

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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**SECTION 1. IDENTIFICATION**

Product name : 0010K MICROMAX™ RESISTOR PASTE

Product code : 000000000027046953

**Manufacturer or supplier's details**

Company name of supplier : Celanese Ltd. Irving Texas

Address : 222 West Las Colinas Boulevard Suite 900N  
Irving TX 75039

Telephone : '+1 972-443-4000

Emergency telephone number : DOMESTIC NORTH AMERICA: 800-424-9300  
INTERNATIONAL, CALL +1 703-527-3887 (collect calls accepted)

**Recommended use of the chemical and restrictions on use**

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

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**SECTION 2. HAZARDS IDENTIFICATION****GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)**

Flammable liquids : Category 4

Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitisation : Category 1

Germ cell mutagenicity : Category 2

Carcinogenicity : Category 2

Reproductive toxicity : Category 1A

Specific target organ toxicity : Category 1 (Blood)  
- repeated exposure (Oral)

**Other hazards**

None known.

**GHS label elements**

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue:
8.0	06-27-2025	300000002587	04-12-2024
			Date of first issue: 01-29-2024

---

Hazard pictograms

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Signal word

:

Danger

Hazard statements

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H227 Combustible liquid.  
H315 Causes skin irritation.  
H317 May cause an allergic skin reaction.  
H319 Causes serious eye irritation.  
H341 Suspected of causing genetic defects.  
H351 Suspected of causing cancer.  
H360 May damage fertility or the unborn child.  
H372 Causes damage to organs (Blood) through prolonged or repeated exposure if swallowed.

Precautionary statements

:

**Prevention:**

P201 Obtain special instructions before use.  
P202 Do not handle until all safety precautions have been read and understood.  
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.  
P270 Do not eat, drink or smoke when using this product.  
P272 Contaminated work clothing must not be allowed out of the workplace.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.  
P280 Wear protective gloves, protective clothing, eye protection and 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.  
P308 + P313 IF exposed or concerned: Get medical advice/ attention.  
P333 + P313 If skin irritation or rash 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.

**Storage:**

P403 Store in a well-ventilated place.  
P405 Store locked up.

**Disposal:**

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

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

## Components

Chemical name	CAS-No.	Concentration (% w/w)
Terpineol	8000-41-7	$\geq 20 - < 30$
Ruthenium (IV) oxide	12036-10-1	$\geq 10 - < 20$
Silver Powder (particle diameter $>100$ nm $<1$ mm)	7440-22-4	$\geq 10 - < 20$
Palladium	7440-05-3	$\geq 1 - < 10$
Bisphenol A-epichlorohydrin resin	25068-38-6	$\geq 1 - < 10$
Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate	68412-53-3	$\geq 1 - < 10$
2-(2-Butoxyethoxy)ethanol	112-34-5	$\geq 1 - < 10$
Glass or Ceramic ingredient(s)		20 - 30%
Lead, Silicon		

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

## SECTION 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.

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue:
8.0	06-27-2025	300000002587	04-12-2024
			Date of first issue: 01-29-2024

---

Most important symptoms and effects, both acute and delayed : Causes skin irritation.  
May cause an allergic skin reaction.  
Causes serious eye irritation.  
Suspected of causing genetic defects.  
Suspected of causing cancer.  
May damage fertility or the unborn child.  
Causes damage to organs through prolonged or repeated exposure if swallowed.

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**SECTION 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.

Further information : 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.

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**SECTION 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.  
Dispose of in accordance with local regulations.

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.

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**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

Keep in suitable, closed containers for disposal.  
Ventilate the area.  
Clean contaminated surface thoroughly.

**SECTION 7. HANDLING AND STORAGE**

- 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.
- 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.

**SECTION 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 <1mm)	7440-22-4	TWA (Dust and fume)	0.1 mg/m3	ACGIH
		TWA (Dust)	0.01 mg/m3	NIOSH REL
		TWA	0.01 mg/m3	OSHA P0
Lead	7439-92-1	TWA	0.05 mg/m3 (Lead)	ACGIH
		PEL	0.05 mg/m3 (Lead)	OSHA CARC
		TWA	0.05 mg/m3 (Lead)	NIOSH REL
Silicon	7440-21-3	TWA (Respirable)	5 mg/m3	NIOSH REL
		TWA (total)	10 mg/m3	NIOSH REL
		TWA (total dust)	15 mg/m3	OSHA Z-1
		TWA (respirable fraction)	5 mg/m3	OSHA Z-1
		TWA (Total)	10 mg/m3	OSHA P0

## 0010K MICROMAX™ RESISTOR PASTE

Version 8.0      Revision Date: 06-27-2025      SDS Number: 300000002587      Date of last issue: 04-12-2024  
 Date of first issue: 01-29-2024

		dust)		
		TWA (respirable dust fraction)	5 mg/m3	OSHA P0
2-(2-Butoxyethoxy)ethanol	112-34-5	TWA (Inhalable fraction and vapor)	10 ppm	ACGIH

**Biological occupational exposure limits**

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Lead	7439-92-1	Lead (Lead)	In blood	Not critical	200 µg/l	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.

**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.

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

Eye 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
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.

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**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	: viscous liquid
Colour	: black
Odour	: pine
Flash point	: 194 °F / 90 °C  Method: Setaflash closed cup - SCC
Density	: 1.83 g/cm <sup>3</sup> (68 °F / 20 °C)
Solubility(ies)	
Water solubility	: slightly soluble (68 °F / 20 °C)
Viscosity	
Viscosity, dynamic	: > 100 Pa.s (77 °F / 25 °C)
Oxidizing properties	: The substance or mixture is not classified as oxidizing. Not classified due to data which are conclusive although insufficient for classification.

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**SECTION 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

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

Hazardous decomposition products : No decomposition if stored and applied as directed.

Under fire conditions:

Carbon monoxide, carbon dioxide and unburned hydrocarbons (smoke).  
Metal oxides

**SECTION 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 inhalation toxicity : Acute toxicity estimate: 81.1 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: Calculation method

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

**Components:****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

**Silver Powder (particle diameter >100 nm <1mm):**

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



**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

Assessment: The substance or mixture has no acute dermal toxicity

**Lead:**

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg  
Method: OECD Test Guideline 401  
Remarks: Information given is based on data obtained from similar substances.

Acute inhalation toxicity : LC50 (Rat): > 5.05 mg/l  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403  
Remarks: Information given is based on data obtained from similar substances.

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 402  
Remarks: Information given is based on data obtained from similar substances.

**Bisphenol A-epichlorohydrin resin:**

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

**Silicon:**

Acute oral toxicity : LD50 (Rat): 3,160 mg/kg

Acute inhalation toxicity : Remarks: No data available

Acute dermal toxicity : Remarks: No data available

**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**

Acute oral toxicity : LD50 (Rat): 4,450 mg/kg

**2-(2-Butoxyethoxy)ethanol:**

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

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

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

**Skin corrosion/irritation**

Causes skin irritation.

**Components:****Terpineol:**

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

**Silver Powder (particle diameter >100 nm <1mm):**

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.

**Lead:**

Species : Rabbit  
Assessment : Not classified as irritant  
Method : OECD Test Guideline 404  
Result : No skin irritation  
Remarks : Information given is based on data obtained from similar substances.

**Bisphenol A-epichlorohydrin resin:**

Species : Rabbit  
Assessment : Irritating to skin.  
Result : Severe skin irritation

**Silicon:**

Remarks : No data available

**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**

Species : Rabbit  
Assessment : Irritating to skin.  
Result : Severe skin irritation  
Remarks : Information given is based on data obtained from similar substances.

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

**2-(2-Butoxyethoxy)ethanol:**

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

**Serious eye damage/eye irritation**

Causes serious eye irritation.

**Components:****Terpineol:**

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

**Silver Powder (particle diameter >100 nm <1mm):**

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

**Lead:**

Species	:	Rabbit
Result	:	No eye irritation
Assessment	:	Not classified as irritant
Method	:	OECD Test Guideline 405
Remarks	:	Information given is based on data obtained from similar substances.

**Bisphenol A-epichlorohydrin resin:**

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

**Silicon:**

Species	:	Rabbit
Remarks	:	slight irritation

**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**

Species	:	Rabbit
Result	:	Risk of serious damage to eyes.
Assessment	:	Risk of serious damage to eyes.
Remarks	:	Information given is based on data obtained from similar substances.

**2-(2-Butoxyethoxy)ethanol:**

Species	:	Rabbit
Result	:	Eye irritation

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

Assessment	:	Irritating to eyes.
Method	:	OECD Test Guideline 405

**Respiratory or skin sensitisation****Skin sensitisation**

May cause an allergic skin reaction.

**Respiratory sensitisation**

Not classified due to lack of data.

**Components:****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.

**Silver Powder (particle diameter >100 nm <1mm):**

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.

**Lead:**

Species	:	Guinea pig
Assessment	:	Does not cause skin sensitisation.
Method	:	OECD Test Guideline 406
Result	:	Does not cause skin sensitisation.
Remarks	:	Information given is based on data obtained from similar substances.

**Bisphenol A-epichlorohydrin resin:**

Species	:	Mouse
Assessment	:	May cause sensitisation by skin contact.
Method	:	OECD Test Guideline 429
Result	:	May cause sensitisation by skin contact.

**Silicon:**

Remarks	:	No data available
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**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**

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.

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

**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.

**Germ cell mutagenicity**

Suspected of causing genetic defects.

**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.
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**Lead:**

Germ cell mutagenicity - Assessment	:	In vitro tests showed mutagenic effects, Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
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**Bisphenol A-epichlorohydrin resin:**

Germ cell mutagenicity - Assessment	:	Animal testing did not show any mutagenic effects., Did not cause genetic damage in cultured bacterial cells., Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
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**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.
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**Carcinogenicity**

Suspected of causing cancer.

**Components:****Terpineol:**

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

Carcinogenicity - Assessment	:	Suspected human carcinogens, An increased incidence of tumours was observed in laboratory animals., Information given is based on data obtained from similar substances.
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**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

**Bisphenol A-epichlorohydrin resin:**

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

**2-(2-Butoxyethoxy)ethanol:**

Carcinogenicity - Assessment : Not classifiable as a human carcinogen.

**IARC** Group 2B: Possibly carcinogenic to humans  
Lead 7439-92-1

**OSHA** OSHA specifically regulated carcinogen  
Lead 7439-92-1  
(Lead and inorganic lead compounds)

**NTP** Reasonably anticipated to be a human carcinogen  
Lead 7439-92-1

**Reproductive toxicity**

May damage fertility or the unborn child.

**Components:****Terpineol:**

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

**Lead:**

Reproductive toxicity - Assessment : Known human reproductive toxicant, Reduced fertility, Information given is based on data obtained from similar substances.  
Delayed foetal development (variations), Information given is based on data obtained from similar substances.

**Bisphenol A-epichlorohydrin resin:**

Reproductive toxicity - Assessment : No toxicity to reproduction, Animal testing showed no reproductive toxicity., No effects on or via lactation  
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.

**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.

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

**Lead:**

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

**Bisphenol A-epichlorohydrin resin:**

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

**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.

**STOT - repeated exposure**

Causes damage to organs (Blood) through prolonged or repeated exposure if swallowed.

**Components:****Terpineol:**

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

**Bisphenol A-epichlorohydrin resin:**

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

**2-(2-Butoxyethoxy)ethanol:**

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

**Repeated dose toxicity****Components:****Terpineol:**

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

**Lead:**

Species : Rat  
LOAEL : 200  
Application Route : Oral  
Target Organs : Blood  
Assessment : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 1.  
Remarks : altered blood chemistry  
Information given is based on data obtained from similar substances.

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

---

**Bisphenol A-epichlorohydrin resin:**

Species	: Rat
NOAEL	: > 1,000 mg/kg
Application Route	: Ingestion
Exposure time	: 90 d
Method	: OECD Test Guideline 408
Remarks	: No toxicologically significant effects were found.

Species	: Mouse
NOAEL	: 100 mg/kg
Application Route	: Skin contact
Exposure time	: 90 d
Method	: OECD Test Guideline 411
Remarks	: No toxicologically significant effects were found.

**Silicon:**

Remarks	: No data available
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**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

**Aspiration toxicity**

Not classified due to lack of data.

**Components:****Silver Powder (particle diameter >100 nm <1mm):**

No aspiration toxicity classification

**Lead:**

No aspiration toxicity classification

**Bisphenol A-epichlorohydrin resin:**

No aspiration toxicity classification

**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**

No aspiration toxicity classification



**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

**2-(2-Butoxyethoxy)ethanol:**

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

**SECTION 12. ECOLOGICAL INFORMATION****Ecotoxicity****Components:****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

**Silver Powder (particle diameter >100 nm <1mm):**

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

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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.

**Lead:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 0.107 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 (Ceriodaphnia dubia (water flea)): 0.597 mg/l  
Exposure time: 48 h  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to algae/aquatic plants : NOEC (algae): 0.0227 mg/l  
Exposure time: 96 h  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): 0.02 mg/l  
Exposure time: 30 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.

**Bisphenol A-epichlorohydrin resin:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 1.2 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1.1 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : ErC50 (Scenedesmus capricornutum (fresh water algae)): > 11 mg/l  
Exposure time: 72 h

NOEC (Scenedesmus capricornutum (fresh water algae)): 4.2 mg/l

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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Exposure time: 72 h

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.3 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.

**Silicon:**

Toxicity to fish : Remarks: No data available

Toxicity to daphnia and other aquatic invertebrates : Remarks: No data available

Toxicity to algae/aquatic plants : Remarks: No data available

**Polyethylene oxide, mono(nonylphenyl) ether, branched, phosphate:**Toxicity to fish : LC50 (Danio rerio (zebra fish)): 81 mg/l  
Exposure time: 96 h**Ecotoxicology Assessment**

Acute aquatic toxicity : Harmful to aquatic life.

Chronic aquatic toxicity : Harmful 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 203Toxicity 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 201NOEC (Desmodesmus subspicatus (green algae)): > 100 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 201**Persistence and degradability****Components:****Terpineol:**

Biodegradability : Biodegradation: 80 %

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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Exposure time: 28 d  
Method: OECD Test Guideline 301  
Remarks: Readily biodegradable.

**Bisphenol A-epichlorohydrin resin:**

Biodegradability : Result: Not 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.

**Bioaccumulative potential****Components:****Terpineol:**

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

**Silver Powder (particle diameter >100 nm <1mm):**

Bioaccumulation : Remarks: Bioaccumulation is unlikely.  
Information given is based on data obtained from similar substances.

Partition coefficient: n-octanol/water : Remarks: Not applicable

**Bisphenol A-epichlorohydrin resin:**

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

**2-(2-Butoxyethoxy)ethanol:**

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 1 (68 °F / 20 °C)  
pH: 7

**Mobility in soil**

No data available

**Other adverse effects**

No data available

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**SECTION 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

**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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.

**SECTION 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 IMO instruments**

Not applicable for product as supplied.

**National Regulations****49 CFR**

Not regulated as a dangerous good

**Special precautions for user**

Remarks	: Regulated by DOT/49CFR as Combustible Liquid when transported in a bulk package ( $\geq 119$ gallons(450 litres))., Not regulated by DOT in non-bulk package. Marine Pollutants assigned UN number 3077 and 3082 in single or combination packaging containing a net quantity per
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**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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.

**SECTION 15. REGULATORY INFORMATION****SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

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

**SARA 311/312 Hazards** : Flammable (gases, aerosols, liquids, or solids)  
Respiratory or skin sensitisation  
Germ cell mutagenicity  
Carcinogenicity  
Reproductive toxicity  
Specific target organ toxicity (single or repeated exposure)  
Skin corrosion or irritation  
Serious eye damage or eye irritation

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

Silver Powder 7440-22-4  
(particle diameter  
>100 nm <1mm)

Lead 7439-92-1

2-(2-Butoxyethoxy)ethanol 112-34-5

**California Prop. 65**

WARNING: This product can expose you to chemicals including 1,4-Dioxane, Acetaldehyde, Lead, which is/are known to the State of California to cause cancer, and Lead, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**California Regulated Carcinogens**

Lead 7439-92-1

**TSCA list**

In compliance with TSCA-active Inventory requirements for commercial purposes.

## 0010K MICROMAX™ RESISTOR PASTE

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

## SECTION 16. OTHER INFORMATION

## Full text of other abbreviations

ACGIH	: USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	: ACGIH - Biological Exposure Indices (BEI)
NIOSH REL	: USA. NIOSH Recommended Exposure Limits
OSHA CARC	: OSHA Specifically Regulated Chemicals/Carcinogens
OSHA P0	: USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
OSHA Z-1	: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	: 8-hour, time-weighted average
NIOSH REL / TWA	: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA CARC / PEL	: Permissible exposure limit (PEL)
OSHA P0 / TWA	: 8-hour time weighted average
OSHA Z-1 / TWA	: 8-hour time weighted average

AIIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; 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

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**0010K MICROMAX™ RESISTOR PASTE**

Version	Revision Date:	SDS Number:	Date of last issue: 04-12-2024
8.0	06-27-2025	300000002587	Date of first issue: 01-29-2024

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Revision Date : 06-27-2025

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