



SAFETY DATA SHEET

SPECIALTY ELECTRONIC MATERIALS (THAILAND) CO LTD HK BRANCH

Product name: Liveo™ MDX4-4159 50% Medical Grade Dispersion

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SPECIALTY ELECTRONIC MATERIALS (THAILAND) CO LTD HK BRANCH 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: Liveo™ MDX4-4159 50% Medical Grade Dispersion

Recommended use of the chemical and restrictions on use

Identified uses: Lubricants and lubricant additives Intermediate

COMPANY IDENTIFICATION

SPECIALTY ELECTRONIC MATERIALS
(THAILAND) CO LTD HK BRANCH

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EMERGENCY TELEPHONE NUMBER

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Local Emergency Contact: 001 800 13 203 9987

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids	: Category 2
Skin corrosion/irritation	: Category 2
Serious eye damage/eye irritation	: Category 1
Skin sensitisation	: Category 1
Specific target organ toxicity - single exposure	: Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	: Category 1 (Central nervous system)
Short-term (acute) aquatic hazard	: Category 2
Long-term (chronic) aquatic hazard	: Category 3

GHS label elements

Hazard pictograms



Signal word: **DANGER!**

Hazard statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause an allergic skin reaction.
Causes serious eye damage.
May cause drowsiness or dizziness.
Causes damage to organs (Central nervous system) through prolonged or repeated exposure.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

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 mist or vapours.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
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): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
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 or doctor/ physician.
Get medical advice/ attention if you feel unwell.
If skin irritation or rash occurs: Get medical advice/ attention.
Take off contaminated clothing and wash before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage

Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal

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

Other hazards

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxyl-terminated	71750-80-6	>= 47.0 - <= 49.0 %
Medium aliphatic solvent naphtha (petroleum)	64742-88-7	>= 35.0 - <= 36.0 %
Isopropanol	67-63-0	>= 15.0 - <= 16.0 %
Methanol	67-56-1	>= 0.5 - <= 2.0 %
Oligomers of (ethylenediaminepropyl)trimethoxysilane	Not available	>= 0.18 - <= 0.2 %

4. FIRST AID MEASURES

Description of first aid measures**General advice:**

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. 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: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay,

preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: No emergency medical treatment necessary.

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. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

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

Unusual Fire and Explosion Hazards: Flash back possible over considerable distance. Exposure to combustion products may be a hazard to health. Vapours may form explosive mixtures with air.

Advice for firefighters

Fire Fighting Procedures: 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. Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.

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. Ventilate the area. Use personal protective equipment. 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, Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

See sections: 7, 8, 11, 12 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling: Do not get on skin or clothing. Do not breathe vapours or spray 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.

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. 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. Store locked up. 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
Medium aliphatic solvent naphtha (petroleum)	ACGIH	TWA	200 mg/m ³ , total hydrocarbon vapor
	Further information: CNS impair: Central Nervous System impairment; URT irr: Upper Respiratory Tract irritation; skin irr: Skin irritation; P: Application restricted to conditions in which there are negligible aerosol exposures; A3: Confirmed animal carcinogen with unknown relevance to humans; Skin: Danger of cutaneous absorption; varies: varies		
Isopropanol	ACGIH	TWA	200 ppm
	Further information: CNS impair: Central Nervous System impairment; URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section); A4: Not classifiable as a human carcinogen		

	ACGIH	STEL	400 ppm
	Further information: CNS impair: Central Nervous System impairment; URT irr: Upper Respiratory Tract irritation; eye irr: Eye irritation; BEI: Substances for which there is a Biological Exposure Index or Indices (see BEI® section); A4: Not classifiable as a human carcinogen		
	TH OEL	TWA	400 ppm
Methanol	ACGIH	TWA	200 ppm
	Further information: Skin: Danger of cutaneous absorption		
	ACGIH	STEL	250 ppm
	Further information: Skin: Danger of cutaneous absorption		

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Isopropanol	67-63-0	Acetone	Urine	End of shift at end of workweek	40 mg/l	ACGIH BEI
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. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures

Eye/face protection: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

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

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	liquid
Color	Straw-coloured
Odor	solvent-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)	> 82 °C
Flash point	Seta closed cup 17 °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)	0.865
Water solubility	No data available
Partition coefficient: n-octanol/water	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Kinematic Viscosity	160 cSt at 25 °C
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. Highly flammable liquid and vapour.

Conditions to avoid: Heat, flames and sparks.

Incompatible materials: Oxidizing agents

Hazardous decomposition products: Formaldehyde.

11. TOXICOLOGICAL INFORMATION

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

Acute toxicity

Acute oral toxicity

Product test data not available. Refer to component data.

Acute dermal toxicity

Product test data not available. Refer to component data.

Acute inhalation toxicity

Product test data not available. Refer to component data.

Skin corrosion/irritation

Product test data not available. Refer to component data.

Serious eye damage/eye irritation

Product test data not available. Refer to component data.

Sensitization

Product test data not available. Refer to component data.

Specific Target Organ Systemic Toxicity (Single Exposure)

Product test data not available. Refer to component data.

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Product test data not available. Refer to component data.

Carcinogenicity

Product test data not available. Refer to component data.

Teratogenicity

Product test data not available. Refer to component data.

Reproductive toxicity

Product test data not available. Refer to component data.

Mutagenicity

Product test data not available. Refer to component data.

Aspiration Hazard

Product test data not available. Refer to component data.

COMPONENTS INFLUENCING TOXICOLOGY:

Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated

Acute oral toxicity

Single dose oral LD50 has not been determined.

Acute dermal toxicity

The dermal LD50 has not been determined.

Acute inhalation toxicity

No adverse effects are anticipated from single exposure to mist.

The LC50 has not been determined.

Skin corrosion/irritation

Brief contact may cause skin irritation with local redness.

Serious eye damage/eye irritation

May cause eye irritation.

Sensitization

For skin sensitization:

No relevant data found.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

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

Specific Target Organ Systemic Toxicity (Repeated Exposure)

No relevant data found.

Carcinogenicity

No relevant data found.

Teratogenicity

No relevant data found.

Reproductive toxicity

No relevant data found.

Mutagenicity

No relevant data found.

Aspiration Hazard

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

Medium aliphatic solvent naphtha (petroleum)

Acute oral toxicity

LD50, Rat, male and female, > 5,000 mg/kg OECD Test Guideline 420

Acute dermal toxicity

LD50, Rabbit, male and female, > 2,000 mg/kg OECD Test Guideline 402 No deaths occurred at this concentration.

Acute inhalation toxicity

LC50, Rat, male and female, 4 Hour, Vapour, > 5.28 mg/l No deaths occurred at this concentration.

Skin corrosion/irritation

Brief contact may cause slight skin irritation with local redness.

Serious eye damage/eye irritation

Essentially nonirritating to eyes.

Sensitization

For respiratory sensitization:
No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

May cause drowsiness or dizziness.
Route of Exposure: Inhalation
Target Organs: Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)

For similar material(s):
In humans, effects have been reported on the following organs:
Central nervous system.
In animals, effects have been reported on the following organs:
Liver.
Kidney

Carcinogenicity

For similar material(s): Based on animal studies, this material demonstrates limited evidence of carcinogenicity. Kidney effects and/or tumors have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans.

Teratogenicity

For similar material(s): Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother.

Reproductive toxicity

For similar material(s): In animal studies, did not interfere with reproduction.

Mutagenicity

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

Aspiration Hazard

May be fatal if swallowed and enters airways.

Isopropanol

Acute oral toxicity

May cause central nervous system depression. Signs and symptoms of excessive exposure may include: Facial flushing. Low blood pressure. Irregular heartbeats. May cause nausea and vomiting.

LD50, Rat, 5,840 mg/kg OECD 401 or equivalent

Acute dermal toxicity

LD50, Rabbit, > 12,800 mg/kg

Acute inhalation toxicity

LC50, Rat, male and female, 6 Hour, vapour, > 10000 ppm

LC50, Rat, vapour, > 24.5 mg/l

Skin corrosion/irritation

Prolonged exposure not likely to cause significant skin irritation.
May cause drying and flaking of the skin.

Serious eye damage/eye irritation

May cause pain disproportionate to the level of irritation to eye tissues.
May cause moderate eye irritation.
May cause moderate corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness.
Vapor may cause lacrimation (tears).

Sensitization

Did not demonstrate the potential for contact allergy in mice.
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

May cause drowsiness or dizziness.
Route of Exposure: Ingestion
Target Organs: Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)

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

Carcinogenicity

Did not cause cancer in laboratory animals.

Teratogenicity

Isopropanol has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive toxicity

In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Mutagenicity

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

Aspiration Hazard

Aspiration into the lungs may occur during ingestion or vomiting, resulting in rapid absorption and injury to other body systems.

Methanol

Acute oral toxicity

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.

Acute dermal toxicity

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 toxicity estimate, 300 mg/kg

Acute inhalation toxicity

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.

Acute toxicity estimate, Not tested on animals, 4 Hour, vapour, 3 mg/l

Skin corrosion/irritation

Brief contact is essentially nonirritating to skin.

Serious eye damage/eye irritation

May cause eye irritation.

Sensitization

For skin sensitization:

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

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

Causes damage to organs.

Route of Exposure: Oral

Target Organs: Eyes, Central nervous system

Specific Target Organ Systemic Toxicity (Repeated Exposure)

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

Carcinogenicity

Did not cause cancer in laboratory animals.

Teratogenicity

Has caused birth defects in lab animals at high doses. There is no evidence that these findings are relevant to humans.

Reproductive toxicity

In animal studies, did not interfere with reproduction.

Mutagenicity

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

Aspiration Hazard

May be harmful if swallowed and enters airways.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

Acute oral toxicity

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

Acute dermal toxicity

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

Acute inhalation toxicity

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

Skin corrosion/irritation

Brief contact may cause moderate skin irritation with local redness.

Serious eye damage/eye irritation

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

Sensitization

Has caused allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:

No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

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

Specific Target Organ Systemic Toxicity (Repeated Exposure)

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

Respiratory tract.

Carcinogenicity

No relevant data found.

Teratogenicity

Did not cause birth defects in laboratory animals.

Reproductive toxicity

In animal studies, did not interfere with reproduction.

Mutagenicity

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

Aspiration Hazard

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

12. ECOLOGICAL INFORMATION

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

Ecotoxicity**Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated****Acute toxicity to fish**

No relevant data found.

Medium aliphatic solvent naphtha (petroleum)**Acute toxicity to fish**

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

Based on information for a similar material:

LL50, Oncorhynchus mykiss (rainbow trout), semi-static test, 96 Hour, 2 - 5 mg/l

Acute toxicity to aquatic invertebrates

EL50, Daphnia magna (Water flea), Static, 48 Hour, 1.4 mg/l, OECD Test Guideline 202

Acute toxicity to algae/aquatic plants

EL50, Pseudokirchneriella subcapitata (green algae), Static, 96 Hour, Growth rate inhibition, 1 - 3 mg/l, OECD Test Guideline 201

Chronic toxicity to aquatic invertebrates

For similar material(s):

NOEC, Daphnia magna, semi-static test, 21 d, 0.81 mg/l

Isopropanol**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, Pimephales promelas (fathead minnow), flow-through test, 96 Hour, 9,640 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

LC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

EC50, Crangon crangon (shrimp), 48 Hour, 1,400 mg/l

Acute toxicity to algae/aquatic plants

NOEC, alga Scenedesmus sp., static test, 7 d, Growth inhibition (cell density reduction), 1,800 mg/l

ErC50, alga Scenedesmus sp., static test, 72 Hour, Growth rate inhibition, > 1,000 mg/l

Toxicity to bacteria

EC50, activated sludge, > 1,000 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, 30 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, 18,260 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, Pimephales promelas (fathead minnow), 28 d, 446 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), 21 d, 208 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 organismsNOEC, Eisenia fetida (earthworms), 14 d, $\geq 1,000$ mg/kg**Persistence and degradability****Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated****Biodegradability:** No relevant data found.**Medium aliphatic solvent naphtha (petroleum)****Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Fail

Biodegradation: 61 %**Exposure time:** 28 d**Method:** OECD Test Guideline 301F**Theoretical Oxygen Demand:** 3.49 mg/mg**Isopropanol****Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

Biodegradation: 95 %**Exposure time:** 21 d**Method:** OECD Test Guideline 301E or Equivalent

10-day Window: Not applicable

Biodegradation: 53 %**Exposure time:** 5 d**Method:** Other guidelines**Theoretical Oxygen Demand:** 2.40 mg/mg Estimated.**Chemical Oxygen Demand:** 2.09 mg/mg Estimated.**Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	20 - 72 %
20 d	78 - 86 %

Photodegradation**Test Type:** Half-life (indirect photolysis)**Sensitization:** OH radicals**Atmospheric half-life:** 1.472 d**Method:** Estimated.**Methanol****Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

Biodegradation: 82.7 %
Exposure time: 5 d
Method: OECD Test Guideline 301D or Equivalent

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.

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.

Bioaccumulative potential

Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated

Bioaccumulation: No relevant data found.

Medium aliphatic solvent naphtha (petroleum)

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

Partition coefficient: n-octanol/water(log Pow): 3.3 - 6 Estimated.

Bioconcentration factor (BCF): 39.66

Isopropanol

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

Partition coefficient: n-octanol/water(log Pow): 0.05 Measured

Methanol

Bioaccumulation: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water(log Pow): -0.77 at 20 °C

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

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

Mobility in Soil

Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated

No relevant data found.

Medium aliphatic solvent naphtha (petroleum)

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

Partition coefficient (Koc): 1451

Isopropanol

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

Partition coefficient (Koc): 1.1 Estimated.

Methanol

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

Partition coefficient (Koc): 0.44 Estimated.

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.

Results of PBT and vPvB assessment

This substance/mixture contains components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB).

Other adverse effects

Dimethyl siloxane, 3-(2-aminoethyl)aminopropyldimethoxysiloxy-terminated

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

Medium aliphatic solvent naphtha (petroleum)

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

Isopropanol

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.

Oligomers of (ethylenediaminepropyl)trimethoxysilane

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.

14. TRANSPORT INFORMATION

Classification for ROAD and Rail transport:

Proper shipping name	FLAMMABLE LIQUID, N.O.S.(Propan-2-ol, Methanol)
UN number	UN 1993
Class	3
Packing group	II

Classification for SEA transport (IMO-IMDG):

Proper shipping name	FLAMMABLE LIQUID, N.O.S.(Propan-2-ol, Methanol)
UN number	UN 1993
Class	3
Packing group	II
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.(Propan-2-ol, Methanol)
UN number	UN 1993
Class	3
Packing group	II

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

15. REGULATORY INFORMATION

Thailand: Notification of Department of Labour Protection and Welfare (List of Hazardous Chemicals)

One or more components of this product are listed.

Emergency Decree on Controlling the Use of Volatile Substances

Neither banned nor restricted

Hazardous Substance Act

This product may subject restriction or prohibition under the type of hazardous substance due to certain applications. For details, please refer to local regulations to decide if any actions (of notification, registration, and/or license in accordance with the determined specific rules and procedure) are needed before business activity happen (production, import, export or to have it in possession for transport and/or storage).

Type 1: the production, import, export, or having in possession must comply with the specified criteria and procedures.

Neither banned nor restricted

Type 2: the production, import, export, or having in possession must first be notified to the authority and must also comply with the specified criteria and procedures.

Neither banned nor restricted

Type 3: the production, import, export, or having in possession must obtain a permit.

Neither banned nor restricted

Type 4: the production, import, export, or having in possession is prohibited.

Neither banned nor restricted

16. OTHER INFORMATION

Revision

Identification Number: 2649641 / A873 / Issue Date: 03.03.2023 / Version: 6.0

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

Legend

ACGIH	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	ACGIH - Biological Exposure Indices (BEI)
STEL	Short-term exposure limit
TH OEL	Thailand. Occupational Exposure Limits
TWA	Time weighted average

Full text of other abbreviations

AllC - 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; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; 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; TECl - 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

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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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