



SAFETY DATA SHEET

DOW CHEMICAL (SHANGHAI) COMPANY LIMITED

according to GB/T 16483 and GB/T 17519

Product name: DOWSIL™ 983 (KR) Curing Agent Gray
SDS Number: 4101383

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DOW CHEMICAL (SHANGHAI) COMPANY LIMITED encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: DOWSIL™ 983 (KR) Curing Agent Gray

Recommended use of the chemical and restrictions on use

Identified uses: Adhesive, binding agents

COMPANY IDENTIFICATION

DOW CHEMICAL (SHANGHAI) COMPANY LIMITED
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EMERGENCY TELEPHONE NUMBER

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Local Emergency Contact: 021-5838-2516

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	viscous liquid
Color	black
Odor	slight
Flammable liquid and vapour. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled. Harmful to aquatic life.	

GHS Classification

Classified as hazardous according to regulatory criteria.

Flammable liquids - Category 3

Skin corrosion/irritation - Category 2

Serious eye damage/eye irritation - Category 1

Skin sensitisation - Category 1

Specific target organ toxicity - repeated exposure - Category 2 - Inhalation

Short-term (acute) aquatic hazard - Category 3

GHS label elements

Hazard pictograms



Signal word: **DANGER!**

Hazard statements

Flammable liquid and vapour.

Causes skin irritation.

May cause an allergic skin reaction.

Causes serious eye damage.

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

Harmful to aquatic life.

Precautionary statements

Prevention

Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.

Keep container tightly closed.

Ground/bond container and receiving equipment.

Use explosion-proof electrical/ ventilating/ lighting equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Wash skin thoroughly after handling.

Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

Wear protective gloves/ eye protection/ face protection.

Response

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.

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 and/or doctor. Get medical advice/ attention if you feel unwell.

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

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage

Store in a well-ventilated place. Keep cool.

Disposal

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

Physical and chemical hazards

Flammable liquid and vapour.

Health hazards

Causes skin irritation.

Causes serious eye damage.

May cause an allergic skin reaction.

May cause damage to organs through prolonged or repeated exposure if inhaled.

Environmental hazards

Harmful to aquatic life.

Other hazards

Static-accumulating flammable liquid.

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Methyltrimethoxysilane	1185-55-3	>= 11.0 - <= 18.0 %
Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane	474530-85-3	>= 11.0 - <= 18.0 %
Unsaturated Fatty Acids treated Calcium Carbonate	Not available	>= 3.0 - <= 6.0 %
N-(3-(Trimethoxysilyl) propyl)-1,2- ethanediamine	1760-24-3	>= 2.0 - <= 6.0 %
3-Aminopropyltriethoxysilane	919-30-2	>= 0.8 - <= 1.4 %
Methanol	67-56-1	<= 1.2 %

N,N'-bis(3-(trimethoxysilyl)propyl)-1,2-ethanediamine	68845-16-9	>= 0.11 - <= 0.57 %
Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)silane	68928-76-7	>= 0.16 - <= 0.3 %
Oligomers of (ethylenediaminepropyl)trimethoxysilane	Not available	<= 0.23 %
N,N-Bis(3-(Trimethylsiloxy)propyl)-1,2-ethanediamine	74956-86-8	>= 0.02 - <= 0.15 %

4. FIRST AID MEASURES

Description of first aid measures

Protection of first-aiders:

First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air and keep comfortable for breathing. 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: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Obtain medical attention without delay. Wash clothing before reuse. Properly dispose of contaminated 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. Seek medical attention immediately. If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tbsp.) for a 40 pound child or 36 ml for an 18 kg child].

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. In cases where several ounces (60 - 100 ml) have been ingested, consider the use of ethanol and hemodialysis in the treatment. Consult standard literature for details of treatment. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. 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. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Alcohol-resistant foam. Dry sand. Dry chemical.

Unsuitable extinguishing media: High volume water jet. Do not use direct water stream..

Special hazards arising from the substance or mixture

Hazardous combustion products: Carbon oxides. Silicon oxides. Nitrogen oxides (NOx). Formaldehyde. Metal oxides.

Unusual Fire and Explosion Hazards: Flash back possible over considerable distance.. Exposure to combustion products may be a hazard to health.. Flammable concentrations of vapor can accumulate at temperatures above flash point; see Section 9.. Flammable mixtures may exist within the vapor space of containers at room temperature.. Closed containers may rupture via pressure build-up when exposed to fire or extreme heat.. Vapours may form explosive mixtures with air..

Advice for firefighters

Fire Fighting Procedures: Use water spray to cool unopened containers.. Evacuate area.. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.. Fire residues and contaminated fire extinguishing water must be disposed of in

accordance with local regulations.. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage.. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed.. Do not use a solid water stream as it may scatter and spread fire..

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Remove undamaged containers from fire area if it is safe to do so.

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

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Remove all sources of ignition. Use personal protective equipment. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. Vapor explosion hazard. Keep out of sewers. Follow safe handling advice and personal protective equipment recommendations.

Environmental precautions: Do not release the product to the aquatic environment above defined regulatory levels. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up: Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapours/mists with a water spray jet. Clean up remaining materials from spill with suitable absorbant. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling: Do not get on skin or clothing. Avoid inhalation of vapour or mist. Do not swallow. Do not get in eyes. Keep container tightly closed. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment. Non-sparking tools should be used. Handle in accordance with good industrial hygiene and safety practice. CONTAINERS MAY BE HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue follow all (M)SDS and label warnings even after container is emptied.

Use with local exhaust ventilation. Use only in an area equipped with explosion proof exhaust ventilation. Ensure all equipment is electrically grounded before beginning transfer operations. This material can accumulate static charge due to its inherent physical properties and can therefore cause an electrical ignition source to vapors. In order to prevent a fire hazard, as bonding and grounding may be insufficient to remove static electricity, it is necessary to provide an inert gas purge before beginning transfer operations. Restrict flow velocity in order to reduce the accumulation of static electricity. Ground and bond container and receiving equipment.

Conditions for safe storage: Keep in properly labelled containers. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations. Keep away from heat and sources of ignition.

Do not store with the following product types: Strong oxidizing agents. Organic peroxides. Flammable solids. Pyrophoric liquids. Pyrophoric solids. Self-heating substances and mixtures. Substances and mixtures, which in contact with water, emit flammable gases. Explosives. Gases. Unsuitable materials for containers: None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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
Methyltrimethoxysilane	Dow IHG	TWA	7.5 ppm
	Further information: Skin Sensitizer		
Unsaturated Fatty Acids treated Calcium Carbonate	Dow IHG	TWA	1 mg/m3
N-(3-(Trimethoxysilyl)propyl)-1,2-ethanediamine	Dow IHG		See Further information
	Further information: Skin Sensitizer		
3-Aminopropyltriethoxysilane	Dow IHG	TWA	0.5 mg/m3
Methanol	ACGIH	TWA	200 ppm
	Further information: Skin: Danger of cutaneous absorption		
	ACGIH	STEL	250 ppm
	Further information: Skin: Danger of cutaneous absorption		
	CN OEL	PC-TWA	25 mg/m3
	Further information: Skin: Skin		
	CN OEL	PC-STEL	50 mg/m3
	Further information: Skin: Skin		
Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane	ACGIH	TWA	0.1 mg/m3 , Tin
	Further information: A4: Not classifiable as a human carcinogen; Skin: Danger of cutaneous absorption		
	ACGIH	STEL	0.2 mg/m3 , Tin
	Further information: A4: Not classifiable as a human carcinogen; Skin: Danger of cutaneous absorption		
Ethanol	ACGIH	TWA	1,000 ppm
	Further information: URT irr: Upper Respiratory Tract irritation		
	ACGIH	STEL	1,000 ppm
	Further information: URT irr: Upper Respiratory Tract irritation		
Methanol	ACGIH	TWA	200 ppm
	Further information: Skin: Danger of cutaneous absorption		
	ACGIH	STEL	250 ppm
	Further information: Skin: Danger of cutaneous absorption		
	CN OEL	PC-TWA	25 mg/m3
	Further information: Skin: Skin		
	CN OEL	PC-STEL	50 mg/m3
	Further information: Skin: Skin		

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

Methanol.

Ethanol

Although some of the components of this product may have exposure guidelines, no exposure would be expected under normal handling conditions due to the physical state of the material.

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

Exposure controls

Engineering controls: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. Local exhaust ventilation may be necessary for some operations. Lethal concentrations may exist in areas with poor ventilation.

Individual protection measures

Eye/face protection: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). 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: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	viscous liquid
Color	black
Odor	slight
Odor Threshold	No data available
pH	No data available
Melting point/range	No data available
Freezing point	No data available
Boiling point (760 mmHg)	> 35 °C
Flash point	Tag closed cup 27.0 °C
Evaporation Rate (Butyl Acetate = 1)	No data available
Flammability (solid, gas)	Not applicable
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)	1.0
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
Decomposition temperature	No data available
Dynamic Viscosity	10,000 mPa.s
Kinematic Viscosity	No data available
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

Reactivity: Not classified as a reactivity hazard.

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Can react with strong oxidizing agents. Vapours may form explosive mixture with air. Flammable liquid and vapour.

Conditions to avoid: Avoid static discharge. Heat, flames and sparks.

Incompatible materials: Avoid contact with oxidizing materials.

Hazardous decomposition products:

Decomposition products can include and are not limited to: Formaldehyde. Methanol. Ethanol.

11. TOXICOLOGICAL INFORMATION

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

Exposure routes

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

Very low toxicity if swallowed. Swallowing may result in irritation of the mouth, throat, and gastrointestinal tract. 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.

As product: Single dose oral LD50 has not been determined.

Information for components:

Methyltrimethoxysilane

LD50, Rat, male and female, 11,685 mg/kg

This substance may hydrolyze to release 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.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

Single dose oral LD50 has not been determined.

This substance may hydrolyze to release 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.

Unsaturated Fatty Acids treated Calcium Carbonate

LD50, Rat, > 5,000 mg/kg

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

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

This substance may hydrolyze to release 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.

3-Aminopropyltriethoxysilane

LD50, Rat, female, 1,479 mg/kg

LD50, Rat, male, 2,665 mg/kg

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.

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

Single dose oral LD50 has not been determined.

This substance may hydrolyze to release 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.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

LD50, Rat, male and female, 892 mg/kg OECD 401 or equivalent

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

This substance may hydrolyze to release 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.

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

Single dose oral LD50 has not been determined.

This substance may hydrolyze to release 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.

Acute dermal toxicity

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

As product: The dermal LD50 has not been determined.

Information for components:

Methyltrimethoxysilane

LD50, Rabbit, male and female, > 9,500 mg/kg OECD 402 or equivalent

This substance may hydrolyze to release 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.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

Based on data from similar materials LD50, Rabbit, > 2,000 mg/kg

This substance may hydrolyze to release 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.

Unsaturated Fatty Acids treated Calcium Carbonate

Based on data from similar materials LD50, > 2,000 mg/kg

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

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

This substance may hydrolyze to release 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.

3-Aminopropyltriethoxysilane

Based on product testing: LD50, Rabbit, male and female, 4,041 mg/kg

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

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

The dermal LD50 has not been determined.

This substance may hydrolyze to release 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.

Bis[2-ethyl-2,5-dimethylhexanoyl]oxy(dimethyl)stannane

LD50, Rat, > 2,000 mg/kg

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

This substance may hydrolyze to release 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.

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

The dermal LD50 has not been determined.

This substance may hydrolyze to release 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.

Acute inhalation toxicity

Brief exposure (minutes) is not likely to cause adverse effects. Vapor from heated material may cause respiratory irritation. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death. Excessive exposure may cause: Respiratory irritation Central nervous system depression Effects may be delayed.

As product: The LC50 has not been determined.

Information for components:

Methyltrimethoxysilane

LC50, Rat, male and female, 6 Hour, vapour, > 7605 ppm OECD Test Guideline 403

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

The LC50 has not been determined.

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

Unsaturated Fatty Acids treated Calcium Carbonate

The LC50 has not been determined.

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

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

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

3-Aminopropyltriethoxysilane

Based on product testing: LC50, Rat, male, 6 Hour, vapour, > 5 ppm No deaths occurred at this concentration.

Based on product testing: LC50, Rat, female, 6 Hour, vapour, > 16 ppm No deaths occurred at this concentration.

Based on product testing: LC50, Rat, male and female, 4 Hour, Aerosol, > 7.35 mg/l

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

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

The LC50 has not been determined.

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

As product: 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

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

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

The LC50 has not been determined.

This substance may hydrolyze to release Methanol. Inhalation of methanol may cause effects ranging from headache, narcosis and visual impairment to metabolic acidosis, blindness, and even death.

Skin corrosion/irritation

Based on information for component(s):

Brief contact may cause moderate skin irritation with local redness.

May cause more severe response on covered skin (under clothing, gloves).

Information for components:

Methyltrimethoxysilane

Brief contact may cause slight skin irritation with local redness.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

Brief contact may cause slight skin irritation with local redness.

Unsaturated Fatty Acids treated Calcium Carbonate

For similar material(s):

Brief contact is essentially nonirritating to skin.

May cause drying and flaking of the skin.

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

Brief contact may cause moderate skin irritation with local redness.

3-Aminopropyltriethoxysilane

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

Methanol

Prolonged contact may cause slight skin irritation with local redness.

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

Brief contact may cause skin irritation with local redness.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

Brief contact may cause skin irritation with local redness.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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.

Serious eye damage/eye irritation

Based on information for component(s):

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

Information for components:

Methyltrimethoxysilane

May cause slight temporary eye irritation.

Corneal injury is unlikely.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

May cause moderate eye irritation.

Unsaturated Fatty Acids treated Calcium Carbonate

For similar material(s):

May cause slight temporary eye irritation.

Dust may irritate eyes.

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.

3-Aminopropyltriethoxysilane

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

Methanol

May cause eye irritation.

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.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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

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.

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.

Sensitization

For skin sensitization:

A component in this mixture has been shown to be a skin sensitizer.

For respiratory sensitization:

No relevant data found.

Information for components:

Methyltrimethoxysilane

For skin sensitization:

Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

For similar material(s):

Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

For similar material(s):

Did not demonstrate the potential for contact allergy in mice.

For respiratory sensitization:
No relevant data found.

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

Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

3-Aminopropyltriethoxysilane

For skin sensitization:
Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Methanol

For skin sensitization:
No relevant data found.

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.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

Has caused allergic skin reactions when tested in guinea pigs.

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.

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

Skin contact may cause an allergic skin reaction.

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Contains component(s) which are classified as specific target organ toxicant, single exposure, category 1.

Information for components:

Methyltrimethoxysilane

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

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

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

Unsaturated Fatty Acids treated Calcium Carbonate

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

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

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

3-Aminopropyltriethoxysilane

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

Methanol

Causes damage to organs.

Route of Exposure: Oral

Target Organs: Eyes, Central nervous system

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

May cause respiratory irritation.

Route of Exposure: Inhalation

Target Organs: Respiratory system

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Aspiration Hazard

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

Information for components:

Methyltrimethoxysilane

May be harmful if swallowed and enters airways.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

Based on available information, aspiration hazard could not be determined.

Unsaturated Fatty Acids treated Calcium Carbonate

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

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

Based on available information, aspiration hazard could not be determined.

3-Aminopropyltriethoxysilane

Based on available information, aspiration hazard could not be determined.

Methanol

May be harmful if swallowed and enters airways.

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

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

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Based on available information, aspiration hazard could not be determined.

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

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

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.

Liver.

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.

Information for components:

Methyltrimethoxysilane

Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

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

3-Aminopropyltriethoxysilane

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

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.

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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

Blood

Kidney

Liver

Immune system.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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

Respiratory tract.

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

No relevant data found.

Carcinogenicity

Contains a component(s) which did not cause cancer in long-term animal studies which used routes of exposure considered relevant to industrial handling.

Information for components:

Methyltrimethoxysilane

No relevant data found.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

No relevant data found.

3-Aminopropyltriethoxysilane

Did not cause cancer in laboratory animals.

Methanol

Did not cause cancer in laboratory animals.

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

No relevant data found.

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

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:

Methyltrimethoxysilane

Did not cause birth defects or any other fetal effects in laboratory animals.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

Did not cause birth defects in laboratory animals.

3-Aminopropyltriethoxysilane

Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother.

Methanol

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

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Did not cause birth defects in laboratory animals.

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

No relevant data found.

Reproductive toxicity

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

Information for components:

Methyltrimethoxysilane

In animal studies, did not interfere with reproduction.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

In animal studies, did not interfere with reproduction.

3-Aminopropyltriethoxysilane

In animal studies, did not interfere with fertility.

Methanol

In animal studies, did not interfere with reproduction.

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

In animal studies, did not interfere with reproduction.

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

No relevant data found.

Mutagenicity

Contains component(s) which were positive in in vitro genetic toxicity studies. Contains component(s) which were negative in some animal genetic toxicity studies and positive in others.

Information for components:

Methyltrimethoxysilane

In vitro genetic toxicity studies were negative in some cases and positive in other cases.
Animal genetic toxicity studies were negative.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

In vitro genetic toxicity studies were positive.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

3-Aminopropyltriethoxysilane

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Methanol

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative in some cases and positive in other cases.

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

In vitro genetic toxicity studies were negative in some cases and positive in other cases.
Animal genetic toxicity studies were negative.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

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

No relevant data found.

12. ECOLOGICAL INFORMATION

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

Ecotoxicity

Methyltrimethoxysilane

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, Oncorhynchus mykiss (rainbow trout), 96 Hour, > 110 mg/l, OECD Test Guideline 203
or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), flow-through test, 48 Hour, > 122 mg/l, OECD Test
Guideline 202

Acute toxicity to algae/aquatic plants

No toxicity at the limit of solubility
ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, > 3.6
mg/l, OECD Test Guideline 201
No toxicity at the limit of solubility
NOEC, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, >= 3.6
mg/l, OECD Test Guideline 201

Toxicity to bacteria

EC10, activated sludge, 3 Hour, Respiration rates., > 100 mg/l, OECD Test Guideline 209

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), 28 d, number of offspring, >= 10 mg/l

Aminopropyltriethoxysilane Rxn with Glycidoxypyltrimethoxysilane and Methyltrimethoxysilane

Acute toxicity to fish

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

Acute toxicity to fish

No relevant data found.

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 fetida* (earthworms), 14 d, >= 1,000 mg/kg

3-Aminopropyltriethoxysilane

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, *Danio rerio* (zebra fish), semi-static test, 96 Hour, > 934 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, *Daphnia magna* (Water flea), static test, 48 Hour, 331 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, *Desmodesmus subspicatus* (green algae), static test, 72 Hour, Growth rate inhibition, > 1,000 mg/l

NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1.3 mg/l

Toxicity to bacteria

EC50, Pseudomonas putida, 5.75 Hour, Respiration rates., 43 mg/l

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

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

Acute toxicity to fish

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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).

For similar material(s):

LC50, Zebra fish (Danio/Brachydanio rerio), semi-static test, 96 Hour, > 100 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna, static test, 48 Hour, 39 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

ErC50, Algae (Scenedesmus subspicatus), Growth rate, 72 Hour, Growth rate, 7.6 mg/l, OECD Test Guideline 201 or Equivalent

For similar material(s):

NOEC, Algae (Scenedesmus subspicatus), Growth rate, 72 Hour, Growth rate, 1.1 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

For similar material(s):

EC50, Bacteria, 3 Hour, Respiration rates., 14 mg/l

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 fetida (earthworms), 14 d, >= 1,000 mg/kg

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

Acute toxicity to fish

No relevant data found.

Persistence and Degradability

Methyltrimethoxysilane

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.

Biodegradation: 54 %

Exposure time: 28 d

Method: Regulation (EC) No. 440/2008, Annex, C.4-A

Aminopropyltriethoxysilane Rxn with Glycidoxypopyltrimethoxysilane and Methyltrimethoxysilane

Biodegradability: 10-day Window: Fail

Biodegradation: 41.3 %

Exposure time: 28 d

Method: OECD Test Guideline 301B

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.

Unsaturated Fatty Acids treated Calcium Carbonate

Biodegradability: No relevant data found.

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.

3-Aminopropyltriethoxysilane

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: 67 %

Exposure time: 28 d

Method: OECD Test Guideline 301A or Equivalent

Stability in Water (1/2-life)

Hydrolysis, half-life, 8.5 Hour, pH 7, Half-life Temperature 24.7 °C

Methanol

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

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.

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

Biodegradability: No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

Biodegradability: For similar material(s): Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.

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

Biodegradation: 3 %

Exposure time: 28 d

Method: OECD Test Guideline 301F or Equivalent

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.

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

Biodegradability: No relevant data found.

Bioaccumulative Potential

Methyltrimethoxysilane

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

Partition coefficient: n-octanol/water(log Pow): -0.82 Estimated.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

Bioaccumulation: No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

Bioaccumulation: No relevant data found.

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

3-Aminopropyltriethoxysilane

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

Partition coefficient: n-octanol/water(log Pow): 1.7 at 20 °C Calculated.

Bioconcentration factor (BCF): 3.4 Cyprinus carpio (Carp) 56 d

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) Measured

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

Bioaccumulation: No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

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

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

Bioaccumulation: No relevant data found.

Mobility in Soil

Methyltrimethoxysilane

No relevant data found.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

No relevant data found.

Unsaturated Fatty Acids treated Calcium Carbonate

No relevant data found.

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

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.

3-Aminopropyltriethoxysilane

No relevant data found.

Methanol

Partition coefficient (Koc): 0.44 Estimated.

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

No relevant data found.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

No relevant data found.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

For similar material(s):

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.

Results of PBT and vPvB assessment

Methyltrimethoxysilane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Unsaturated Fatty Acids treated Calcium Carbonate

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

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

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

3-Aminopropyltriethoxysilane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Methanol

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

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

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Oligomers of (ethylenediaminepropyl)trimethoxysilane

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

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

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Other adverse effects

Methyltrimethoxysilane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Aminopropyltriethoxysilane Rxn with Glycidoxypropyltrimethoxysilane and Methyltrimethoxysilane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Unsaturated Fatty Acids treated Calcium Carbonate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

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

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

3-Aminopropyltriethoxysilane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Methanol

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

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

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Bis[(2-ethyl-2,5-dimethylhexanoyl)oxy](dimethyl)stannane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

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

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

13. DISPOSAL CONSIDERATIONS

Disposal methods: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. 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. 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. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device. For additional information, refer to: Handling & Storage Information, MSDS Section 7 Stability & Reactivity Information, MSDS Section 10 Regulatory Information, MSDS Section 15

Treatment and disposal methods of used packaging: Empty containers should be recycled or otherwise disposed of by an approved waste management facility. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. Do not re-use containers for any purpose.

14. TRANSPORT INFORMATION

Classification for ROAD and Rail transport:

Proper shipping name	FLAMMABLE LIQUID, N.O.S.(Methyltrimethoxysilane)
UN number	UN 1993
Class	3
Packing group	III

Classification for SEA transport (IMO-IMDG):

Proper shipping name	FLAMMABLE LIQUID, N.O.S.(Methyltrimethoxysilane)
UN number	UN 1993
Class	3
Packing group	III
Marine pollutant	No
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	Flammable liquid, n.o.s.(Methyltrimethoxysilane)
UN number	UN 1993
Class	3
Packing group	III

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

The following statutes, regulations and standards have the related prescribes on chemicals in terms of safe use, storage, transportation, loading and unloading, classification and symbol etc.

Provisions on the Environmental Administration of New Chemical Substances.

The Regulation on Chemicals Safe Use at Working Site

Law on Prevention and Control of Environmental Pollution Caused by Solid Waste.

Regulation on the Safety Management of Hazardous Chemicals

Catalogue of Hazardous Chemicals: Listed

General rule of classification and hazard communication of chemicals (GB 13690)

Occupational Exposure Limits for Hazardous Agent in The workshop Chemical Hazardous Agents(GBZ 2.1).

Classification and Code of Dangerous Goods (GB 6944)

List of Dangerous Goods (GB 12268)

China. Inventory of Existing Chemical Substances in China (IECSC) (IECSC)

All intentional components are listed on the inventory, are exempt, or are supplier certified.

16. OTHER INFORMATION

Revision

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

Date of first issue: 17.02.2015

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
CN OEL	Occupational exposure limits for hazardous agents in the workplace - Chemical hazardous agents.
Dow IHG	Dow Industrial Hygiene Guideline
PC-STEL	Permissible concentration - short term exposure limit
PC-TWA	Permissible concentration - time weighted average
STEL	Short-term exposure limit
TWA	Time weighted average

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen,

Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; 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; 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; IECS - 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; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; 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; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals 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; WHMIS - Workplace Hazardous Materials Information System

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.

DOW CHEMICAL (SHANGHAI) COMPANY LIMITED 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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