

**SAFETY DATA SHEET**

This SDS complies with HazCom 2012 OSHA 29CFR 1910.1200

**Section 1: Chemical Product and Company Identification****1.1 Product identifiers**

PRODUCT NAMES: **X-23-7921-5**  
FORMULA: Preparation/Mixture

**1.2 Relevant identified uses of the substance or mixture and uses advised against**

PRODUCT USE: This product is used as a thermal interface material. For industrial use only.

**1.3 Details of the supplier of the safety data sheet****CHEMICAL SUPPLIER COMPANY NAME**

Shin-Etsu MicroSi, Inc.

10028 South 51<sup>st</sup> Street

Phoenix, AZ 85044

Safety Data Sheet Competent Person: [ehsteam@microsi.com](mailto:ehsteam@microsi.com)**Contact Information**

Information: (480) 893-8898

Fax: (480) 893-8637

Customer Service [cdteam@microsi.com](mailto:cdteam@microsi.com)

MANUFACTURER'S NAME: Shin-Etsu Chemical Co., Ltd.

ADDRESS: 4-1, Marunouchi 1-chome, Chiyoda-ku, Tokyo, 100-0005, Japan

TELEPHONE NUMBER: 81-3-6812-2400 Tokyo, Japan

81-25-545-5811 Niigata, Japan

31-20-662-1359 Shin Etsu International Europe B.V., Amsterdam, The Netherlands

**1.4 Emergency telephone number**

Chemtrec 24 hrs: 800-424-9300

Chemtrec International: 703-527-3887

**Section 2: Hazards Identification****2.1 Classification of the substance or mixture****Classification according to HazCom 2012**

Not classified as a hazardous substance or mixture.

**2.2 Label elements**

Not classified as a hazardous substance or mixture.

**2.3 Hazards not otherwise classified (HNOC)**

None.

&lt;10 % of mixture consists of ingredients of unknown acute toxicity.

**HAZARD CLASSIFICATION:**

Not Classified as Hazardous based on IMO, IATA, IMDG and DOT.

**FIRE AND EXPLOSION:**

Not considered flammable or combustible.

**NFPA Rating:**

Component	Health (Blue)	Flammability (Red)	Reactivity (Yellow)	Special (White)
X-23-7921-5	2	1	0	--

**Section 3: Composition / Information on Ingredients**

PRODUCT COMPOSITION	APPROX %	CAS NO.	EC/List No.
Aluminum	70 - 80	7429-90-5	231-072-3
Zinc Oxide**	15 - 25	1314-13-2	215-222-5

\*Some items on this SDS may be designated as trade secrets (TS). Bona fide requests for disclosure of trade secret information to medical personnel must be made in accordance with the provisions contained in 29 CFR 1910.1200 I 1-13.

\*\*Lead is a natural occurring impurity in zinc oxide and is not physically added during the manufacture of zinc oxide. The percentage of lead in this product is <0.001%.

## Section 4: First Aid Measures

### 4.1 Description of First Aid Measures

Inhalation:	Remove to fresh air. If not breathing, provide CPR (cardio pulmonary resuscitation) and get immediate medical attention.
Skin Contact:	Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing.
Eye Contact:	Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
Ingestion:	If swallowed do not induce vomiting, give large quantities of water to drink. Never give anything to an unconscious person. Get immediate medical attention.

### 4.2 Most important symptoms and effects, both acute and delayed

Ingestion:	No information available.
Inhalation:	No information available.
Skin Contact:	May cause skin irritation.
Eye Contact:	May cause eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

### 4.3 Indication of any immediate medical attention and special treatment needed

Symptoms may not appear immediately. In case of accident or if you feel unwell, seek medical advice immediately.

## Section 5: Fire-fighting Measures

### 5.1 Suitable extinguishing media

Use foam, dry chemical powder, carbon dioxide, or dry sand.

### 5.2 Special hazards arising from the substance or mixture

No data available.

### 5.3 Protective actions fire-fighters

Wear standard protective equipment and self-contained breathing apparatus for firefighting if necessary.

### 5.4 Further information

Use water spray to cool unopened containers.

## Section 6: Accidental Release Measures

### 6.1 Personal precautions, protective equipment, and emergency procedures

Wear proper personal protective equipment. For personal protection see section 8.

### 6.2 Environmental precautions

Prevent spilled material from entering sewers or waterways.

### 6.3 Methods and materials for containment and cleaning up

Use appropriate materials such as towels or wipes to clean up grease. Scrape up material and place in waste container. For disposal see section 13.

## Section 7: Handling and Storage

### 7.1 Precautions for safe handling

Wear proper protective equipment when handling this material.  
Avoid contact with skin, eyes, or clothing.  
Wash hands and face after handling this material.

## 7.2 Conditions for safe storage, including any incompatibilities

Store in a cool place at temperatures (32-85°F).  
Keep container closed when not in use.  
Keep away from heat and flame.  
Utilize chemical segregation.  
Follow all applicable local regulations for handling and storage.

## 7.3 Specific uses

This product is intended to aid in the thermal management of electronic devices. For industrial use only

# Section 8: Exposure Controls/Personal Protection

## 8.1 Control Parameters

PRODUCT COMPOSITION	ACGIH TLV (TWA)	OSHA PEL (TWA)	NIOSH REL (TWA)
Aluminum	1 mg/m <sup>3</sup> Respirable fraction (Excursion NTE 3x TLV)	15 mg/m <sup>3</sup> Total dust 5 mg/m <sup>3</sup> Respirable fraction	10 mg/m <sup>3</sup> Total dust 5mg/m <sup>3</sup> Respirable fraction
Zinc Oxide	2 mg/m <sup>3</sup> Respirable fraction	15 mg/m <sup>3</sup> Total dust 5 mg/m <sup>3</sup> Respirable fraction	5 mg/m <sup>3</sup> Total dust

## 8.2 Exposure Controls

Ventilation:

Always provide good general, mechanical room ventilation where this chemical is used.

Special Ventilation Controls:

Use this material inside totally enclosed equipment or use it with local exhaust ventilation at points where vapors can be released into the workspace air.

Respiratory Protection:

Use an NIOSH-approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Protective Gloves:

Wear chemical impervious gloves at all times while working with this product. Recommended glove types include: Laminate Film, Nitrile, or Tri-polymer. Check with your company's glove supplier to ensure chemical resistance.

Eye Protection:

Safety Glasses, chemical goggles, face shield.

Protective Clothing:

Wear suitable protective clothing to prevent skin contact.

Other Equipment:

Make safety shower, eyewash stations, and hand washing equipment available in the work area.

Work/Hygiene Practices:

Avoid breathing fumes. Avoid contact with eyes. Wash hands after handling.

# Section 9: Physical and Chemical Properties

	PRODUCT CRITERIA
APPEARANCE - COLOR:	Gray
PHYSICAL STATE:	Grease / Paste
ODOR:	Slight odor
ODOR THRESHOLD	No data available
pH	No data available
MELTING POINT/FREEZING POINT:	No data available
INITIAL BOILING POINT AND BOILING RANGE:	No data available
FLASH POINT:	> 212°F (150°C) Closed Cup
EVAPORATION RATE:	Negligible (Butyl acetate = 1)
FLAMMABILITY (Solid, gas)	Ignitable at high temperature
UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	Not measured
VAPOR PRESSURE	Negligible (25°C)
VAPOR DENSITY (AIR = 1)	No data available
RELATIVE DENSITY (25°C):	2.6
SOLUBILITY(IES)	Not soluble in water
OXIDIZING PROPERTIES	No data available



PARTITION COEFFICIENT: n-octanol/water	Not applicable
AUTO IGNITION TEMPERATURE	No data available
DECOMPOSITION TEMPERATURE	No data available
VISCOSITY	No data available

## Section 10: Stability and Reactivity

- 10.1 Reactivity:** No hazardous reaction known under normal conditions of use, storage and transport.
- 10.2 Chemical Stability:** Stable under recommended conditions.
- 10.3 Possibility of Hazardous Reactions:** Will not occur under normal temperatures and pressures.
- 10.4 Conditions to Avoid:** None
- 10.5 Incompatibility (Materials to Avoid):** Strong oxidizing agents.
- 10.6 Hazardous Decomposition Products:** Thermal breakdown of this product during fire or very high heat condition may evolve the following hazardous decomposition product: Carbon oxides and traces of incompletely burned carbon compounds, Silicon dioxide, Formaldehyde.

## Section 11: Toxicological Information

- 11.1 Likely routes of exposure**  
Inhalation, dermal, skin and eye contact.
- 11.2 Symptoms related to the physical, chemical and toxicological characteristics**  
May cause skin or eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness or swelling.
- 11.3 Delayed and immediate effects and also chronic effects from short- and long-term exposure**  
Symptoms may not appear immediately. In case of accident or if you feel unwell, seek medical advice immediately.

GHS Required Criteria	Toxicity Criteria	Toxicity Information	Comments	Chemical Constituent
Acute Toxicity	LD50 (Oral/Rat)	>15900 mg/kg	No mortality	Aluminum
	LC50 (Inhalation/Rat)	>10 mg/m <sup>3</sup>	Mild acute inflammatory response – No mortality	Aluminum
	LD50 (Oral/Mouse)	>5000 mg/kg	No mortality	Zinc Oxide
	LD50 (Oral/Rat)	>5000 mg/kg	No mortality	Zinc Oxide
	LC50 4 hours (Inhalation/Rat)	>5.7 mg/L	No mortality	Zinc Oxide
Skin Corrosion/Irritation	20 % w/v zinc oxide was found to be non-irritating to guinea-pig skin.			Zinc Oxide
Serious Eye Damage / Eye Irritation	50 µL bulk volume, 90 min exposure, 18 hr observation on human cornea tissue		Not irritating	Zinc Oxide
Respiratory or Skin Sensitization	Skin sensitization	Not sensitizing		Zinc Oxide
Germ Cell Mutagenicity	Bacterial reverse mutation assay was found to be non-mutagenic to <i>S. typhimurium</i> strains.			Zinc Oxide
Carcinogenicity	IARC	No data available.		
	NTP	No data available.		
	OSHA	No data available.		
Reproductive Toxicity	Not classifiable.			
STOT -- Single Exposure	Not classifiable.			
STOT -- Repeated Exposure	Not classifiable.			
Aspiration Hazard	No data available			

## Section 12: Ecological Information

Toxicity:	NOEC <i>Lepomis cyanellus</i> (Green Sunfish) > 50 mg/L, 96hr. – No Mortality	Aluminum
	LC50 <i>Ceriodaphnia dubia</i> (water flea) 5.7 - 52 µg/L @pH 6, depending on the hardness and dissolved organic carbon.	Aluminum
	LC50 <i>Danio rerio</i> (Zebrafish) = 3.31 mg/L, 96hr.	Zinc Oxide
	LC50 <i>Daphnia magna</i> (water flea) = 1.55 mg/L, 48hr.	Zinc Oxide
	72-hour EC50=0.17mg/L (zinc-oxide concentration equivalent: 0.21mg/L) of algae ( <i>Selenastrum</i> ) (EHC221, 2001)	Zinc Oxide
	EC/IC50: >100 mg/L. 72-hour Growth inhibition of Green Algae ( <i>Pseudokirchneriella subcapitata</i> )	Test data for X-23-7783D (Comparable product)
	EC/IC50: >100 mg/L. 48-hour Immobilization of <i>Daphnia magna</i>	Test data for X-23-7783D (Comparable product)
	LC50: >100 mg/L. 98-hour Survival of Rainbow Trout ( <i>Oncorhynchus Mykiss</i> )	X-23-7783D (Comparable product)
Persistence and degradability:	No data available.	
Bioaccumulative potential	No data available.	
Mobility in soil:	No data available.	
PBT and vPvB assessment:	PBT/vPvB assessment not available as chemical assessment not required/not conducted	
Other adverse effects:	No data available.	

Shin-Etsu MicroSi contracted with Maxxim Analytical Services on July 28, 2011, to conduct aquatic testing on a comparable Thermal Grease product. The results of the aquatic testing are included in the above table.

The acute toxicity/inhibition of Thermo Grease X-23-7783D (test item) to three aquatic organisms was assessed using the following methods:

OECD. 1984 and 2006. Alga and Cyanobacteria, Growth Inhibition Test. OECD Guidelines for Testing Chemicals. Section 2: Effects on Biotic System. Test Method 201.

OECD. 1992. Fish, Acute Toxicity Test. OECD Guidelines for Testing of Chemicals, Section 2: Effects on Biotic Systems. Test Method OECD 203.

OECD. 2004. *Daphnia* sp., Acute Immobilisation Test. OECD Guidelines for Testing of Chemicals, Section 2: Effects on Biotic Systems. Test Method OECD 202. (48-hr Immobilisation of *Daphnia magna*).

## Section 13: Disposal Considerations

**Waste from residues/unused products:** Recommend waste material be disposed of by using incineration. Follow the waste disposal requirements of your country, state, or local authorities.

**Contaminated packaging:** Contaminated packaging material should be disposed of as stated above for residues and unused product.

**Rinsate:** Do not dispose of rinse water containing product in a sanitary sewer system or stormwater drainage system.

## Section 14: Transport Information

14.1 – 14.5:

**Regulatory note:** Laboratory testing has confirmed that this product does not meet the criteria of an “Environmentally hazardous substance”, UN 3077. Upon request, the testing results will be provided. Also, reference Section 12.

**DOT TRANSPORT:** Not Regulated

**ADR: International Carriage of Dangerous Goods by Road** Not Regulated

**SEA TRANSPORT:** IMDG Not Regulated

**AIR TRANSPORT:** IATA/ICAO Not Regulated

**14.6 Special precautions for user:** Not applicable

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code: Not Applicable

## Section 15: Regulatory Information

### 15.1 Safety, health, and environmental regulations / legislation specific for the substance or mixture

#### TOXIC SUBSTANCES CONTROL ACT (TSCA) STATUS:

**This product is in compliance with all applicable rules and orders of TSCA. All components are listed on the TSCA Inventory.**

#### SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA) TITLE III SECTION 313 SUPPLIER NOTIFICATION:

This regulation requires submission of annual reports of toxic chemical(s) that appear in section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40 CFR 372.

The toxic chemicals contained in this product are: Aluminum

#### CALIFORNIA PROPOSITION 65:



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

Lead is a naturally occurring impurity in Zinc Oxide.

Lead: No Significant Risk Level (NSRL) for carcinogens = 15 µg/day (Oral)

Lead: Maximum Allowable Dose Level (MADL) for reproductive toxicants = 0.5 µg/day

#### STATE RIGHT-TO-KNOW TOXIC SUBSTANCE OR HAZARDOUS SUBSTANCE LIST:

Massachusetts:	Aluminum, Zinc Oxide
Minnesota:	Aluminum, Zinc Oxide
New Jersey:	Aluminum, Zinc Oxide
Pennsylvania:	Aluminum, Zinc Oxide

#### CANADA:

WHMIS-2015: This SDS is in compliance with WHMIS 2015 (HPR / new HPA).

#### WEEE CERTIFICATION: Waste Electrical and Electronic Equipment (WEEE), European Union Directive 2012/19/EU.

This product does not meet the criteria of the 10 categories of electrical and electronic equipment listed in Annex 1 of Directive 2012/19/EU. Shin-Etsu MicroSi hereby certifies that this product is exempt from WEEE. Packaging materials were not considered for this certification

#### RoHS CERTIFICATION:

Shin-Etsu MicroSi hereby certifies that this product complies with the RoHS Directive 2011/65/EU and Annex II of the RoHS Directive (2015/863/EU) that restricts the use of the ten listed chemicals. Packaging materials were not considered for this certification.

15.2 Chemical Safety assessment: Not applicable

## Section 16: Other Information

#### Abbreviation:

PEL = Permissible Exposure Limit

STOT = Specific Target Organ Toxicity

TLV = Threshold Limit Value

TWA = Time Weighted Average

Initial issue date: 20 November 2008

Final revision date: 1 November 2021

Revision Number: 10

Revision explanation: Updated to include manufacturer's new address and phone number.

Information Sources: RTECS, ECHA, REACH, NITE, TOXNET, OSHA 29CFR 1910.1200

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