Safety Data Sheet

National Institute of Advanced Industrial Science and Technology AIST

1. Identification of the Substance/Mixture and the Supplier

Supplier : National Institute of Advanced Industrial Science and Technology (AIST)
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Identity of Substance/Mixture : Certified reference material: NMIJ CRM 8202-a
Lead-Free Solder Chip (Sn96.5Ag3Cu0.5)-Pb Low Concentration

Recommended Use of the Chemical and Restriction on Use : This certified reference material (CRM) is intended for use in controlling the precision of analysis or for confirming the validity of analytical methods or instruments during the quantitative determination of Pb, Ag, and Cu in a tin-based lead-free solder containing Ag and Cu. Do not use this reference material for other purposes than testing/research.

2. Hazards Identification

GHS Classification :

Skin Sensitization	:	Hazard Category 1
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	:	Hazard Category 2 (Respiratory system)
Specific Target Organ Toxicity/Systemic Toxicity (Repeated Exposure)	:	Hazard Category 1 (Lung) Hazard Category 2 (Eye & Respiratory organ)

GHS Label Element:

Signal Word : Danger

Hazards Statement :
May cause an allergic skin reaction
May cause damage to organ (respiratory system)
Causes damage to organ (lung) through prolonged or repeated exposure
May cause damage to organ (eye & respiratory organ) through prolonged or repeated exposure

Other Hazards : -

Statement

Precautionary Statement : ［Precaution］
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Avoid breathing dust/fume/gas/mist/vapors/spray.
Wear protective gloves.
［Action］
If on skin: Wash with plenty of soap and water.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.
If skin irritation or rash occurs: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.

［Storage］
This CRM should be stored in clean and dry place at room temperature (15 °C to 35 °C) and shielded from direct light.
［Disposal］
Dispose of this reference material in accordance with applicable legislation and local government ordinance.
Entrust disposal of this reference material to a professional waste disposal company licensed by prefectural governor.

The other hazards than the above do not result in classification or are not classifiable.

3. Composition/Information on Ingredients

Substance/Mixture : Mixture(alloy)
Name : Solder

Ingredient 1
Chemical name : Tin
Chemical formula : Sn
Molecular weight : 118.71
CAS number : 7440-31-5
Content : Ca. 96.5 %
Reference Number in Gazetted List in Japan : Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : -
Industrial Safety and Health Act : -

Ingredient 2
Chemical name : Silver
Chemical formula : Ag
Molecular weight : -
CAS number : 7440-22-4

Content	:	Ca. 3 %
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : - Industrial Safety and Health Act : -

Ingredient 3

Chemical name	:	Copper
Chemical formula	:	Cu
Molecular weight	:	-
CAS number	:	7440-50-8
Content	:	Ca. 0.5 %
Reference Number in Gazetted List in Japan	:	Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. : - Industrial Safety and Health Act : -

※Elements below are minor components contained.

Component・content	:	Lead (Pb) : Ca. 200 mg/kg Antimony (Sb) : Ca. 1.4 mg/kg Bismuth (Bi) : Ca. 0.7 mg/kg Indium (In) : Ca. 0.5 mg/kg
Hazadous substance	:	Tin, Silver, Copper

4. First-aid Measures

If in Eyes	:	Rinse cautiously with clean water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention when feeling unwell.
If on Skin	:	Remove/Take off contaminated clothing, etc. Rinse thoroughly with clean water. Get medical advice/attention when feeling unwell.
If Inhaled	:	Remove victim to fresh air and gargle, then keep at rest and warm. Get medical advice/attention.
If Ingested	:	Rinse mouth thoroughly with water. Drink a lot of water then it induces vomiting. Immediately call a physician.
Measures to be taken to protect the person applying first aid	:	Use personal protective equipment.

5. Fire-fighting Measures

Extinguishing Media	:	Use a general fire extinguishing agent. However, the water injection prohibited if the solder is melted.
Fire-Specific Hazards	:	In the case of fire, irritating or toxic fume (or gas) may be generated.
Specific Fire-Fighting	:	Eliminate ignition sources at the origin of a fire and put out fire

Method		by using extinguishing media. Remove movable containers promptly to a safe place. In the case of immovable containers, cool their surroundings with sprayed water.
Protection of Fire-Fighters	:	Carry out fire-fighting from the windward in order to avoid breathing hazardous gas. Use personal protective equipment such as fire protection clothing, heat-resistant clothing, protective clothing, breathing apparatus, circulating oxygen respirator, rubber gloves, and rubber boots.

6. Accidental Release Measures

Personal Precaution	:	Use appropriate personal protective equipment during the operation to avoid contact with skin, eyes, and clothes.
Personal Protective Equipment and Emergency Procedures	:	Ventilate the affected areas thoroughly, if it is in an indoor environment, until the clean-up operation is completed. Use appropriate personal protective equipment during the operation to avoid skin contact of splash etc. and inhalation of dust and gas.
Environmental Precautions	:	Take precautions to prevent spillage from draining into rivers etc. to adversely impact the environment. Make it sure to appropriately treat contaminated wastewater in order to prevent untreated wastewater from being released into the surrounding environment.
Recovery and Neutralization	:	Collect spillage in empty containers by getting it adsorbed to wiping cloth, rag or earth and sand, etc. Then neutralize with slaked lime or soda ash, and wash away with a large amount of water.
Prevention of Secondary Disaster	:	Mark the restricted area with rope etc. to keep out unauthorized people. Carry out the clean-up operation from the windward and make people on the leeward side evacuate.

7. Handling and Storage

Handling

Engineering Precautions	:	Avoid direct contact with human body. Use appropriate personal protective equipment to avoid inhalation and contact with eyes and skin. Strict ban on fire. Keep away from fire, water, acid, hot surfaces, sparks and oxidizing agent. Avoid the hot and humid environment.
Local and General Ventilation	:	When dust is generated, seal the source, and provide local exhaust ventilation or central ventilation.
Engineering Precautions	:	Avoid direct contact with human body. Use appropriate personal protective equipment to avoid inhalation and contact with eyes and skin. Strict ban on fire. Keep away from fire, water, acid, hot surfaces,

sparks and oxidizing agent.
Avoid the hot and humid environment.

Storage

Appropriate Storage Conditions : ・This CRM should be stored in clean and dry place at room temperature (15 °C to 35 °C) and shielded from direct light.

Safe Container Packaging Material : Plastic case

8. Exposure Controls/Personal Protection

Safety management notes

・Not specified

Permissible Concentration

・ACGIH TLV-TWA（2000）	Sn : 2 mg/m^3 Ag : 0.1 mg/m^3 Cu : 0.2 mg/m^3(fume), 1 mg/m^3(dusts and mists)
・Values recommended by Japan Society for Occupational Health (2000)	Ag : 0.01 mg/m^3
・OSHA PEL TWA	Sn : 8H TWA , 2 mg/m^3 Ag : 0.01 mg/m^3 Cu : 8H TWA , 0.1 mg/m^3(fume) 8H TWA , 1 mg/m^3(dusts and mists)

Facility engineering : Keep container tightly closed and install local ventilation system when dust is generated. Install facilities to rinse eyes and to wash hands and body in the vicinity of a place handling this reference material and label them.

Personal Protective equipment

Respiratory protection : Protective gas masks, and self-contained compressed air breathing apparatus,

Hands : Protective gloves

Eyes : Protective glasses

Skin and Body : Protective clothing (long-sleeved work clothes), protection boots, protective clothing, etc.

9. Physical and Chemical Properties

・Appearance, etc.	: Solid (chip)
・Color	: Silver gray
・Odor	: No data
・pH	: No data
・Melting point	: 220 °C
・Boiling point	: No data
・Flashing point	: No data
・Explosive range	: No data
・Vapor pressure	: No data

・Relative vapor density(Air=1)	:	No data
・Specific gravity	:	7.2 g/cm^3
・Solubility	:	Insoluble in water
・*n*-Octanol/water partition coefficient (Log Po/w)	:	No data
・Auto-ignition temperature	:	No data

10. Stability and Reactivity

◇Stability
・Stable in normal conditions
◇Reactivity
・Reactivity is low.
◇Conditions to Avoid
・Sunlight, Heat, contact with water or oxidizing agent
◇Hazardous Decomposition Products
・No- data

11. Toxicological Information

Acute Toxicity

	<Tin>	Unreported-human TDLo:250 mg/kg(RTECS) Implant-rat TDLo:395 mg/kg(RTECS)
	<Silver>	Oral Mouse LD : >10 mg/kg(RTECS) Oral Guinea pig LD : >5 mg/kg(RTECS)
	<Copper>	Abdominal cavity Mouse LD50 : 0.07 mg/kg(RTECS)
Serious Eye Damage/ Eye Irritation	<Silver>	In the tests using rabbits, mild irritation was observed and it disappeared in 48 hours (IUCLID (2000)). (Category 2B)
Skin Sensitization	<Silver>	Exposure to silver powder caused allergic contact dermatitis (ACGIH (2001)). Contact with an accessary containing silver caused allergic skin reaction (PATTY (5th (2001)). The silver is categorized as Category 1 as it contains 3% of Category 1 silver.
Specific Target Organ Toxicity/Systemic Toxicity (Single Exposure)	<Silver>	The four-hour exposure to heated metallic silver fume caused damage to lung accompanying pulmonary edema (ACGIH (2001)). Occupational exposure to silver dust caused respiratory tract irritation (ATSDR ToxFAQs (1997)). The silver is categorized as Category 2 as it contains 3% of Category 1 (respiratory system) silver.
Specific Target Organ Toxicity/Systemic Toxicity		Data in EHC15 indicated pneumoconiosis in the workers

(Repeated Exposure) <Tin> breathing metallic tin.
The tin is categorized as Category 1 as it contains 96.5% of Category 1 (lung) tin.

<Silver> Occupational exposure to silver powder caused argyria in which pigment deposited in skin and mucous membrane (ACGIH (2001) and PATTY (5th (2001)), but night-time vision deterioration occurred as a functional disorder (ATSDR ToxFAQs (1997)).
Silver deposition in lung due to prolonged inhalation of silver dust caused bronchitis (PATTY (5th (2001) and HSDB (2003)).
The silver is categorized as Category 2 as it contains 3% of Category 1 (eye and respiratory organ) silver.

12. Ecological Information

Degradability, concentration
・No-data
Bioaccumulative Potential
・No-data
Ecotoxicity
＜Copper＞
There is a data "LC50≦100mg/L" for copper metal, but behavior of this CRM in water is unknown. (Category 4)

13. Disposal Considerations

・Dispose of this reference material in accordance with applicable legislation and local government ordinance.
・When the above-mentioned treatments are not possible, entrust disposal of residual waste to a professional waste disposal company licensed by prefectural governor.
・Dispose of containers after thoroughly removing their contents.

14. Transport Information

UN Number	:	-
UN Classification	:	-
Material name	:	-
Container grade	:	-
ICAO/IATA	:	-
Marine pollutant	:	N/A
Precautions	:	Avoid direct sunlight and transfer with care not to spill/leak by dropping or falling, etc.

15. Regulatory Information

◇Industrial Safety and Health Act
・Article 57-2 (Enforcement Order: Article 18) Hazardous substance whose name, etc.

must be labeled.

- Article 57-2 (Enforcement Order: Article 18-2) Hazardous substance whose name, etc. must be notified（No.322、No.137、No.379）

◇Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR system Pollutant Release and Transfer Register)

- Class 1 Designated chemical substances（No.82）

16. Other Information

Other

The information in this document is not intended to be exhaustive and is based on currently available information and data. The measures given in this document are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety measures appropriate to each specific application and context of use. This document is intended to provide information and not intended to guarantee anything in handling this reference material.