This product (wrought copper and copper alloy) are solid metal products, and the obligation to submit SDS 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-Zn-Al-Ni Group | H3300 | Brass | C6872 | Pipe | Mixture (alloy) |
| Cu-Zn-Ni Group | H3110, H3130 H3270 | Nickel silver | C7351, C7451 C7521, C7541 | Sheet Strip | Mixture (alloy) |
| | | | C7701 | | |
| | | | C7451, C7521 C7541, C7701 | Bar Wire | |
| | | | C7941, C7521 C7541, C7701 | Bar | |

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.

2-1. 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 metales: | 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. 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: a) Cu-Fe-Al-Mn-Ni (Aluminum bronze)

b) Cu-Fe-Mn-Ni (Cupronickel)

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

a) Brass

| 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 | | |
| | C6872 | 0.1%max | 1% max | 0.1% max | 1% max | |
| Copper (Cu) | 76.0 to 79.0 | — | — | 379 | — | 7440-50-8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Nickel (Ni) | 0.2 to 1.0 | — | 308 | 418 | — | 7440-02-0 |
| Zinc (Zn) | Bal. | — | — | — | — | 7440-66-6 |
| Aluminum (Al) | 1.8 to 2.5 | — | — | — | — | 7429-90-5 |
| Iron (Fe) | 0.05 max | — | — | — | — | 7439-89-6 |
| Lead (Pb) | 0.05 max | — | 304 | 411 | — | 7439-92-1 |
| Arsenic (As) | 0.02 to 0.06 | 332 | — | 458 | — | 7440-38-2 |

b) Nickel silver

| 3.2. Elements | 3.2 Composition (mass%) | | | | | | 3.4 Ordinance No. (Only Substances Subject to MSDS Publication) | | | | 3.5CAS No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | C 7351 | C 7451 | C 7521 | C 7541 | C 7701 | C 7941 | PRTR Law | | Industrial Safety and Health Law | | |
| | | | | | | | 0.1 %≦ | 1 %≦ | 0.1 %≦ | 1 %≦ | |
| Copper (Cu) | 70.0 to 75.0 | 63.0 to 67.0 | 62.0 to 66.0 | 60.0 to 64.0 | 54.0 to 58.0 | 60.0 to 64.0 | — | — | 379 | — | 7440-50-8 |
| Nickel (Ni) | 16.5 to 19.5 | 8.5 to 11.0 | 16.5 to 19.5 | 12.5 to 15.5 | 16.5 to 19.5 | 16.5 to 19.5 | — | 308 | 418 | — | 7440-02-0 |
| Zinc (Zn) | Bal. | Bal. | Bal. | Bal. | Bal. | Bal. | — | — | — | — | 7440-66-6 |
| Manganese (Mn) | 0 to 0.50 | 0 to 0.50 | 0 to 0.50 | 0 to 0.50 | 0 to 0.50 | 0 to 0.50 | — | 412 | — | 550 | 7439-96-5 |
| Iron (Fe) | 0.25 max | 0.25 max | 0.25 max | 0.25 max | 0.25 max | 0.25 max | — | — | — | — | 7439-89-6 |
| Lead (Pb) | 0.03 max | 0.03 max | 0.03 max | 0.03 max | 0.03 max | 0.8 to 1.8 | — | 304 | 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. 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. 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. 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. 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. 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

| | Brass | Nickel silver |
|---|---|---|
| 9-1.Appearance of a chemical product,<br>・physical state and colour,<br>・form<br>・odour | <br>Lustrous golden solid<br>Depends on product form<br>None | <br>Lustrous silver-white solid<br>Depends on product form<br>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

| | Brass | Nickel silver | | | | |
|---|---|---|---|---|---|---|
| | C6872 | C7351 | C7451 | C7521 | C7541 | C7701 | C7941 |
| 9-3. Melting point (ºC) | 935 | — | — | 1070 | 1040 | — | — |
| 9-10. Relative density | 8.33 | — | 8.69 | 8.73 | 8.70 | 8.70 | — |

c) Configuration element characteristics

| | Cu | Ni | Mn | Zn | Al | Fe | Pb | As |
|---|---|---|---|---|---|---|---|---|
| 9-8. Vapor pressure (Pa) | — | — | — | — | — | — | — | — |
| 9-9. Boiling point (ºC) | 2582 | 2910 | 2060 | 907 | 2520 | 2860 | 1750 | Sublimination 610 |

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.<br>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. 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. Nickel

| | | |
|---|---|---|
| Acute toxicity: | Oral: | Rat $LD_{50}$>9000 mg/kg<br>(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. 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. 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. 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. 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. Nickel

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