5466 MICROMAX ™ CONDUCTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: -
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1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 5466 MICROMAX ™ CONDUCTOR PASTE
Product code : 000000000021057583

Manufacturer or supplier's details

Company : Celanese (Shanghai) International Trading Co., Ltd

Address : 4560 Jinke Road, Zhangjiang, Pudong
Shanghai, China 201210

Telephone : 86-21-38619288

Emergency telephone number : CHEMTREC International phone number: +1-703-527 3887, +86 532 8388-9090 (China, 24h)

E-mail address : HazCom@celanese.com

Recommended use of the chemical and restrictions on use

Recommended use : For industrial use only.
Paste for electronic industry

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance : viscous liquid
Colour : grey
Odour : slight

Combustible liquid. Causes skin irritation. Causes serious eye irritation. May cause damage to organs (Central nervous system) through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects.

GHS Classification

Flammable liquids : Category 4

Skin corrosion/irritation : Category 2

Serious eye damage/eye irritation : Category 2A

Specific target organ toxicity - repeated exposure : Category 2 (Central nervous system)

Short-term (acute) aquatic hazard : Category 1

Long-term (chronic) aquatic hazard : Category 1

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H227 Combustible liquid.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H373 May cause damage to organs (Central nervous system) through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 Do not breathe mist or vapours.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P314 Get medical advice/ attention if you feel unwell.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391 Collect spillage.

Storage:

P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Physical and chemical hazards

Combustible liquid.

Health hazards

Causes skin irritation. Causes serious eye irritation. May cause damage to organs through prolonged or repeated exposure.

Environmental hazards

Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Other hazards which do not result in classification

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
silver powder: [particle diameter > 100 nm < 1 mm]	7440-22-4	60 -70
Terpineol	8000-41-7	1 -10
Bis(2-butoxyethyl) ether	112-73-2	1 -10
Stoddard solvent (< 0.1% benzene)	8052-41-3	1 -10
2-(2-Butoxyethoxy)ethanol	112-34-5	1 -10
Toluene	108-88-3	0.1 -1
Palladium	7440-05-3	0.1 -1

Glass or Ceramic ingredient(s) Copper		1 - 10%
Contains:	Copper	0 - 0.1 %

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

4. FIRST AID MEASURES

If inhaled : If inhaled, remove to fresh air.
If breathing is difficult, give oxygen.
If not breathing, give artificial respiration.
Get medical attention.

In case of skin contact : Wash off with soap and water.
Get medical attention if irritation develops and persists.
Wash contaminated clothing before re-use.

In case of eye contact : Immediately flush eyes for at least 15 minutes. Get medical attention.

If swallowed	:	If swallowed Rinse mouth with water. Call a physician or poison control centre immediately. DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Most important symptoms and effects, both acute and delayed	:	Causes skin irritation. Causes serious eye irritation. May cause damage to organs through prolonged or repeated exposure.

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Dry sand Dry chemical Alcohol-resistant foam
Specific hazards during firefighting	:	Hazardous decomposition products formed under fire conditions. (see also section 10) Avoid breathing decomposition products.
Specific extinguishing methods	:	Evacuate personnel to safe areas. Stop spill/release if it can be done with minimal risk. Do not allow run-off from fire fighting to enter drains or water courses.
Special protective equipment for firefighters	:	Exposure to decomposition products may be a hazard to health. Wear self-contained breathing apparatus for firefighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Wear suitable protective equipment.
Environmental precautions	:	Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Clean contaminated floors and objects thoroughly while observing environmental regulations.

Methods and materials for containment and cleaning up	:	Contain spill. Soak up with inert absorbent material. Collect and contain contaminated absorbent and dike material for disposal. Keep in suitable, closed containers for disposal. Ventilate the area. Clean contaminated surface thoroughly.
Prevention of secondary hazards	:	Dispose of in accordance with local regulations.

7. HANDLING AND STORAGE

Handling

Advice on protection against fire and explosion	:	Avoid formation of dust and aerosols. Keep away from heat and sources of ignition.
Advice on safe handling	:	Avoid inhalation, ingestion and contact with skin and eyes. Use only with adequate ventilation/personal protection. Keep container closed when not in use. Take care to avoid waste and spillage when weighing, loading and mixing the product.
Avoidance of contact	:	Acids

Storage

Conditions for safe storage	:	Store in original container. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from sources of ignition - No smoking. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material. Keep container closed when not in use. Do not reuse empty container.
Further information on storage stability	:	Stable under normal conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
silver powder: [particle diameter > 100 nm < 1 mm]	7440-22-4	TWA (Dust and fume)	0.1 mg/m3	ACGIH
Stoddard solvent (< 0.1% benzene)	8052-41-3	TWA	100 ppm	ACGIH
2-(2-Butoxyethoxy)ethanol	112-34-5	TWA (Inhalable	10 ppm	ACGIH

		fraction and vapor)		
Toluene	108-88-3	PC-TWA	50 mg/m3	CN OEL
	Further information: Skin			
		PC-STEL	100 mg/m3	CN OEL
	Further information: Skin			
		TWA	20 ppm	ACGIH
Copper	7440-50-8	PC-TWA (Dust)	1 mg/m3 (Copper)	CN OEL
		PC-TWA (Fumes)	0.2 mg/m3 (Copper)	CN OEL
		TWA (Dust and mist)	1 mg/m3 (Copper)	ACGIH
		TWA (Fumes)	0.2 mg/m3 (Copper)	ACGIH

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Toluene	108-88-3	hippuric acid	Urine	End of workshift (after exposure has ended)	2 g/l	CN BEI
		hippuric acid	Urine	End of workshift (after exposure has ended)	1 mol/mol creatinine	CN BEI
		hippuric acid	Urine	End of workshift (after exposure has ended)	1.5 g/g creatinine	CN BEI
		hippuric acid	Urine	End of workshift (after exposure has ended)	11 Millimoles per liter	CN BEI
		toluene	end exhaled air	End of workshift (15-30 min after exposure has ended)	20 mg/m³	CN BEI
		toluene	end exhaled	Prior to shift	5 mg/m³	CN BEI

			air			
		Toluene	In blood	Prior to last shift of workweek	0.02 mg/l	ACGIH BEI
		Toluene	Urine	End of shift (As soon as possible after exposure ceases)	0.03 mg/l	ACGIH BEI
		o-Cresol	Urine	End of shift (As soon as possible after exposure ceases)	0.3 mg/g creatinine	ACGIH BEI

Engineering measures : Local exhaust or a laboratory hood should be used when handling the materials.
Maintain air concentrations below occupational exposure standards.

Personal protective equipment

Respiratory protection : Provide adequate ventilation.
No personal respiratory protective equipment normally required.
Where there is potential for airborne exposures in excess of applicable limits, wear approved respiratory protection with dust/mist cartridge.
When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
Consult the respirator manufacturer to determine the appropriate type of equipment for a given application.
Observe respirator use limitations specified by the manufacturer.

Persons performing maintenance or repairs on exhaust system equipment (e.g. ducts) may need to use respirators and protective clothing to prevent exposure to any accumulated residues.

Eye/face protection : Wear safety glasses with side shields.

Skin and body protection : Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Lightweight protective clothing
Safety shoes

Hand protection

Material	:	Impervious gloves
Remarks	:	Gloves must be inspected prior to use. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. The exact break through time can be obtained from the protective glove producer and this has to be observed. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Contaminated work clothing should not be allowed out of the workplace. Remove contaminated clothing and protective equipment before entering eating areas. Remove and wash contaminated clothing before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	viscous liquid
Colour	:	grey
Odour	:	slight
Flash point	:	80 °C Method: Setaflash closed cup - SCC
Density	:	2.81 g/cm³ (25 °C)
Solubility(ies) Water solubility	:	slightly soluble

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Polymerization will not occur. Stable at normal temperatures and storage conditions.
Conditions to avoid	:	None reasonably foreseeable.

Incompatible materials	:	Acids
Hazardous decomposition products	:	No decomposition if stored and applied as directed. Under fire conditions: Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke). Metal oxides

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Not classified due to lack of data.

Product:

Acute oral toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute inhalation toxicity	:	LC50 (Rat): > 5.16 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 436 Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Terpineol:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal

toxicity

Stoddard solvent (< 0.1% benzene):

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Acute dermal toxicity : LD50 (Rabbit): > 3,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

2-(2-Butoxyethoxy)ethanol:

Acute oral toxicity : LD50 (Mouse): 2,410 mg/kg
Method: OECD Test Guideline 401
Target Organs: Central nervous system
Remarks: narcosis

Acute inhalation toxicity : Remarks: An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable concentration.

Acute dermal toxicity : LD50 (Rabbit): 2,764 mg/kg
Method: OECD Test Guideline 402

Toluene:

Acute oral toxicity : LD50 (Rat): 5,580 mg/kg
Method: EC Directive 92/69/EEC B.1 Acute Toxicity (Oral)

Acute inhalation toxicity : LC50 (Rat): 28.1 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403

Acute dermal toxicity : LD50 (Rabbit): > 5,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Copper:

Acute oral toxicity : LD50 (Rat): > 17,000 mg/kg

Acute inhalation toxicity : (animals (unspecified species)): 0.1 mg/l

Acute dermal toxicity : Remarks: No data available

Skin corrosion/irritation

Causes skin irritation.

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Species	:	Rabbit
Assessment	:	No skin irritation
Method	:	OECD Test Guideline 404
Result	:	Slight or no skin irritation
Remarks	:	Minimal effects that do not meet the threshold for classification.

Terpineol:

Species	:	Rabbit
Assessment	:	Irritating to skin.
Method	:	OECD Test Guideline 404
Result	:	Skin irritation

Bis(2-butoxyethyl) ether:

Species	:	Rabbit
Assessment	:	Not classified as irritant
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Stoddard solvent (< 0.1% benzene):

Species	:	Rabbit
Assessment	:	Irritating to skin.
Method	:	OECD Test Guideline 404
Result	:	Severe skin irritation

2-(2-Butoxyethoxy)ethanol:

Species	:	Rabbit
Assessment	:	Not classified as irritant
Method	:	OECD Test Guideline 404
Result	:	No skin irritation

Toluene:

Species	:	Rat
Assessment	:	Irritating to skin.
Method	:	Directive 67/548/EEC, Annex V, B.4.
Result	:	Severe skin irritation

Copper:

Remarks	:	No data available

Serious eye damage/eye irritation

Causes serious eye irritation.

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Species	:	Rabbit
Result	:	No eye irritation
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 405

Terpineol:

Species	:	animals (unspecified species)
Result	:	Eye irritation
Assessment	:	Irritating to eyes.
Method	:	OECD Test Guideline 405

Bis(2-butoxyethyl) ether:

Species	:	Rabbit
Result	:	No eye irritation
Assessment	:	Not classified as irritant
Method	:	OECD Test Guideline 405

Stoddard solvent (< 0.1% benzene):

Species	:	Rabbit
Result	:	Slight or no eye irritation
Assessment	:	No eye irritation
Method	:	OECD Test Guideline 405
Remarks	:	Minimal effects that do not meet the threshold for classification.

2-(2-Butoxyethoxy)ethanol:

Species	:	Rabbit
Result	:	Eye irritation
Assessment	:	Irritating to eyes.
Method	:	OECD Test Guideline 405

Toluene:

Species	:	Rabbit
Result	:	Irritation to eyes, reversing within 7 days
Assessment	:	Mild eye irritation
Method	:	OECD Test Guideline 405

Copper:

Species	:	animals (unspecified species)
Remarks	:	Irritant

Respiratory or skin sensitisation

Skin sensitisation

Not classified due to lack of data.

Respiratory sensitisation

Not classified due to lack of data.

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	US EPA Test Guideline OPPTS 870.2600
Result	:	Does not cause skin sensitisation.
Remarks	:	Information given is based on data obtained from similar substances.

Terpineol:

Test Type	:	Maximisation Test
Species	:	Guinea pig
Assessment	:	Not a skin sensitizer.
Method	:	OECD Test Guideline 406
Result	:	Did not cause sensitisation on laboratory animals.

Bis(2-butoxyethyl) ether:

Species	:	Human
Assessment	:	Does not cause skin sensitisation.
Result	:	Does not cause skin sensitisation.
Remarks	:	Information given is based on data obtained from similar substances.

Stoddard solvent (< 0.1% benzene):

Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 406
Result	:	Does not cause skin sensitisation.

Species	:	Mouse
Assessment	:	Does not cause respiratory sensitisation.
Result	:	Does not cause respiratory sensitisation.

2-(2-Butoxyethoxy)ethanol:

Species	:	Mouse
Assessment	:	Does not cause respiratory sensitisation.
Result	:	Does not cause respiratory sensitisation.

Test Type	:	Maximisation Test
Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 406
Result	:	Does not cause skin sensitisation.

Toluene:

Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	Directive 67/548/EEC, Annex V, B.6.
Result	:	Does not cause skin sensitisation.

Species	:	Not tested on animals
Assessment	:	Does not cause respiratory sensitisation.
Result	:	Does not cause respiratory sensitisation.

Copper:

Species	:	Human
Remarks	:	May cause sensitisation of susceptible persons by skin contact.

Germ cell mutagenicity

Not classified due to lack of data.

Components:

Terpineol:

Germ cell mutagenicity - Assessment	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects., Evidence suggests this substance does not cause genetic damage in animals.

Bis(2-butoxyethyl) ether:

Germ cell mutagenicity - Assessment	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects., Did not cause genetic damage in cultured mammalian cells., Did not cause genetic damage in cultured bacterial cells.

Stoddard solvent (< 0.1% benzene):

Germ cell mutagenicity - Assessment	:	Animal testing did not show any mutagenic effects., Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

2-(2-Butoxyethoxy)ethanol:

Germ cell mutagenicity - Assessment	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects., Animal testing did not show any mutagenic effects.

Toluene:

Germ cell mutagenicity - Assessment	:	Animal testing did not show any mutagenic effects., Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Carcinogenicity

Not classified due to lack of data.

Components:

Terpineol:

Carcinogenicity - Assessment	:	Not classifiable as a human carcinogen., Overall weight of evidence indicates that the substance is not carcinogenic.

2-(2-Butoxyethoxy)ethanol:

Carcinogenicity - Assessment	:	Not classifiable as a human carcinogen.

Toluene:

Carcinogenicity - Assessment	:	Animal testing did not show any carcinogenic effects.

Reproductive toxicity

Not classified due to lack of data.

Components:

Terpineol:

Reproductive toxicity - Assessment	:	Animal testing showed effects on reproduction at levels equal to or above those causing parental toxicity.

Bis(2-butoxyethyl) ether:

Reproductive toxicity - Assessment	:	No toxicity to reproduction, Animal testing showed no reproductive toxicity. Animal testing showed no developmental toxicity.

Stoddard solvent (< 0.1% benzene):

Reproductive toxicity - Assessment	:	No toxicity to reproduction, Animal testing showed no reproductive toxicity., Information given is based on data obtained from similar substances. Animal testing showed no developmental toxicity.

2-(2-Butoxyethoxy)ethanol:

Reproductive toxicity - Assessment	:	No toxicity to reproduction, Animal testing showed no reproductive toxicity. Animal testing showed no developmental toxicity.

Toluene:

Reproductive toxicity - Assessment	:	Some evidence of adverse effects on sexual function and fertility, based on animal experiments., Animal testing showed effects on reproduction at levels below those causing parental toxicity that included:, Reduced sperm count Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

STOT - single exposure

Not classified due to lack of data.

Components:

Terpineol:

Assessment : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Stoddard solvent (< 0.1% benzene):

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

2-(2-Butoxyethoxy)ethanol:

Target Organs : Central nervous system
Assessment : The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.

Toluene:

Target Organs : Central nervous system
Assessment : The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.

STOT - repeated exposure

May cause damage to organs (Central nervous system) through prolonged or repeated exposure.

Components:

Terpineol:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Bis(2-butoxyethyl) ether:

Exposure routes : Ingestion
Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Stoddard solvent (< 0.1% benzene):

Target Organs : Central nervous system
Assessment : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.

2-(2-Butoxyethoxy)ethanol:

Assessment : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Toluene:

Target Organs	:	Central nervous system
Assessment	:	The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Repeated dose toxicity

Components:

Terpineol:

Species	:	Rat
Application Route	:	Oral
Remarks	:	No toxicologically significant effects were found.

Bis(2-butoxyethyl) ether:

Species	:	Rat
NOAEL	:	100 mg/kg
Application Route	:	Ingestion
Method	:	see user defined free text

Stoddard solvent (< 0.1% benzene):

Species	:	Human
Application Route	:	Inhalation
Test atmosphere	:	vapour
Exposure time	:	12 Months

Species	:	Rat
NOAEL	:	1,056 mg/kg
Application Route	:	Ingestion
Exposure time	:	28 d
Method	:	OECD Test Guideline 407
Remarks	:	No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification. Information given is based on data obtained from similar substances.

Species	:	Rabbit
NOAEL	:	2,000 mg/kg
Application Route	:	Skin contact
Exposure time	:	28 d
Method	:	OECD Test Guideline 410
Remarks	:	No toxicologically significant effects were found.

2-(2-Butoxyethoxy)ethanol:

Species	:	Rat
Application Route	:	Dermal
Remarks	:	Skin irritation

Species	:	Rat
Application Route	:	Oral

Remarks	:	Spleen effects Organ weight changes Liver effects kidney effects
Species	:	Rat
Application Route	:	Inhalation
Remarks	:	Liver effects lung effects

Toluene:

Species	:	Rat
Application Route	:	Inhalation
Test atmosphere	:	vapour
Exposure time	:	28 d
Remarks	:	central nervous system effects

Copper:

Application Route	:	Inhalation
Remarks	:	Inhalation fume fever Respiratory irritation immune system effects Liver effects

Aspiration toxicity

Not classified due to lack of data.

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

No aspiration toxicity classification

Stoddard solvent (< 0.1% benzene):

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

2-(2-Butoxyethoxy)ethanol:

The substance or mixture causes concern owing to the assumption that it causes a human aspiration toxicity hazard.

Toluene:

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 0.016 mg/l Exposure time: 96 h Remarks: Information given is based on data obtained from similar substances.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 0.0125 mg/l Exposure time: 48 h Remarks: Information given is based on data obtained from similar substances.
Toxicity to algae/aquatic plants	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.19 mg/l Exposure time: 96 h Remarks: Information given is based on data obtained from similar substances. EC10 (Pseudokirchneriella subcapitata (green algae)): 0.03462 mg/l Exposure time: 72 h Remarks: Information given is based on data obtained from similar substances.
Toxicity to fish (Chronic toxicity)	:	NOEC (Oncorhynchus mykiss (rainbow trout)): 0.0012 mg/l Exposure time: 32 d Remarks: Information given is based on data obtained from similar substances.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.00327 mg/l Exposure time: 21 d Remarks: Information given is based on data obtained from similar substances.

Ecotoxicology Assessment

Acute aquatic toxicity	:	Very toxic to aquatic life.
Chronic aquatic toxicity	:	Very toxic to aquatic life with long lasting effects.

Terpineol:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 62 - 80 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): 73 mg/l Exposure time: 48 h Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 68 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EbC50 (Pseudokirchneriella subcapitata (green algae)): 17 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Bis(2-butoxyethyl) ether:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 210 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Information given is based on data obtained from similar substances.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 42.5 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	EC50 (Desmodesmus subspicatus (green algae)): 41.3 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Ecotoxicology Assessment

Acute aquatic toxicity	:	Harmful to aquatic life.
Chronic aquatic toxicity	:	This product has no known ecotoxicological effects.

Stoddard solvent (< 0.1% benzene):

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 2.5 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Information given is based on data obtained from similar substances.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Remarks: Information given is based on data obtained from similar substances.
Toxicity to algae/aquatic plants	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 1.2 mg/l Exposure time: 96 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.16 mg/l Exposure time: 96 h Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Ecotoxicology Assessment

Acute aquatic toxicity	:	Toxic to aquatic life.
Chronic aquatic toxicity	:	Toxic to aquatic life with long lasting effects.

2-(2-Butoxyethoxy)ethanol:

Toxicity to fish	:	LC50 (Lepomis macrochirus (Bluegill sunfish)): 1,300 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae/aquatic plants	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 201 NOEC (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 201

Toluene:

Toxicity to fish	:	LC50 (Fish (unspecified species)): 5.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Ceriodaphnia dubia (water flea)): 3.78 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	:	EC50 (algae): 207 mg/l Exposure time: 72 h
Toxicity to fish (Chronic toxicity)	:	NOEC (Fish (unspecified species)): 1.39 mg/l Exposure time: 40 d
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Ceriodaphnia dubia (water flea)): 0.74 mg/l Exposure time: 7 d

Ecotoxicology Assessment

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

Copper:

Toxicity to algae/aquatic plants	:	EC50 (algae): 0.0127 mg/l Exposure time: 72 h
M-Factor (Acute aquatic toxicity)	:	10
M-Factor (Chronic aquatic toxicity)	:	10

Persistence and degradability

Components:

Terpineol:

Biodegradability	:	Biodegradation: 80 % Exposure time: 28 d Method: OECD Test Guideline 301 Remarks: Readily biodegradable.

Bis(2-butoxyethyl) ether:

Biodegradability	:	Result: rapidly biodegradable Remarks: Information given is based on data obtained from similar substances.

Stoddard solvent (< 0.1% benzene):

Biodegradability	:	Result: Biodegradable Method: OECD Test Guideline 301

2-(2-Butoxyethoxy)ethanol:

Biodegradability	:	Biodegradation: 85 % Exposure time: 28 d Method: OECD Test Guideline 301C Remarks: Readily biodegradable.

Toluene:

Biodegradability	:	Result: Biodegradable

Bioaccumulative potential

Components:

silver powder: [particle diameter > 100 nm < 1 mm]:

Bioaccumulation	:	Remarks: Bioaccumulation is unlikely. Information given is based on data obtained from similar substances.
Partition coefficient: n-octanol/water	:	Remarks: Not applicable

Terpineol:

Bioaccumulation : Bioconcentration factor (BCF): 24.13
Remarks: Bioaccumulation is unlikely.

Bis(2-butoxyethyl) ether:

Partition coefficient: n-octanol/water : log Pow: 1.92

Stoddard solvent (< 0.1% benzene):

Bioaccumulation : Remarks: The substance has the potential to bioaccumulate.

Partition coefficient: n-octanol/water : log Pow: 3.5 - 6.4 (20 °C)

2-(2-Butoxyethoxy)ethanol:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 1 (20 °C)
pH: 7

Toluene:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 2.65

Mobility in soil

No data available

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : If recycling is not practicable, dispose of in compliance with local regulations.
Do not reuse empty container.Never place unused product down any indoor or out door drain.
Contaminated/not cleaned containers should be treated/handled like product waste.Dispose of container properly.Refer to applicable Local, State/Provincial, and Federal Regulations, as well as industry Standards.

14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID,

N.O.S.
(Silver)

Class	:	9
Packing group	:	III
Labels	:	9
Environmentally hazardous	:	no

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Silver)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

National Regulations

GB 6944/12268

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Silver)
Class	:	9
Packing group	:	III
Labels	:	9
Marine pollutant	:	no

JT/T 617

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Class	:	9
Packing group	:	III
Labels	:	9
Environmentally hazardous	:	no

Special precautions for user

Remarks	:	Marine Pollutants assigned UN number 3077 and 3082 in single or combination packaging containing a net quantity per

single or inner packaging of 5 L or less for liquids or having a net mass per single or inner packaging of 5 KG or less for solids may be transported as non-dangerous goods as provided in section 2.10.2.7 of IMDG code, IATA special provision A197, and ADR/RID special provision 375.

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

15. REGULATORY INFORMATION

National regulatory information

Law on the Prevention and Control of Occupational Diseases

Regulations on Safety Management of Hazardous Chemicals

Catalogue of Hazardous Chemicals	:	This product is not listed in the catalogue of hazardous chemicals, but it meets the definition of hazardous chemicals and its principles of determination.
Identification of Major Hazard Installations for Hazardous Chemicals (GB 18218)	:	Not listed
Hazardous Chemicals for Priority Management under SAWS	:	Listed
Catalogue of Specially Controlled Hazardous Chemicals	:	Not listed
List of Explosive Precursors	:	Listed

Regulations on Labour Protection in Workplaces where Toxic Substances are Used

Catalogue of Highly Toxic Chemicals	:	Not listed

Regulation of Environmental Management on the First Import of Chemicals and the Import and Export of Toxic Chemicals

China Severely Restricted Toxic Chemicals for Import and Export	:	Not listed

Regulation on the Administration of Precursor Chemicals

Catalogue and Classification of Precursor Chemicals	:	Not listed

Regulations on the Administration of Controlled Chemicals

List of Controlled Chemicals	:	Not listed

Regulations of Ozone Depleting Substances Management

List of Controlled Ozone Depleting Substances	:	Not listed

List of Controlled Ozone Depleting Substances Import and Export : Not listed

Environmental Protection Law

List of Priority Controlled Chemicals : Listed

List of Key Controlled New Pollutants : Not listed

16. OTHER INFORMATION

Revision Date : 2025/05/09

Date format : yyyy/mm/dd

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
CN BEI	:	China. Biological Occupational Exposure Indices
CN OEL	:	Occupational exposure limits for hazardous agents in the workplace - Chemical hazardous agents.

ACGIH / TWA	:	8-hour, time-weighted average
CN OEL / PC-TWA	:	Permissible concentration - time weighted average
CN OEL / PC-STEL	:	Permissible concentration - short term exposure limit

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; 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; 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

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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