, pH 7

Photodegradation

Test Type: Half-life (indirect photolysis) **Sensitization:** OH, radicals' **Atmospheric half-life:** 0.088 d **Method:** Estimated.

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Biodegradability: No relevant data found.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Biodegradability: No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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.

For similar material(s): 10-day Window: Fail

Biodegradation: 39 %

Exposure time: 28 d

Method: OECD Test Guideline 301A or Equivalent

Theoretical Oxygen Demand: 2.39 mg/mg

Estimated. **Chemical Oxygen Demand:** 1.76 mg/mg

Estimated. **Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	23 %
10 d	30 %
20 d	29 %

Stability in Water (1/2-life)

Hydrolysis, half-life, 0.025 Hour, pH 7

Photodegradation

Test Type: Half-life (indirect photolysis) **Sensitization:** OH, radicals' **Atmospheric half-life:** 0.088 d **Method:** Estimated.

Methanol

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

Theoretical Oxygen Demand: 1.50 mg/mg

Chemical Oxygen Demand: 1.49 mg/mg Dichromate

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	72 %
20 d	79 %

Photodegradation

Test Type: Half-life (indirect photolysis) **Sensitization:** OH, radicals' **Atmospheric half-life:** 8 - 18 d **Method:** Estimated.

Ethylenediamine

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

10-day Window: Not applicable

Biodegradation: 95 %

Exposure time: 28 d

Method: OECD Test Guideline 301C or Equivalent

Theoretical Oxygen Demand: 3.47 mg/mg

Bioaccumulative potential

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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

Partition coefficient: n-octanol/water (log Pow): < 3 estimated

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

Bioaccumulation: No relevant data found.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

Bioaccumulation: No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Partition coefficient: n-octanol/water (log Pow): < 3 estimated

Methanol

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

Partition coefficient: n-octanol/water (log Pow): -0.77 Measured

Bioconcentration factor (BCF): < 10 Leuciscus idus (Golden orfe)

Me

asured

Ethylenediamine

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

Partition coefficient: n-octanol/water (log Pow): -1.6 at 20 °C Measured

Bioconcentration factor (BCF): 0.07 Fish Estimated.

Mobility in soil

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine

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): > 5000 Estimated.

N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine

No relevant data found.

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

For similar material(s):

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): > 5000 Estimated.

Methanol

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

Partition coefficient (Koc): 0.44 Estimated.

Ethylenediamine

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): 4766 Measured

13. Disposal considerations

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. Transport Information

No. A	1263
Official definition of transport of the UN	Paint related material
Class	3
Group of container/packaging	III
Environmental risks	No applicable.

15. Regulatory information

SARA 302 Components

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components

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.

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

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

Components

CAS Number



Sigma Ink Inc.
12800 Brookprinter Place
Poway Ca, 92064

SAFETY DATA SHEET

N-(3-(Trimethoxysilyl) propyl)-1,2-ethanediamine	1760-24-3
N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine	68845-16-9
N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine	74956-86-8
Oligomers of (ethylenediaminepropyl)trimethoxysilane	Not available

16. Another information

Additional information

The information and recommendations in this safety sheet with, to our best know and understand, precise to the date of his expedition. At all the here included will have to be considered to create guarantee, expresses or implicit and will not establish contractual relation legally validates. It is responsibility of the user determine the applicability of this information and the suitability of the material or product for any purpose.