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-Be Group	H3130, H3270	Copper beryllium for spring	C1700, C1720, C1751	Plate, Strip, Bar, Wire	Mixture (alloy)

1-2. Company information

Company name:

Address: (Postal code)

Department: Supervisors: (Position:)

Tel: , Fax:

Emergency tel number:

[Creation date: DD/MM/YY]

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.

2-1Copper : GHS classification

Physical hazards:

Explosives:	Outside scope of classification
Flammable gases:	Outside scope of classification
Flammable aerosols:	Outside scope of classification
Oxidizing gas:	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

Pictogram

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. Beryllium: 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:	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:	Outside classification

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):	Cannot classify
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Class 1
	Germ cell mutagenicity:	Cannot classify
	Carcinogenicity:	Class 1A
	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:	Class 4

Label element

Pictogram

Signal word: Danger

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

Risk of causing allergic skin reaction

Risk of cancer

Damage to respiratory organs

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.

2-3. Cobalt : 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:	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):	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):	Outside scope of classification
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Class 1
	Germ cell mutagenicity:	Cannot classify
	Carcinogenicity:	Class 2
	Reproductive toxicity:	Class 2
	Specific target organ toxicity - single exposure:	Class 3 (airway irritant)
	Specific target organ toxicity - repeated exposure:	Class 1 (respiratory organs)
	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

Suspected risk of malign influence on reproductive functions or fetus

Damage to respiratory organs, nervous system, kidneys, liver and heart

Risk of causing respiratory irritation

Respiratory organ damage due to long-term or repeated exposure

Risk of harm due to long-term effects

Precautionary statement: [Prevention]

Use suitable protective equipment and ventilation equipment to avoid exposure.

Wear suitable protective gloves.

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

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

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

Use only outdoors or in a well-ventilated area.

Wash hands thoroughly after handling.

Avoid discharging into the environment.

[Response]

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 feeling unwell, consult a physician and receive treatment.

Contaminated work clothing should not be allowed out of the workplace.

Wash contaminated clothing before reuse.

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

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

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

Collect spillage.

[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:	Outside classification
	Self-heating substances and mixtures:	Cannot classify
	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):	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):	Outside scope of classification
	Skin corrosion/irritation:	Cannot classify
	Serious eye damage/eye irritation:	Cannot classify
	Respiratory sensitization:	Class 1
	Germ cell mutagenicity:	Cannot classify
	Carcinogenicity:	Class 2
	Reproductive toxicity:	Cannot classify
	Specific target organ toxicity - single exposure:	Class 1 (respiratory organs and kidneys)
	Specific target organ toxicity - repeated exposure:	Class 1 (respiratory organs)
	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: Cu-Be

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. (Only substances subject to MSDS publication)				3.5. CAS No.
				PRTR Law		Industrial Safety and Health Law		
	C1700	C1720	C1751	0.1% max	1% max	0.1% max	1% max	
Copper (Cu)	following table	following table	following table	---	---	379	---	7440-50-8
Beryllium (Be)	1.60 to 1.79	1.80 to 2.00	0.2 to 0.6	394	---	6	---	7440-41-7
Cobalt (Co)	following table	following table	following table	---	100	172	---	7440-48-4
Nickel (Ni)	following table	following table	1.4 to 2.2	---	308	418	---	7440-02-0

Elements	Composition (mass%)		
	C1700	C1720	C1751
Ni+Co	0.20 min	0.20 min	---
Ni+Co+Fe	0.6 max	0.6 max	---
Cu+Be+Ni	---	---	99.5 min
Cu+Be+Ni+Co+Fe	99.5 min	99.5 min	---

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. Beryllium

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

Consult a physician and receive treatment.

If experiencing respiratory symptoms, consult a physician.

If on skin: Wash away using large quantities of soap and water.

Consult a physician and receive treatment.

If skin irritation or rash occurs, consult a physician and receive treatment.

If in eyes: Irrigate carefully for several minutes with water.

If feeling unwell, consult a physician and receive treatment.

If swallowed: Rise out the mouth.

Consult a physician and receive treatment.

Anticipated acute effects and anticipated delayed effects::

If inhaled: Cough, frog, shortness of breath, pharyngeal pain, chest pain, feeling of

weakness, pulmonary edema.

If skin contact is made: Reddening and Irritation.

If on eyes: Irritation and reddening.

If ingested orally: Nausea, vomiting, stomachache with diarrhea.

4-3. Cobalt

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

Consult a physician and receive treatment.

If on skin: Wash skin promptly.

Wash away using large quantities of soap and water.

Consult a physician and receive treatment.

Wash contaminated clothing before reuse.

If in eyes: Irrigate carefully for several minutes with water.

Consult a physician and receive treatment.

If swallowed: Rise out the mouth.

Consult a physician and receive 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.

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. Beryllium

Extinguishing media: small fire: CO_2, powder retardants, sand, soil and general foam extinguisher

larger fire: water jet, water mist and general foam extinguisher

Specific hazards: There is a risk of ignition with friction, heat, spark and flame.

There are risks of explosion or explosive burning.

There is a risk of reignition after extinguishing.

Specific extinguishing methods:

In case that there is a risk of flame expanding with water jet, use suitable extinguishing media other than water jet.

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

If it is impossible to move, cool the container and the surrounding area with water jet.

After extinguishing, sufficiently cool the container with volumes of water.

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

5-3. Cobalt

Extinguishing media: Special powder retardants, soda ash, caustic lime and dry sand

Unsuitable extinguishing media:

CO_2, Water jet. foam extinguisher

Specific hazards: There is a risk of the container exploding when heated.

There is a risk of irritant, corrosive, or poisonous fumes being emitted due to fire.

Specific extinguishing methods:

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

Sealing or choking method are suitable.

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 and materials 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. Beryllium

Personnel 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.

Stay upwind.

Move from lower zone.

Environmental precautions:

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

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

Recovery and neutralization:

Stop the leak if there is no danger.

Collect leaks using clean, static-proof tools, and recover in a sealable container before implementing disposal processing.

Methods and materials for containment and methods and materials for cleaning up:

Stop the leak if there is no danger.

Secondary disaster prevention measures:

Promptly remove all ignition sources. (Prohibit smoking, fireworks, and naked flames in the vicinity.)

Carefully remove leaking material on the floor to avoid slipping.

6-3. Cobalt

Personnel precautions, protective equipment, and emergency procedures:

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.

Do not touch or walk through any leaking material.

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 and materials for cleaning up:

Stop the leak if there is no danger.

Secondary disaster prevention measures:

Promptly remove all ignition sources. (Prohibit smoking, fireworks, and naked flames in the vicinity.)

Prevent inflow to drainage ditches, sewers, basements, or sealed locations.

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.

Methods and materials for cleaning up:

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

Methods and materials for containment and methods and materials 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. Beryllium

<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: Store hazardous materials in their storage location, and install the lighting, illumination, and ventilation necessary for handling.

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

Storage conditions: Store away from heat, sparks, naked flames, and other ignition sources.

No smoking.

Store away from oxidizing agents.

Lock the storage location.

Store in a cool, well-ventilated location.

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

Container and packing materials:

Use the containers specified in the UN transportation law.

7-3. Cobalt

<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: Store hazardous materials in their storage location, and install the lighting, illumination, and ventilation necessary for handling.

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

Storage conditions: Store in sealed containers.
Securely seal the containers, and store in a cool location.
Store away from substances that are dangerous when mixed.
Lock the storage location.

Container and packing materials:
Use the containers specified in the UN transportation law.

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:
Conforming to “2. Hazards identification”.

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. Beryllium

Administrative level: 0.002 mg/m^3 (as beryllium)

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2005 version):

0.002 mg/m^3 (as beryllium)

・ACGIH (2005 version): TLV-TWA 0.002mg/m^3 (as beryllium), A1

TLV-STEL 0.01mg/m^3 (as beryllium)

Facility measures: Use explosion-proof electrical, ventilation, and lighting equipment.

Protective equipment

・Respiratory protection: If ventilation is insufficient, wear respirator protective equipments authorized by manufacturer or the government.

・Hand protection: Wear suitable protective gloves.

・Eye protection: Wear suitable eye protective equipment.

・Skin and body protection:

Use suitable protective clothing.

Hygiene measures: Wash hands thoroughly after handling.

8-3. Cobalt

Administrative level: Not set

Permissible limit (Exposure limits, biological exposure indices)

・Japan Society for Occupational Health (2005 version):

0.05 mg/m^3 (as cobalt)

・ACGIH (2005 version): TWA 0.02 mg/m^3 (as cobalt)

Facility measures: If dusts generate, install local ventilation system.

If dust and fume generate in high temperature process, install ventilation.

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

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:

Use suitable protective clothing and masks as necessary.

Hygiene measures: Do not eat, drink or smoke when using this product.

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) Product nomenclature characteristics

	C1700	C1720	C1751
9-1.Appearance of a chemical product, ・physical state and colour, ・form ・odour	 Lustrous golden solid Depends on product form None	 Lustrous golden solid Depends on product form None	 Lustrous browned solid Depends on product form None
9-2. pH, with indication of the concentration	---		---
9-4. Decomposition temperature	---		---
9-5. Flashpoint	---		---
9-6. Upper/lower flammability	---		---
9-7. Explosive limits	---		---
9-11. Solubility(ies)	---		---
9-12. n-octanol /water partition coefficient	---		---
9-13. Other data (radioactivity, bulk density, etc.)	---		---

b) Alloy characteristics

	C1700	C1720	C1751
9-3. Melting point (ºC)	865	865	1029
9-10. Relative density	8.26	8.26	8.75

c) Configuration element characteristics

	Cu	Be	Co	Ni
9-8. Vapor pressure (Pa)	---	---	---	---
9-9. Boiling point (ºC)	2582	2470	2930	2910

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. Beryllium

Stability:	Stable under normal handling conditions. Granule or powder may cause powder dust explosion if mixed

with air.

Possibility of hazardous reactions:	Reacts with strong acid and strong base, so there is a risk of generating flammable/explosive(hydrogen) gases. Reacts with chlorinated solvent such as carbon tetrachloride, so there is a risk of generating mixtures which show sensitivity to impacts. Reacts with base, halogen, halide, sulfur and alkali metal. Reacts with nitrogen and carbon to form nitride and carbide under high temperature.
Conditions to avoid:	Mixing with powder or air. Naked flame, spark
Incompatible materials:	Strong acids, strong base, carbon tetrachloride, trichloroethylene
Hazardous decomposition products:	Causes irritating, poisonous gas and fumes when fire.

10-3. Cobalt

Stability:	Stable against heating and contacting with water. Ignite spontaneously in air.
Possibility of hazardous reactions:	Reacts with strong oxidants. Reacts violently with oxygen, so there is a danger of fire and explosion. Reacts violently with acid to form hydrogen.
Conditions to avoided:	Contact with incompatible materials.
Incompatible materials:	Strong oxidant, acid
Hazardous decomposition products:	CO, CO_2, HCl, etc. when burned.

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:	Strong oxidant, strong acid
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. Beryllium

Acute toxicity Oral: No data

Dermal: No data

Inhalation: Inhalation (gas): This is a solid according to the GHS definition (i.e., outside the scope of classification)

Inhalation (vapor): No data

Inhalation (dust, mist): Insufficient data, so cannot classify

Skin corrosion and irritability: Insufficient data, so cannot classify

Critical injury and irritability to eyes: Insufficient data, so cannot classify

Respiratory organ sensitization and skin sensitization:

Respiratory organ sensitization: Classified as airway sensitization group 1 by the

Japan Society for Occupational Health (2005)

Skin sensitization: Classified as skin sensitization group 2 by the Japan Society for Occupational Health (2005)

Inhalation risks causing allergies, asthma, or respiratory distress (class 1)

There is a risk of causing allergic skin reactions (class 1)

Reproductive cell mutagenicity: No data

Carcinogenicity: Although classified as 2A by the Japan Society for Occupational Health[30] and category 2 by EU ANNEX I[36], the substance has been classified 1 by IARC[40], A1 by ACGIH[10], L (inhalation) by the EPA[49], and K by NTP (NTP RoC (2005))[30].

There is a risk of carcinogenesis (class 1A)

Reproductive toxicity: Although there are reports of epidemiological surveys that deny any relation between industrial beryllium exposure and spontaneous abortions and premature births, this is not evidence that enables reproductive toxicity to be clearly denied.

Specific marker organs and systemic toxicity (single exposure):

As airway inflammation due to short-term exposure has been observed in humans, and there are also reports of severe chemical pneumonia being caused[35), 43), 10), 20), 8), 23), 26)], the designated marker organs are the respiratory organs.

Specific marker organs and systemic toxicity (repeated exposure):

As there are reports of chronic beryllium disease (berylliosis) in cases of long-term exposure in humans[35), 43), 10), 20), 8), 23), 26)], the designated marker organs are the respiratory organs.

Respiratory organ failure due to long-term or repeated exposure (class 1)

Absorptive respiratory organ harmfulness:

Insufficient data, so cannot classify

11-3. Cobalt

Acute toxicity Oral: Designated outside of classification based on the oral administration tests with LD_{50}= 6171 mg/kg[2] using rats.

Dermal: No data

Inhalation (Gas): As this is a solid according to GHS definitions, has inhalation is not presumed, and the substance is designated outside classification.

Inhalation (Vapor): No data

Inhalation (Mist): As data is insufficient, designated as unclassifiable.

Skin corrosion and irritability: No data

Critical injury and irritability to eyes: No data

Respiratory organ sensitization and skin sensitization:

Respiratory organ sensitization: Designated as class 1 as this was classified as having airway sensitization by the Japanese Society of Occupational and Environmental Allergy special committee.

There is a risk of causing allergic skin reactions

Reproductive cell mutagenicity: No data

Carcinogenicity: Designated as class 2 as this was designated A3 (as cobalt and inorganic compounds) by ACGIH[6], group 2B (as cobalt and cobalt compounds) by IARC[10], and 2B by the Japan Society for Occupational Health (as cobalt and cobalt compounds)[4].

Suspected risk of carcinogenesis

ACGIH A3 (Carcinogenic substance in animals)

IARC group 2B (Possibly carcinogenic in humans)

Reproductive toxicity: Although there are no reports concerning general toxicity in parent animals, as histological changes to the testicles and reduced reproductive rates in the next generation have been observed[8), 10)], designated as class 2.

Suspected risk of adverse effects on sexual functions and fetuses

Specific marker organs and systemic toxicity (single exposure):

As there are descriptions of irritability, etc., to the bronchus in humans[8)], this is thought to cause airway irritability. From the above, the classification is class 3 (airway irritability).

Risk of irritation to the respiratory organs

Specific marker organs and systemic toxicity (repeated exposure):

As there are reports of respiratory organ irritability, reduced pulmonary function, wheezing, asthma, pneumonia, fibrosis, myocardial infarction, functional effects on the ventricles, cardiomegaly, and heart failure due to occupational exposure to cobalt[8)], the respiratory organs and heart are thought to be marker organs. the effects on the heart, however, have been judged to be secondary, and so were not used. From the above, the classification was class 1 (respiratory organs).

Respiratory organ malfunction due to long-term or repeated exposure

Absorptive respiratory organ harmfulness:

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. Beryllium

Acute aquatic environmental harm:

Cannot classify due to insufficient data.

Chronic aquatic environmental harm:

As this is a metal and its actions in water are unknown, it was designated class 4.

May cause long lasting harmful effects.

12-3. Cobalt

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.

May cause long lasting harmful effects.

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. Beryllium

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.

13-3. Cobalt

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.

13-4. 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. Beryllium

<International regulations>

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

・UN number: 1567

・UN proper shipping name: Beryllium powder

・Class: 6.1

・Subsidiary risk: 4.1

・Packing group: II

・Marine pollutant: Not applicable

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

・UN number: 1567

・UN proper shipping name: Beryllium powder

・Class: 6.1

・Packing group: II

<Japanese regulations>

Information on road transport regulation: No regulations.

Information on marine transport regulation: As according to the regulations of the Ship Safety Act.
(Limited to powders only)

・UN number: 1567

・Product name: Beryllium powder

・Class: 6.1

・Packing group: II

・Marine pollutant: Not applicable.

Information on air transport regulation: As according to the regulations of the Civil Aeronautics Act.
(Limited to powders only)

・UN number: 1567

・Product name: Beryllium powder

・Class: 6.1

・Subsidiary risk: 4.1

・Packing group: II

14-3. Cobalt

<International regulations>

Information on marine transport regulation:	As according to the IMO regulation
・UN number:	1383
・Product name:	Pyrophoric alloy
・Class:	4.2
・Packing group:	I
・UN number:	3089
・Product name:	Metallic powder (flammable)
・Class:	4.1
・Packing group:	II
・Marine pollutant:	Not applicable
Information on air transport regulation:	As according to the ICAO/IATA regulation
・UN number:	1383
・Product name:	Pyrophoric alloy
・Class:	4.2
・Packing group:	I
・UN number:	3089
・Product name:	Metallic powder (flammable)
・Class:	4.1
・Packing group:	II

<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:	1383
・Product name:	Pyrophoric alloy
・Class:	4.2
・Packing group:	I
・Marine pollutant:	Not applicable
・UN number:	3089
・Product name:	Metallic powder (flammable)
・Class:	4.1
・Packing group:	II
・Marine pollutant:	Not applicable

Information on air transport regulation:	As according to the regulations of the Civil Aeronautics Act.
・UN number:	1383 (carriage prohibition)
・UN number:	3089
・Product name:	Metallic powder (flammable)
・Class:	4.1
・Packing group :	II

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. Beryllium

Occupational Health and Safety Law (OHSL):

Specified chemical substance – Group-1 substance

(Substance of permission for manufacturing)

(The ordinance on prevention of hazards due to specified chemical substances, article 2, paragraph 1, item 1)

Materials to be notified

(Law article 57-2, and article 56, paragraph 1)

(Edict No. 6)

Toxic substances subject to indicate their names, etc.

(Order article 18)

Specified chemical substance –substance under special supervision

(The ordinance on prevention of hazards due to specified chemical substances, article 38-3)

Labor standards act Hazardous substance causing diseases

(Law article75, paragraph 2, ordinance article 35, table 1-2, item 4)

Pollutant Release and Transfer (PRTR) Law:

Class I designated chemical substance, specific class I designated chemical substance

(Law article 2, paragraph 2, order article 1 table 1, order article 4)

(Edict No. 394)

Ship safety law: Toxic substance and poison

(The regulations for the carriage and storage of dangerous goods by ships, article 2, 3, dangerous good table 1)

Civil aeronautics act: Toxic substance and poison

(Ordinance, article 194, dangerous good table 1)

15-3. Cobalt

Occupational Health and Safety Law (OHSL):

Materials to be notified

(Law article 57-2, and order article 18-2, table 9)

(Edict No. 172)

Pollutant Release and Transfer (PRTR) Law:

Class I designated chemical substance

(Law article 2, paragraph 2, order article 1 table 1)

(Edict No. 132)

Ship safety law: Flammable substances and pyrophoric substances

(The regulations for the carriage and storage of dangerous goods by ships, article 2, 3, dangerous good table 1)

Flammable substances and flammable substance

(The regulations for the carriage and storage of dangerous goods by ships, article 2, 3, dangerous good table 1)

Civil aeronautics act: Carriage prohibition (flammable substances and pyrophoric substances)

(Ordinance, article 194, dangerous good table 1)

Flammable substances and flammable substance

(Ordinance, article 194, dangerous good table 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

<References>

1) Ullmanns (E) (5th edition, 1995)

2) Contamination Dangers Handbook (2nd edition, 1997)

3) RTECS (2005)

4) ICSC (J) (1993)

5) Sax (8th edition, 1992)

6) Lange (14th edition 1992)

7) Gangolli (1st edition 1993) vol. 2

8) Lide (85th edition, 2004-2005)

9) SRC (Access on Jul 2005)

10) PATTY (4th edition, 1994)

11) EHC200 (1998)

12) EPA (IRIS (Access on Jul 2005))

13) ACGIH (7th edition, 2001)

14) Handbook of Danger and Harmful Chemical Substances, Japan Industrial Safety and Health Association (1992)

15) Booklet of the Threshold Limit Values and Biological Exposure Indices, 6th edition; Japan Chemical Industry Ecology-Toxicology & Information Center (2004)

16) GHS Classification Results (Sumika Technical Information Service, Inc.)

17) Japan Chemical Industry Association, "Emergency Measures and Policies, Container Yellow Card (Labeling)"

18) Japan Chemical Industry Association, "Chemical Substances Control Law Regulations Search System" (CD-ROM) (2005)

19) Japan Chemical Database Ltd., "Comprehensive Chemicals Database" (2005)

20) Safety Database (revised and expanded supplementary edition, 1997)

21) JETOC, “Collection of Existing Chemical Substance Safety Inspection Data for the Chemical Substances Control Law”

22) Ministry of the Environment, “Chemical Substances Ecological Impact Tests”

16-2. Beryllium

<References>

1) ICSC (2002)

2) Merck (13th, 1996)

3) IMDG (2004)

4) Hommel (1991)

5) SRC (Access on Oct 2005)

6) HSDB (Access on Jun 2005)

7) Lange (16th, 2005)

8) PATTY (4th, 1994)

9) IUCLID (2000)

10) ACGIH（7th, 2001）

11) RTECS (2005)

12) HSFS (2000)

13) SITTIG (4th, 2002)

14) ICSC (J) (1999)

15) Chapman (2005)

16) Lange (16th, 2005)

17) GESTICS (2005)

18) Howard (1997)

19) Weiss (2nd, 1986)

20) DFGOT vol.3 (1992)

21) Verschueren (4th, 2003)

22) CERI Hazard Data Collection (2000)

23) IARC 58 (1993)

24) SIDS (2004)

25) ECETOC TR48 (1992)

26) ATSDR (2002)

27) CaPSAR (1999)

28) SIAR (1997)

29) Sax (8th, 1992)

30) J Occup Health (2005)

31) Dictionary of Organic Compounds

32) IRIS (1998)

33) Ministry of the Environment – Risk Assessment Vol. 3 (2004)

34) Japanese Society of Allergology, Substances List (draft)

35) EHC 106 (1990)

36) EU-Annex I (Access on Oct 2005)

37) Gangolli (2nd, 1999)

38) NICNAS (1994)

39) NTP RoC (11th, 2005)

40) IARC (Access on Oct 2005)

41) J Occup Health 45:137-139 (2003)

42) Eur Respr J. 25(1):201-204 (2005)

43) CICAD 32 (2001)

44) NTP TOX-49 (2004)

45) Hazardous Materials DB (Div.2, 1993）

46) IARC 65 (1996)

47) Solvents Pocket Book (1996)

48) Ullmanns (E) (5th, 1995)

49) IRIS (Access on Aug 2005)

16-3. Cobalt

<References>

1）ICSC（2004）
2）RTECS（2004）
3）SIDS（2003）
4）Japan Society for Occupational Health（2005）
5）Ministry of the Environment – Risk Assessment Vol. 3 (2004)
6）ACGIH（7th,2001）
7）NTP DB（Access on February 2006）
8）ATSDR（2004）
9）EPA（1998）
10）IARC（1991）
11） JETOC, “Collection of Existing Chemical Substance Safety Inspection Data for the Chemical Substances Control Law”
12） Handbook of Danger and Harmful Chemical Substances, Japan Industrial Safety and Health Association (1992)

13）GHS Classification Results (NITE)
14）Japan Chemical Industry Association, "Emergency Measures and Policies, Container Yellow Card (Labeling)"
15）Japan Chemical Industry Association, "Chemical Substances Control Law Regulations Search System" (CD-ROM) (2005)
16）Japan Chemical Database Ltd., "Comprehensive Chemicals Database" (2005)
17）Amoore, J.E. and Haulata, E. Jouranal of Applied Toxicology, 3（6）272（1983）

16-4. Nickel

<References>

1) ICSC (2004)

2) Merck (13th edition, 2001)

3) ECETOC TR33 (1989)

4) Japan Society for Occupational Health (2005)

5) Ministry of the Environment Risk Evaluations Vol. 3 (2004)

6) CaPSAR (1994)

7) NTP (2005)

8) ATSDR (2005)

9) EPA (1998)

10) IARC (1991)

11) JETOC, “Collection of Existing Chemical Substance Safety Inspection Data for the Chemical Substances Control Law”

12) Handbook of Danger and Harmful Chemical Substances, Japan Industrial Safety and Health Association (1992)

13) GHS Classification Results (NITE)

14) Japan Chemical Industry Association, "Emergency Measures and Policies, Container Yellow Card (Labeling)"

15) Japan Chemical Industry Association, "Chemical Substances Control Law Regulations Search System" (CD-ROM) (2005)

16) Japan Chemical Database Ltd., "Comprehensive Chemicals Database" (2005)

17) Amoore, J. E. and Haulata, E., Journal of Applied Toxicology, 3(6) 272 (1983)

18) ACGIH (2005)