This product (wrought copper and copper alloy) are solid metal products, and the obligation to submit MSDS documents according to the Japanese Pollutant Release and Transfer Register (PRTR) law and the Japanese Industrial Safety and Health Law (for chemical substances) does not apply.

1. Chemical product and company identification

1-1. Name of chemical substance (Product Name): See table below.

Alloy Group	Corresponding JIS No.	Alloy Name	Alloy No.	Shape	Substance Classification
Cu-Sn-Ni Group	-	Phosphor bronze	FX510	Bar Wire	Mixture (alloy)
Cu-Sn-Ni-Pb Group		Free-cutting Phosphor bronze	FX403	Bar	

1-2. Company information

Company name: Fujii manufacturing Co.,Ltd.

Address: 157-8 Naka Shiroi-shi, Chiba (Postal code 〒270-1406)

Department:Technical development department

Supervisors:AKIO SHIMIZU (Position: department director)

Tel:047-491-0241 , Fax:047-491-0247

[Creation date: February 08, 2023]

2. Hazards identification

This product (wrought copper and copper alloy) is a molded product, and so is outside the scope of GHS classification. Further, as there is no alloy information, GHS classification information in units of the configuration elements are referenced for the description.

2-1. Copper : GHS Classification

Physical hazards:

Explosives:	Outside scope of classification
Flammable gases:	Outside scope of classification
Flammable aerosols:	Outside scope of classification
Oxidizing gases:	Outside scope of classification
Gases under pressure:	Outside scope of classification
Flammable liquids:	Outside scope of classification

	Flammable solids:	Cannot classify
	Self-reactive substances and mixtures:	Outside scope of classification
	Pyrophoric liquids:	Outside scope of classification
	Pyrophoric solids:	Cannot classify
	Self-heating substances and mixtures:	Cannot classify
	Substances and mixtures which, in contact with water, emit flammable gases:	Cannot classify
	Oxidizing liquids:	Outside scope of classification
	Oxidizing solids:	Outside scope of classification
	Organic peroxides:	Outside scope of classification
	Corrosive to metals:	Cannot classify
Health hazards:		
	Acute toxicity (oral):	Cannot classify
	Acute toxicity (dermal):	Cannot classify
	Acute toxicity (inhalation: gases):	Outside scope of classification
	Acute toxicity (inhalation: vapors):	Outside scope of classification
	Acute toxicity (inhalation: dusts):	Cannot classify
	Acute toxicity (inhalation: mists):	Cannot classify
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Cannot classify
	Germ cell mutagenicity:	Cannot classify
	Carcinogenicity:	Outside classification
	Reproductive toxicity:	Cannot classify
	Specific target organ toxicity - single exposure:	Class 3 (airway irritant)
	Specific target organ toxicity - repeated exposure:	Class 1 (liver)
	Aspiration hazard:	Cannot classify
Environmental hazards:	Acute aquatic toxicity:	Cannot classify
	Chronic aquatic toxicity:	Class 4

Label elements

Pictgram

Signal word: Danger

Hazard statement: Risk of irritation to respiratory organs

Nerve damage due to long-term or repeated exposure

Risk of harm due to long-term effects

Precautionary statement: [Prevention]

Do not inhale the dust.

Avoid discharging into the environment.

[Response]

If inhaled, move to a location with fresh air, and rest in a posture that facilitates breathing.

If feeling unwell, consult a physician to receive diagnosis and treatment.

[Disposal]

Recycling is possible, so if recovering and discarding, entrust the work to a waste disposal specialist who is licensed by the prefectural governor.

2-2. Tin: GHS Classification

Physical hazards:

Explosives:	Outside scope of classification
Flammable gases:	Outside scope of classification
Flammable aerosols:	Outside scope of classification
Oxidizing gases:	Outside scope of classification
Gases under pressure:	Outside scope of classification
Flammable liquids:	Outside scope of classification
Flammable solids:	Cannot classify
Self-reactive substances and mixtures:	Outside scope of classification
Pyrophoric liquids:	Outside scope of classification
Pyrophoric solids:	Cannot classify
Self-heating substances and mixtures:	Cannot classify
Substances and mixtures which, in contact with water, emit flammable gases:	Cannot classify
Oxidizing liquids:	Outside scope of classification
Oxidizing solids:	Outside scope of classification
Organic peroxides:	Outside scope of classification
corrosive to metals:	Cannot classify

Health hazards:

Acute toxicity (oral):	Cannot classify
Acute toxicity (dermal):	Cannot classify

	Acute toxicity (inhalation: gases):	Outside scope of classification
	Acute toxicity (inhalation: vapors):	Cannot classify
	Acute toxicity (inhalation: dusts):	Cannot classify
	Acute toxicity (inhalation: mists):	Outside scope of classification
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Cannot classify
	Germ cell mutagenicity:	Cannot classify
	Carcinogenicity:	Cannot classify
	Reproductive toxicity:	Cannot classify
	Specific target organ toxicity - single exposure:	Class 1 (respiratory organs)
	Specific target organ toxicity - repeated exposure:	Class 1 (respiratory organs)
	Aspiration hazard:	Cannot classify
Environmental hazards:	Acute aquatic toxicity:	Cannot classify
	Chronic aquatic toxicity:	Cannot classify

Label element

Pictogram

Signal word: Danger

Hazard statement: Organ damage (lungs)

Precautionary statement: [Prevention]

When using the product, do not eat, drink, or smoke.

Use suitable protective equipment and ventilation equipment to avoid exposure.

Do not inhale the dust.

[Response]

If exposed or fear exposure, consult a physician and receive diagnosis treatment.

If feeling unwell, consult a physician and receive treatment.

[Storage]

Lock the storage location.

[Disposal]

Entrust disposal of containers and contents to a specialist disposal processor who is licensed by the prefectural governor.

2-3. Lead: GHS Classification

Physical hazards:		
	Explosives:	Outside scope of classification
	Flammable gases:	Outside scope of classification
	Flammable aerosols:	Outside scope of classification
	Oxidizing gases:	Outside scope of classification
	Gases under pressure:	Outside scope of classification
	Flammable liquids:	Outside scope of classification
	Flammable solids:	Outside classification
	Self-reactive substances and mixtures:	Outside scope of classification
	Pyrophoric liquids:	Outside scope of classification
	Pyrophoric solids:	Outside classification
	Self-heating substances and mixtures:	Outside classification
	Substances and mixtures which, in contact with water, emit flammable gases:	Outside classification
	Oxidizing liquids:	Outside scope of classification
	Oxidizing solids:	Outside scope of classification
	Organic peroxides:	Outside scope of classification
	Corrosive to metals:	Cannot classify
Health hazards:	Acute toxicity (oral):	Cannot classify
	Acute toxicity (dermal):	Cannot classify
	Acute toxicity (inhalation: gases):	Outside scope of classification
	Acute toxicity (inhalation: vapors):	Outside scope of classification
	Acute toxicity (inhalation: dusts):	Cannot classify
	Acute toxicity (inhalation: mists):	Cannot classify
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Cannot classify
	Germ cell mutagenicity:	Class 2
	Carcinogenicity:	Class 2
	Reproductive toxicity:	Class 1A
	Specific target organ toxicity - single exposure:	Cannot classify
	Specific target organ toxicity - repeated exposure:	

		Class 1 (Hematopoietic system, central nervous system, peripheral nervous system, cardiovascular system, immune system)
	Aspiration hazard:	Cannot classify
Environmental hazards:	Acute aquatic toxicity:	Cannot classify
	Chronic aquatic toxicity:	Cannot classify

Label element

Pictogram

Signal word: Danger

Hazard statement: Suspected risk of genetic disease

Suspected risk of cancer

Risk of malign influence on reproductive functions or fetus

Damage to the hematopoietic system, kidneys, central nervous system, peripheral nervous system, cardiovascular system, and immune system due to long-term or repeated exposure

Precautionary statement: [Prevention]

When using the product, do not eat, drink, or smoke.

Use suitable protective equipment and ventilation equipment to avoid exposure.

Do not inhale the dust.

Wash hands thoroughly after handling.

Avoid discharging into the environment.

[Response]

If exposed or fear exposure, consult a physician and receive diagnosis treatment.

If feeling unwell, consult a physician and receive treatment.

[Storage]

Lock the storage location.

[Disposal]

Entrust disposal of containers and contents to a specialist disposal processor who is licensed by the prefectural governor.

2-4. Nickel: GHS Classification

Physical hazards:

Explosives:	Outside scope of classification
Flammable gases:	Outside scope of classification
Flammable aerosols:	Outside scope of classification
Oxidizing gases:	Outside scope of classification
Gases under pressure:	Outside scope of classification
Flammable liquids:	Outside scope of classification
Flammable solids:	Cannot classify
Self-reactive substances and mixtures:	Outside scope of classification
Pyrophoric liquids:	Outside scope of classification
Pyrophoric solids:	Cannot classify
Self-heating substances and mixtures:	Cannot classify
Substances and mixtures which, in contact with water, emit flammable gases:	Cannot classify
Oxidizing liquids:	Outside scope of classification
Oxidizing solids:	Outside scope of classification
Organic peroxides:	Outside scope of classification
corrosive to metals:	Cannot classify

Health hazards:

Acute toxicity (oral):	Outside classification
Acute toxicity (dermal):	Cannot classify
Acute toxicity (inhalation: gases):	Outside scope of classification
Acute toxicity (inhalation: vapors):	Cannot classify
Acute toxicity (inhalation: dusts):	Cannot classify
Acute toxicity (inhalation: mists):	Cannot classify
Skin corrosion/irritation:	Class 3
Serious eye damage/eye irritation:	Class 2B
Respiratory sensitization:	Cannot classify
Germ cell mutagenicity:	Cannot classify
Carcinogenicity:	Outside classification
Reproductive toxicity:	Class 1B
Specific target organ toxicity - single exposure:	Class 1 (respiratory organs)
Specific target organ toxicity - repeated exposure:	Class 1 (respiratory organs and nervous system)
Aspiration hazard:	Cannot classify

Environmental hazards: Acute aquatic toxicity: Cannot classify

Chronic aquatic toxicity: Class 4

Label elements

Pictogram

Signal word: Danger

Hazard statement: Inhalation risks causing allergies, asthma, or breathing difficulties

Risk of causing allergic skin reaction

Suspected risk of cancer

Damage to respiratory organs and kidneys

Respiratory organ damage due to long-term or repeated exposure

Risk of harm to aquatic life forms due to long-term effects

Precautionary statement: [Prevention]

Wear suitable protective gloves, goggles, and face masks.

When using the product, do not eat, drink, or smoke.

Wash hands thoroughly after handling.

If there is insufficient ventilation, wear suitable protective equipment for respiration.

Wear suitable personal protective equipment.

Avoid discharging into the environment.

Do not remove contaminated clothing from the worksite.

Do not inhale dust, vapor, fumes, or spray.

[Response]

If the substance adheres to the skin, wash using copious amounts of soap and water.

Wash contaminated clothing before reuse.

If there is adhesion to skin, and if skin irritation or rash occurs, consult a physician for diagnosis and treatment.

If inhaled, and respiration is difficult, move to a location with fresh air, and rest in a posture that facilitates respiration.

If inhaled, or if respiratory symptoms manifest, contact a physician.

If exposed or fear exposure, consult a physician and receive diagnosis treatment.

If exposed, consult a physician.

If feeling unwell, consult a physician and receive treatment.

[Storage]

Lock the storage location.

[Disposal]

Entrust disposal of containers and contents to a specialist disposal processor who is licensed by the prefectural governor.

3. Composition/information on ingredients

3-1. Substance or mixtures: Mixture (alloy)

3-2. Chemical name: See “1-1 Name of chemical substance”

Chemical composition: See the table below

3-3. Chemical formula or structural formula: None

3-4. Ordinance No. (PRTR Law and Industrial Safety and Health Law): See the table below

3-5. CAS No.: See the table below

3-6. Official publication reference No.: N/A

3.2. Elements	3.2 Composition (mass%)		3.4 Ordinance No.(management No.) (Only Substances Subject to MSDS Publication)				3.5. CAS No.
	FX510	FX403	PRTR Law		Industrial Safety and Health Law		
			0.1% max	1% max	0.1% max	1% max	
Copper (Cu)	---	---	---	---	379	---	7440-50-8
Nickel(Ni)	0.5-1.5	0.5-1.5	---	1-354(308)	418	---	7440-02-0
Tin(Sn)	7.0-9.0	7.0-9.0	---	---	322	---	7440-31-5
Phosphorus(P)	0.03-0.35	0.03-0.35	---	---	---	---	7723-14-0
Lead (Pb)	---	0.2-1.0	---	1-304(697)	411	---	7439-92-1

4. First-aid measures

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

4-1.Copper

If inhaled: Move the victim to a location with fresh air, and make sure they rest in a pose that facilitates respiration.

If feeling unwell, consult a physician and receive treatment.

If on skin: Remove contaminated clothing.

Wash skin promptly.

If feeling unwell, consult a physician and receive treatment.

Wash contaminated clothing before reuse.

If in eyes: Irrigate carefully for several minutes with water. Next, if wearing contact lenses that can be removed easily, remove the contact lenses. Thereafter, continue to wash.

Consult a physician and receive treatment.

If swallowed: Rise out the mouth promptly, and immediately consult a physician for treatment.

Anticipated acute effects and anticipated delayed effects:

If inhaled: Eye and skin reddening, eye pain, cough, headache, shortness of breath, pharyngeal pain, stomach pain, nausea, and vomiting. Delayed symptom: Metal fume fever.

Protection for first-aid providers:

First-aid providers must wear protective equipment appropriate for the circumstances.

Special notes to an attending physician:

Rest and medical observation over time are indispensable.

4-2. Tin

If inhaled: Move the victim to a location with fresh air, and make sure they rest in a pose that facilitates respiration.

Seek medical advice.

If on skin: Wash skin promptly.

Seek medical advice.

Wash the contaminated clothes before reusing.

If in eyes: Wash the eyes carefully with water for a few minutes.

Seek medical advice.

Special measures (If emergency treatment is required, refer to the supplementary first-aid instructions)

If swallowed: Rinse mouth with water.

Seek medical advice.

Special measures (If emergency treatment is required, refer to the supplementary first-aid instructions)

Anticipated acute effects and anticipated delayed effects:

If inhaled: Vapor and mist irritate the lungs and upper trachea.

If on skin: Irritates the skin

If in eyes: Irritates the mucosa.

4-3. Lead

If inhaled: Move the victim to a location with fresh air, and make sure they rest in a pose that facilitates respiration.

If feeling unwell, consult a physician and receive treatment.

If on skin: Remove contaminated clothing.

Wash skin promptly.

If feeling unwell, consult a physician and receive treatment.

Wash contaminated clothing before reuse.

If in eyes: Irrigate carefully for several minutes with water. Next, if wearing contact lenses that can be removed easily, remove the contact lenses. Thereafter, continue to wash.

Consult a physician and receive treatment.

If swallowed: Rise out the mouth promptly, and immediately consult a physician for treatment.

Anticipated acute effects and anticipated delayed effects:

Stomach cramps, drowsiness, headache, nausea, vomiting, fatigue, wheezing, pallor, hemoglobinuria, and lethargy

Most important signs and symptoms: No description.

Protection for first-aid providers:

First-aid providers must wear protective equipment appropriate for the circumstances.

Special notes to an attending physician:

Rest and medical observation over time are indispensable.

4-4. Nickel

If inhaled: Move the victim to a location with fresh air, and make sure they rest in a pose that facilitates respiration.

If feeling unwell, consult a physician and receive treatment.

Adhesion to skin: Remove contaminated clothing.

Wash skin promptly.

Wash away using large quantities of soap and water.

Consult a physician and receive treatment.

If in eyes: Irrigate carefully for several minutes with water. Next, if wearing contact lenses that can be removed easily, remove the contact lenses. Thereafter, continue to wash.

Consult a physician and receive treatment.

If swallowed: Rise out the mouth promptly, and immediately consult a physician for treatment.

Anticipated acute effects and anticipated delayed effects: :

No data.

Most important signs and symptoms :

No data.

Protection for first-aid providers :

No data.

Special notes to an attending physician:

No data.

5. Fire-fighting measures

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

5-1. Copper

Extinguishing media: Special powder retardants and dry sand.

Unsuitable extinguishing media:

Water jet, foam extinguisher, and CO_2.

Specific hazards: There is a risk of irritant, poisonous, or corrosive gas or fumes being emitted by fire.

Using water on metal fires may emit hydrogen gas.

Specific extinguishing methods: Move the container from the region on fire if there is no danger.

Ideally, sealant methods and oxygen starvation methods should be used for metal fires.

Protection of firefighters: When firefighting, wear suitable breathing equipment and (heat-resistant) chemical protective clothing.

5-2. Tin

Extinguishing media: Special powder retardants and dry sand.

Unsuitable extinguishing media:

Use of other extinguishers is prohibited.

Specific hazards: The substance is flammable.

If the substance is in powder form, the dust may cause an explosion.

Reacts with strong oxidizers.

Specific extinguishing methods:

Fire should be extinguished from a distance and only close enough for effective fire fighting.

Move the container from the region on fire if there is no danger.

If the containers are not movable, cool the container by pouring water on and around the containers.

After the fire is extinguished, continue to pour a large amount of water to cool the containers sufficiently.

Protection of firefighters: When firefighting, wear suitable breathing equipment and (heat-resistant) chemical protective clothing.

5-3. Lead

Extinguishing media: The product itself is not flammable.

Unsuitable extinguishing media:

Rod infusers, foam extinguisher, and CO_2.

Specific hazards: There is a risk of irritant or poisonous gas being emitted due to fire.

Specific extinguishing methods:

Move the container from the region on fire if there is no danger.

Protection of firefighters: When firefighting, wear suitable breathing equipment and (heat-resistant) chemical protective clothing.

5-4. Nickel

Extinguishing media: Water mist, foam retardant, powder retardant, carbon gas, dry sands.

Unsuitable extinguishing media:

Water jet.

Specific hazards: The substance is not flammable and will not itself burn, but heating may cause degradation and emit corrosive and/or poisonous mist.

Metal nickel is stabilized against oxidation using an ordinary oxidation membrane, but a fresh metal surface without an oxidation membrane will be rapidly oxidized by the air. Consequently, there is a risk that freshly powdered metal nickel will ignite upon contact with air.

Specific extinguishing methods:

Move the container from the region on fire if there is no danger.

Protection of firefighters: Wear suitable respiratory equipment and (flame-resistant) protective clothing.

6. Accidental release measures

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

6-1. Copper

Personnel precautions, protective equipment, and emergency procedures:

Prohibit admission to all non-essential personnel.

Do not touch or walk through any leaking material.

Workers must wear protective equipment (See “8. Exposure Prevention and Protection Measures”), avoid gas and fume inhalation, and contact with the eyes and skin.

Environmental precautions:

Be careful not to discharge into rivers, or to affect the environment.

Recovery and neutralization:

Sweep together any spills and collect in a sealable container before discarding.

Methods and materials for containment and methods for cleaning up:

Stop the leak if there is no danger.

Secondary disaster prevention measures:

Promptly remove all ignition sources and flammable substances. (Smoking, fireworks, and naked flames in the vicinity are prohibited.) Prevent inflow to drainage ditches, sewers, basements, or sealed locations.

6-2. Tin

Physical precautions protective equipment and emergency procedures:

Do not touch or walk through any leaking material.

Immediately move to a suitable distance in all directions as a leakage area.

Prohibit admission to all non-essential personnel.

Workers must wear protective equipment (See “8. Exposure Prevention and Protection Measures”), avoid gas and fume inhalation, and contact with the eyes and skin.

If fire is not occurring with the spillage, wear highly sealed and no-permeable protective clothing.

Stay on the windward side.

Keep away from low grounds.

Broken containers or the spillage must not be touched without wearing appropriate protective clothing.

Environmental precautions:

Be careful not to discharge into rivers, or to affect the environment.

Recovery and neutralization:

If the amount of spillage is small, collect the spillage into a dry, clean container using a clean antistatic equipment, cover the top loosely, and dispose of it afterwards.

If there is a large amount of spillage, wet with water and set up protective fences, then dispose of it afterwards.

Methods and materials for containment, cleaning up:

Stop the leak if there is no danger.

Secondary disaster prevention measures:

Promptly remove all ignition sources and flammable substances. (Smoking, fireworks, and naked flames in the vicinity are prohibited.)

Residue on the floor risks slipping, so process assiduously.

6-3. Lead

Physical precautions protective equipment, and emergency procedures:

Prohibit admission to all non-essential personnel.

Do not touch or walk through any leaking material.

Workers must wear protective equipment (See “8. Exposure Prevention and Protection Measures”), avoid gas and fume inhalation, and contact with the eyes and skin.

Environmental precautions:

Be careful not to discharge into rivers, or to affect the environment.

Recovery and neutralization:

Wipe up any leaks and collect in a sealable empty container before implementing disposal processing.

Methods and materials for containment, cleaning up:

Stop the leak if there is no danger.

Secondary disaster prevention measures:

Residue on the floor risks slipping, so process assiduously.

6-4. Nickel

Personnel precautions, protective equipment, and emergency procedures:

Remove all ignition sources.

Prohibit admission to all non-essential personnel.

Ventilate before entering a sealed location.

Environmental precautions:

Do not discharge into the environment.

Be careful not to discharge into rivers, or to affect the environment.

Recovery and neutralization:

Wipe up any leaks and collect in an empty container before implementing disposal processing.

Methods and materials for containment and methods for cleaning up:

Dampen with water, and reduce airborne dust to prevent dispersal.

Secondary disaster prevention measures:

Cover with a plastic sheet to prevent dispersal.

7. Handling and storage

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

7-1. Copper

<Handling>

Technical measures: Install equipment measures as described in “8. Exposure controls and personal protection”, and wear protective equipment.

Local / total ventilation: Implement local ventilation and total ventilation as described in “8. Exposure controls and personal protection ”.

Precautions for safe handling:

Conforming to “2. Hazards identification”.

Prevention of contact: Refer to “10. Stability and Reactivity”.

<Storage>

Incompatible materials: Refer to “10. Stability and Reactivity”.

Storage conditions: Avoid locations with sudden temperature changes and high humidity when storing.

7-2. Tin

<Handling>

Technical measures: Install equipment measures as described in “8. Exposure controls and personal protection”, and wear protective equipment.

Local / total ventilation: Implement local ventilation and total ventilation as described in “8. Exposure controls and personal protection ”.

Precautions for safe handling:

Conforming to “2. Hazards identification”.

Prevention of contact: Refer to “10. Stability and Reactivity”.

<Storage>

Technical measures: The walls pillars, and floors of the storage location must be fireproof, and beams are to be made of noncombustible materials.

The roof of the storage location must be made noncombustible materials and covered with light noncombustible materials, such as metal sheets.

The storage location must not have ceilings.

The floor of storage location must be built to avoid flowing in of water or permeation of water.

Storage location must be equipped with lighting, illumination, and ventilation facility necessary for the storage and handling of dangerous goods.

Incompatible materials: Refer to “10. Stability and Reactivity”.

Safe storage conditions: Store away from oxidants.

Container and packing materials:

Although there are no packing or container regulations, place in a sealable, undamaged container.

7-3. Lead

<Handling>

Technical measures: Install equipment measures as described in “8. Exposure controls and personal protection”, and wear protective equipment.

Local / total ventilation: Implement local ventilation and total ventilation as described in “8. Exposure controls and personal protection ”.

Precautions for safe handling:

Conforming to “2. Hazards identification”.

Prevention of contact: Refer to “10. Stability and Reactivity”.

<Storage>

Technical measures: Technical measures are not required.

Incompatible materials: Refer to “10. Stability and Reactivity”.

Safe storage conditions: Store away from oxidants.

Lock the storage location.

Container and packing materials:

Although there are no packing or container regulations, place in a sealable, undamaged container.

7-4. Nickel

<Handling>

Technical measures: Install equipment measures as described in “8. Exposure controls and personal protection”, and wear protective equipment.

Local / total ventilation: Implement local ventilation and total ventilation as described in “8. Exposure controls and personal protection ”.

Precautions for safe handling: No data.

Prevention of contact: No data.

<Storage>

Technical measures: No special technical measures are required.

Incompatible materials: No data.

Storage conditions: Lock the storage location.

Container and packing materials: No data.

8. Exposure controls and personal protection

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

8-1. Copper

Administrative level: Not specified.

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2005 version): Not specified.

・ACGIH (2005 version): TLV-TWA 0.2 mg/m^3 (as fumes)

TLV-TWA 1 mg/m^3 (as dust or mist)

Facility measures: To maintain the concentrations in air at or below the recommended tolerable concentrations, seal all processes, and use local air filters and other equipment countermeasures.

Protective Equipment

・Respiratory protection: Wear suitable respirator protective equipment.

・Hand protection: Wear suitable protective gloves.

・Eye protection: Protective goggles (regular glasses, regular glasses with lateral plates, or goggles)

・Skin and body protection: Wear protective equipment such as protective clothing and safety boots, etc.

8-2. Tin

Administrative level: Not specified.

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2005 version):

Not specified

・ACGIH (2005 version): TLV-TWA 2 mg/m^3 (As Sn)

Facility measures: If dust or fumes are produced in high-temperature processes, ventilation devices must be installed to keep the contamination substances in the air below the administrative level.

Protective equipment

・Respiratory protection: Wear suitable respirator protective equipment.

・Hand protection: Wear suitable protective gloves.

・Eye protection: Wear protective equipment for eyes and face. Wear safety glasses. If there is a risk that the substance may come in contact with the eyes or face due to scattering or spraying, general chemical splash goggles and face shields must be worn.

・Skin and body protection: Wear protective equipment such as protective clothing and safety boots, etc.

Hygiene measures: Wash hands thoroughly after handling.

8-3. Lead

Administrative level: 0.05 mg/m3 (lead and its compounds, as lead)

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2005 version):

0.1 mg/m3 lead and its compounds, excluding alkyl lead, as lead

・ACGIH (2005 version): TLV-TWA 0.05 mg/m3 (A3; BEI lead and its inorganic compounds, as lead)

Facility measures: Install eyewash containers and safety showers in worksites where the substance is stored and handled.

Implement ventilation to make sure the airborne concentration remains below the recommended tolerable concentration.

Protective equipment

・Respiratory protection: Wear suitable respirator protective equipment.

・Hand protection: Wear suitable protective gloves.

・Eye protection: Wear protective equipment for eyes and face.

・Skin and body protection: Wear protective equipment such as protective clothing and safety boots, etc.

Hygiene measures: Wash hands thoroughly after handling.

8-4. Nickel

Administrative level: Not set

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2007 version):

1 mg/m^3

・ACGIH (2007 version): TWA 1.5 mg/m^3 (inhalable particles)

Facility measures: Install eyewash containers and safety showers in worksites where the substance is stored and handled. To prevent exposure, install sealable devices or localized ventilators.

Protective Equipment

・Respiratory protection: Wear suitable respirator protective equipment.

・Hand protection: Wear suitable protective gloves.

・Eye protection: Wear suitable eye protective equipment.

・Skin and body protection:

Wear suitable protective clothes.

Hygiene measures: Wash hands thoroughly after handling.

9. Physical and chemical properties: Fields marked with "---" in the table indicates no data.

a) Properties according to product name

	Phosphor bronze FX510	Free-cutting phosphor bronze FX403
9-1.Appearance of a chemical product, physical state and color	Lustrous Orange solid	
form	Depends on product form	
odour	None	
9-2. pH, with indication of the Concentration	—	
9-3. Melting point (ºC)	—	
9-4.Decomposition temperature	—	
9-5. Flashpoint	—	
9-6.Upper/lower flammability	—	
9-7. Explosive limits	—	
9-10.Relative density	8.79	8.81
9-11. Solubility(ies)	—	

9-12. n-octanol /water partition coefficient	–
9-13. Other Data (Radioactivity, bulk Density, Etc.)	–

b) Properties according to constituent element

	Cu	Sn	Ni	P	Pb
9-8. Vapor pressure (Pa)	–	–	–	–	–
9-9. Boiling point (ºC)	2582	2625	2910	280	1750

10. Stability and reactivity

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

10-1. Copper

Stability	Turns green when exposed to damp air. Compounds sensitive to shock are formed by acetylene compounds, ethylene oxides, and azides.
Possibility of hazardous reactions:	Reacts with oxides (chlorates, bromates, and iodates, etc.), so there is a risk of explosion.
Conditions to avoid:	Contact with humidity and hazardous mixtures.
Incompatible materials:	Acetylene compounds, ethylene oxides, azides, oxides (chlorates, bromates, and iodates, etc.)
Hazardous decomposition products:	CO, CO_2, and copper fumes when burned.

10-2. Tin

Stability:	Stable at room temperature and in air. The affinity to oxygen is low, and the color of the substance does not change in dry air at room temperature. Not oxidized at or below 200℃. In higher temperature, SnO_2 membrane is formed on the surface.
Possibility of hazardous reactions:	Reacts with strong oxidizers, acids, strong bases, halogens, sulfur, etc. Reacts quickly with halogen to produce tin halide. Reacts slowly with alkali at low temperature, and rapidly at high temperature.
Conditions to avoid:	Scattering of dust.
Incompatible materials:	Strong oxidizers, acids, strong bases, halogens, sulfur, etc.
Hazardous decomposition products:	None applicable (elements).

10-3. Lead

Stability:	Reacts with pure water and weak organic acids in the presence of oxygen.
Possibility of hazardous reactions:	No dangerous or harmful reactions under normal conditions. Reacts with concentrated nitric acid at high temperatures, boiling concentrated chlorine, and concentrated sulfuric acid. Reacts with fluorine and chlorine at room temperature.
Conditions to avoided:	Mixing powder or granules with air may cause dust explosions.

Incompatible materials:	Oxidants.
Hazardous decomposition products:	May emit poisonous fumes or gas when heated.

10-4. Nickel

Stability:	Thought to be stable when stored and handled according to the laws and regulations
Possibility of hazardous reactions:	Metal nickel is stable against oxidation using an ordinary oxidation membrane, but a fresh metal surface without an oxidation membrane will be rapidly oxidized by the air. Consequently, there is a risk that freshly powdered metal nickel will ignite upon contact with air.
Conditions to avoided:	No data.
Incompatible materials:	No data.
Hazardous decomposition products:	No data.

11. Toxicological information

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

11-1. Copper

Acute toxicity: Oral: Rabbits LDL_0 120 μg/kg[3)]

Skin irritation/corrosion:

Contact with skin causes reddening symptoms.[14)]

Eye damage/irritation: Contact with eyes causes reddening. Causes painful symptoms.[14)]

Acts as an irritant.[10)]

Respiratory or skin sensitization:

Respiratory organ sensitization: no data.

Skin sensitization: The Japan Society for Occupational Health classified this as skin sensitization group 2 (a substance thought probably to sensitize humans), but The Japanese Society for Dermatoallergology and Contact Dermatitis has no classification.

Reproductive cell mutagenicity:

No data.

Carcinogenicity: EPA classifies this as group D (substance that cannot be classified as carcinogenic to humans).

Reproductive toxicity: No data.

Specific target organ toxicity (single exposure):

Fumes irritate the upper airway.[13)]

Thought to be an airway irritant.

Risk of irritation to the respiratory organs (class 3)

Specific target organ toxicity (repeated exposure):

Hepatomegaly identified in workers exposed to high airborne concentrations (estimated ingestion 200 mg/day).[11)]

Nerve damage due to long-term or repeated exposure (class 1)

Aspiration hazard: No data.

11-2.Tin

Acute toxicity:	Oral:	No information.
	Dermal:	No information.
	Inhalation (gas):	No information.
	Inhalation (vapor):	No information.
	Inhalation (mist):	No information.

Skin irritation/corrosion: No information.

Eye damage/irritation: No definite date available.

Respiratory or skin sensitization: No information.

Reproductive cell mutagenicity: No date available.

Carcinogenicity: No definite date available.

Reproductive toxicity: No information.

Specific target organ toxicity (single exposure):

No definite date available.

Specific target organ toxicity (repeated exposure):

Coniosis was observed in warkers handling metallic tin.

Long-term exposure to this substance may cause benign coniosis(stannosis).

Organ damage from long-term or repeated exposure (Class 1)(Lungs)

Long-term or repeated exposure causes renal disorders.

Long-term or repeated exposure causes lung disorders.

Aspiration hazard: No data.

11-3. Lead

Acute toxicity:	Oral:	No information.
	Dermal:	No information.
	Inhalation (dust):	No information.

Skin irritation/corrosion: No information.

Eye damage/irritation: No information.

Respiratory or skin sensitization:

Respiratory organ sensitization: No information.

Reproductive cell mutagenicity:

Results have been obtained that contradict the chromosome abnormalities in the peripheral blood lymphocytes of people who work with lead, but as there are reports of chromosome abnormalities and micronucleus induction effects in lead itself[23), 37), 20), 10)], the substance was designated class 2.

Carcinogenicity: Classified as B[23), 30)] and A3[10)], and as B2 by the EPA.

Suspected risk of carcinogenesis (class 2)

IARC group 2 (might be carcinogenic in humans)

Reproductive toxicity: Designated class 1A as there are reports of cases of human exposure affecting spermatogenesis[37), 20), 8), 23)], and reports that ovulation function failure has been observed in cases of exposure among female EHC workers.

Although there are reports of connections to cognitive function development impairment in newborns[10), 20), 8), 23)], and connections to increased spontaneous abortions[20), 8)], no clear conclusions have been obtained.

Risk of malign influence on reproductive functions or fetus (class 1A)

Specific target organ toxicity (single exposure):

Despite reports of cases in which renal function failure has been identified in humans with acute poisoning[20)], the same source also reports that there was no renal failure in subsequent epidemiological surveys.

Specific target organ toxicity (repeated exposure):

From reports that the marker organs are the hematopoietic system, nervous system, and the kidneys and the cardiovascular system[20)], reports that heme synthesis impairment, nephropathy, and encephalopathy have been observed in cases of human exposure[37), 10), 8), 23)], reports of the peripheral nerves and central nervous functions have been affected in cases of human exposure[37), 10), 8)], reports of effects such as hypertension on the cardiovascular system in cases of human exposure[37), 10)], and reports that immunosuppressive actions have been observed in cases of human exposure[8)], the marker organs are thought to be the hematopoietic system, liver, CNS, peripheral nervous system, cardiovascular system, and immune system, all of which have been designated class 1.

Although there are descriptions of case reports of reduced thyroid gland and adrenal functions in EHC, both these case reports are from before 1970, and there have been no similar reports subsequently, and as DFGOT describes no effects on the thyroid gland[20], the thyroid and adrenal glands are not thought to be marker organs.
Impairment of the hematopoietic system, kidneys, CNS, peripheral nervous system, cardiovascular system, and immune system due to long-term or repeated exposure (class 1)

Aspiration hazard: No data.

11-4. Nickel

Acute toxicity:	Oral:	Rat LD_{50}>9000 mg/kg (ECETOC TR No. 33 (1989)) is outside classification.
	Dermal:	No data.
	Inhalation (gas):	Solid according to GHS definitions.
	Inhalation (vapor):	No data.
	Inhalation (dust):	Deemed unclassifiable as there is no test data using animals. Nevertheless, cases have been reported of death due to respiratory distress syndrome after 13 days inhalation exposure that was estimated to have a concentration of 382 mg Ni/m^3 for 90 minutes (ATSDR (2005)).
	Inhalation (mist):	Solid according to GHS definitions.

Skin irritation/corrosion: No data.

Eye damage/irritation : No data.

Respiratory or skin sensitization:

Respiratory organ sensitization: (One) case of rhinitis has been identified in humans, and an irritation reaction has been observed in the trachea. (NITE initial risk evaluations ver. 1.0, No. 69 (2008)). Further, as this was classified as an airway sensitizer (group 2) in the tolerable concentration recommendations from The Japan Society for Occupational Health (2008), and as an airway sensitizer by The Japanese Society of Occupational and Environmental Allergy (2004) and DFG (MAK/BAT No. 43 (2007)), the substance was designated as class 1.
Skin sensitization: There are reports of hives (NITE initial risk evaluations ver. 1.0, No. 69 (2008); EHC No. 108 (1991)), contact dermatitis (NITE initial risk evaluations ver.

1.0, No. 69 (2008); EHC No. 108 (1991); IARC vol. 49 (1990)), and positive reactions (NITE initial risk evaluations ver. 1.0, No. 69 (2008); EHC No. 108 (1991)) in batch tests. Further, as this was classified as a skin sensitizer (group 1) in the tolerable concentration recommendations from The Japan Society for Occupational Health (2008), and as a skin sensitizer by The Japanese Society of Occupational and Environmental Allergy (2004) and DFG (MAK/BAT No. 43 (2007)), the substance was designated as class 1.

Reproductive cell mutagenicity:

Although the results of chromosome abnormalities in alveolar macrophages due to inhalation exposure in rats is positive (NITE initial risk evaluations ver. 1.0, No. 69 (2008)), this was a special testing system. In addition, this as deemed unclassifiable as there is no *in vivo* test data. Further, in vitro mutagenicity tests: Chromosome abnormality tests using human lymphocytes (IARC vol. 49 (1990)) and sudden mutation tests using the human lymphoblast TK6 (detailed risk evaluation series 19 (2006)) were negative.

Carcinogenicity: As the existing classification are as follows: IARC is 2B (IARC), NTP is R (NTP (2005)), and EU is Carcinoma category 3; R40 (EU (2007)), the substance was classified as class 2. Further, the occurrence of either cancer or sarcoma can be seen in carcinogenesis tests using inhalation, subcutaneous, intramuscular, intrathoracic, and intraperitoneal administration in rats. (NITE initial risk evaluations ver. 1.0, No. 69 (2008), IARC vol. 49 (1990); detailed risk evaluation series 19 (2006).)

Reproductive toxicity: From descriptions that birthweight is reduced and stillborn births in the last trimester of pregnancy increase at concentrations up to 250 ppm through oral administration in rats (Teratogenic (12^{th}, 2007)), and deaths increase and a number of cases of teratogenicity were observed before implantation (Teratogenic (12^{th}, 2007)), it is thought that there are occurrence toxicity effects at does that do not reveal general toxicity in the parent animals, and so this substance was classified as class 1B.

Specific target organ toxicity (single exposure):

Failure of the alveolar epithelial cells occurred at doses of 0.5 mg or greater with inhalation exposure tests in male rats (single tracheal administration. (NITE initial risk evaluations ver. 1.0, No. 69 (2008).) Further, as there are descriptions that “inhalation exposure in humans causes “Failure and edema in the alveoli walls in the alveolar

regions, and conspicuous renal tubular necrosis in the kidneys" (ATSDR(2005)), this substance was designated class 1 (respiratory organs and kidneys).

Specific target organ toxicity (repeated exposure):

Pulmonary alveolar proteinosis (PAP) and pulmonary granulomatous inflammation were observed in females, and wet lung mononuclear cells were observed in males, at doses of 1 mg/m^3 (0.001 mg/L) or greater, which is equivalent to class 1 of the inhalation exposure tests (OECD TG 413) for 13 weeks using rats. (NITE initial risk evaluations ver. 1.0, No. 69 (2008).) Further, as pleurisy, pneumonia, pulmonary congestion, and edema were observed in inhalation exposure tests for 21 months in rats (CaPSAR (1994)) at doses of 15 mg/m^3 (0.015 mg/L), which is equivalent to class 1 in the guidance, and pneumonia was caused at 1 mg/m^3 (0.001 mg/L) in inhalation exposure tests for six months using rabbits, this substance was designated class 1 (respiratory organs). Meanwhile, changes such as ataxia, irregular breathing, a fall in body temperature, salivation, and limb discoloration were observed with doses of 100 mg/kg/day in 90-day forced oral tests in rats, and although comparatively mild, the symptoms were also observed at 35 mg/kg/day. In addition, as there are reports of 100% fatalities at concentrations of 100 mg/kg/day (IRIS 1996), the substance was designated class 2 (CNS). Further, the EU classification is T; R48/23.

Aspiration hazard: No data.

12. Ecological information

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

12-1. Copper

Acute aquatic environmental harm:

Cannot classify due to insufficient data.

Chronic aquatic environmental harm:

Despite the existence of L(E)C_{50}≤100 mg/L data, as this is a metal and its actions in water are unknown, it was designated class 4.

12-2. Tin

Acute aquatic environmental harm:

No information.

Chronic aquatic environmental harm:

No information.

12-3. Lead

Acute aquatic environmental harm:

No information.

Chronic aquatic environmental harm:

No information.

12-4. Nickel

Acute aquatic environmental harm:

Cannot classify due to insufficient data.

Chronic aquatic environmental harm:

Despite the existence of L(E)C_{50}≤100 mg/L data, as this is a metal and its actions in water are unknown, it was designated class 4.

13. Disposal considerations

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

13-1. Copper

Waste from residues:

Follow the relevant laws and local disposal regulations. Entrust disposal to and industrial waste contractor or local public body that is authorized by the prefectural governor where available. If outsourcing waste disposal, thoroughly notify the contractors of the dangers and harmfulness before outsourcing.

Contaminated container and contaminated packaging:

Either clean and recycle the containers, or dispose of them suitably according to the relevant laws and regulations, and local government standards.

When disposing of empty containers, make sure to discard the contents completely.

13-2. Tin

Waste from residues:

Follow the relevant laws and local disposal regulations. Entrust disposal to and industrial waste contractor or local public body that is authorized by the prefectural governor where available.

If outsourcing waste disposal, thoroughly notify the contractors of the dangers and harmfulness before outsourcing. Do not discharge the waste liquid containing this substance and waste liquid after washing diredtly into waterways or bury or dispose of the unprosessed products.

Contaminated container and contaminated packaging:

Either clean and recycle the containers, or dispose of them suitably according to the relevant laws and regulations, and local government standards.

When disposing of empty containers, make sure to discard the contents completely.

The method of disposing of spray cans differ for each local government. Disposal must be conducted according to the regulations of the relevant local government.

13-3. Lead

Waste from residues:

Follow the relevant laws and local disposal regulations. Entrust disposal to and industrial

waste contractor or local public body that is authorized by the prefectural governor where available. If outsourcing waste disposal, thoroughly notify the contractors of the dangers and harmfulness before outsourcing. Substances in an elemental state can be reused, so recover them.

Contaminated container and contaminated packaging:

Either clean and recycle the containers, or dispose of them suitably according to the relevant laws and regulations, and local disposal regulations.

When disposing of empty containers, make sure to discard the contents completely.

13-4. Nickel

Waste from residues:

Before disposal, render as harmless and stable as possible, and neutralize, etc., to reduce to a low hazard level. Follow the relevant laws and local disposal regulations. Entrust disposal to and industrial waste contractor or local public body that is authorized by the prefectural governor where available. If outsourcing waste disposal, thoroughly notify the contractors of the dangers and harmfulness before outsourcing.

Contaminated container and contaminated packaging:

Either clean and recycle the containers, or dispose of them suitably according to the relevant laws and regulations, and local government standards.

When disposing of empty containers, make sure to discard the contents completely.

14. Transport information

There is no information for mixtures (alloys), so information in units of the configuration elements are referenced for the description.

14-1. Copper

<International regulations>

Information on marine transport regulation: Non-dangerous substance.

・UN number: Not applicable

Information on air transport regulation: Non-dangerous substance.

・UN number: Not applicable

<Japanese regulations>

Information on road transport regulation: No special regulations.

Information on marine transport regulation: Non-dangerous substance.

Information on air transport regulation: Non-dangerous substance.

14-2.Tin

<International regulations>

Information on marine transport regulation: Non-dangerous substance.

・UN number: Not applicable

Information on air transport regulation: Non-dangerous substance.

・UN number: Not applicable

<Japanese regulations>

Information on road transport regulation: No regulations.

Information on marine transport regulation: Non-dangerous substance.

Information on air transport regulation: Non-dangerous substance.

14-3. Lead

<International regulations>

Information on marine transport regulation: Non-dangerous substance.

・UN number: Not applicable

Information on air transport regulation: Non-dangerous substance.

・UN number: Not applicable

<Japanese regulations>

Information on road transport regulation: No regulations.

Information on marine transport regulation: Non-dangerous substance.

Information on air transport regulation: Non-dangerous substance.

14-4. Nickel

<International regulations>

Information on marine transport regulation: As according to the IMO regulation

・UN number: 3089

・Product name: Metallic powder (flammable)

・Class: 4.1

・Packing group: II, III

・Marine pollutant: Not applicable

Information on air transport regulation: As according to the ICAO/IATA regulation

・UN number: 3089

・Product name: Metallic powder (flammable)

・Class: 4.1

・Packing group: II, III

<Japanese regulations>

Information on road transport regulation: Not applicable

Information on marine transport regulation: As according to the regulations of the Ship Safety Act.

・UN number: 3089

・Product name: Metallic powder (flammable)

・Class: 4.1

・Packing group: II, III

・Marine pollutant: Not applicable

Information on air transport regulation: As according to the regulations of the Civil Aeronautics Act.

・UN number: 3089

・Product name: Metallic powder (flammable)

・Class: 4.1

・Packing group : II, III

15. Regulatory information

This product (copper and copper alloy) are solid metal products, and the obligation to submit MSDS documents according to the Pollutant Release and Transfer Register (PRTR) law and the Industrial Safety and Health Law (for chemical substances) does not apply.

The configuration element unit information is described below for reference.

15-1. Copper

Occupational Health and Safety Law (OHSL):

Materials to Be Notified

(Law Paragraph 57, and edict Paragraph 18.2 Table 9)

(Edict No. 379)

15-2. Tin

Occupational Health and Safety Law (OHSL):

Materials to Be Notified

(Law Paragraph 57, and edict Paragraph 18.2 Table 9)

(Edict No. 322)

15-3. Lead

Occupational Health and Safety Law (OHSL):

Materials to Be Notified

(Law Paragraph 57, and edict Paragraph 18.2 Table 9)

(Edict No. 411)

Lead (Edict table No. 4 and lead poisoning prevention regulations paragraph 1.1)

Law Concerning Reporting, etc., of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in their Management:

Type 1 designated chemical substance

Pollutant Release and Transfer (PRTR) Law:

(Law Paragraph 2.2, edict paragraph 1, Appendix Table 1)

(Edict No. 304)

Labor standards Law: Toxic chemicals

(Law Paragraph 75.2, edict Paragraph 35 Table 1.2.4)

Air pollution control act: Harmful substance

(Edict paragraph 1)

Water pollution prevention act: Harmful substance

(Edict Paragraph 2, Ministerial Ordinance for Sewage Standards Paragraph 1)

Soil contamination countermeasures act:

Special harmful substance

(Law Paragraph 2.1, edict paragraph 1)

15-4. Nickel

Occupational Health and Safety Law (OHSL):

Materials to Be Notified

(Law Paragraph 57, and edict Paragraph 18.2 Table 9)

(Edict No. 418)

Air pollution control act: Harmful airborne substances

(Paragraph 2.13, submitted to the Central Environment Council 18 October 1996)

Law concerning reporting, etc., of releases to the environment of specific chemical substances and promoting improvements in their management:

Type 1 designated chemical substance

Pollutant Release and Transfer (PRTR) Law:

(Law Paragraph 2.2, edict paragraph 1, Appendix Table 1)

(Edict No. 308)

Labor standards Law: Carcinogenic chemical substances

(Law Paragraph 75.2, edict Paragraph 35 Table 1.2.7)

16. Other information

16-1. Copper

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16-2. tin

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16-3. Lead

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16-4. Nickel

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