Safety Data Sheet (MSDS③)	SDS № P.1

1. Identification

1-1. Name of chemical substances, etc. (product name)

Alloy name	Corresponding JIS H no.	Alloy no.	Form	Category of substance	Content of chemical composition
Picoless	---	---	Tube	Single substance	As shown in the table P.4

1-2. Company information

Company name: KMCT Corporation

Address: 65 Hirasawa Hadano-city, Kanagawa-PREF. 257-0015 Japan

Department: Quality Assurance Section

Telephone: +81-463-82-2600 Fax: +81-463-82-7540

[Revised (3) on: 1st. April 2022]

2. Hazard Classification

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

2-1 Copper: GHS classification

Physical hazard	Explosives	Not applicable
	Flammable gas	Not applicable
	Flammable aeroso	Not applicable
	Oxidizing gas	Not applicable
	Compressed gas	Not applicable
	Flammable liquid	Not applicable
	Flammable solid	Not classifiable
	Self-reactive substances and mixture	Not applicable
	Pyrophoric liquid	Not applicable
	Pyrophoric solid	Not classifiable
	Self-heating substances and mixture	Not classifiable
	Substances and mixtures that, in contact with water, emit flammable gas	Not classifiable
	Oxidizing liquid	Not applicable
	Oxidizing solid	Not applicable
	Organic peroxide	Not applicable
	Corrosive to metal	Not classifiable
Health hazards	Acute toxicity (oral)	Not classifiable
	Acute toxicity (dermal)	Not classifiable
	Acute toxicity (inhalation: gas)	Not applicable

Acute toxicity (inhalation: vapor)	Not classifiable
Acute toxicity (inhalation: dust)	Not classifiable
Acute toxicity (inhalation: mist)	Not classifiable
Skin corrosion/irritation	Not classifiable
Serious eye damage/irritation	Not classifiable
Respiratory sensitization	Not classifiable
Skin sensitization	Not classifiable
Germ cell mutagenicity	Not classifiable
Carcinogenicity	Unclassified
Toxic to reproduction	Not classifiable
Specific target organ toxicity, systemic toxicity (single exposure)	
	Category 3 (respiratory tract irritation)
	Label elements 
Specific target organ toxicity, systemic toxicity (repeated exposure)	
	Category 1 (liver)
	Label elements 
Aspiration hazard	Not classifiable

Environmental hazard

Short-term (acute) hazardous to the aquatic environment		Not classifiable
Long-term (chronic)	hazardous to the aquatic environment	Category 4
		No diagram

2-2 Tin: GHS classification

Physical hazard	Explosives	Not applicable
	Flammable Gas	Not applicable
	Flammable aerosol	Not applicable
	Oxidizing gas	Not applicable
	Compressed gas	Not applicable
	Flammable liquid	Not applicable
	Flammable solid	Not classifiable
	Self-reactive substances and mixture	Not applicable
	Pyrophoric liquid	Not applicable
	Pyrophoric solid	Not classifiable
	Self-heating substances and mixture	Not classifiable

	Substances and mixtures that, in contact with water, emit flammable gas	
		Not classifiable
	Oxidizing liquid	Not applicable
	Oxidizing solid	Not applicable
	Organic peroxide	Not applicable
	Corrosive to metal	Unclassifiable
Health hazards	Acute toxicity (oral)	Not classifiable
	Acute toxicity (dermal)	Not classifiable
	Acute toxicity (inhalation: gas)	Not applicable
	Acute toxicity (inhalation: vapor)	Not classifiable
	Acute toxicity (inhalation: dust, mist)	Not classifiable (dust)
	Acute toxicity (inhalation: dust, mist)	Not applicable (mist)
	Skin corrosion/irritation	Not classifiable
	Serious eye damage/irritation	Not classifiable
	Respiratory sensitization	Not classifiable
	Skin sensitization	Not classifiable
	Germ cell mutagenicity	Not classifiable
	Carcinogenicity	Not classifiable
	Toxic to reproduction	Not classifiable
	Specific target organ toxicity, systemic toxicity (single exposure)	
		Unclassifiable
	Specific target organ toxicity, systemic toxicity (repeated exposure)	
		Category 1 (lungs)
		Label elements 
	Aspiration hazard	Not classifiable
Environmental hazard		
Short-term (acute) hazardous to the aquatic environment		Not classifiable
Long-term (chronic) hazardous to the aquatic environment		Category 4
		No diagram

3. Composition/Information on Ingredients

3-1. Single substance or mixture : Shown in the table in Section 1-1.
3-2. Chemical name : The alloy types and names are shown in the table in Section 1-1.
Ingredients and content : As shown in the table below.
3-3. Chemical formula or structural formula : None
3-4. Ordinance no. (PRTR Law, ISHA) : As shown in the table below.
3-5. CAS no. : As shown in the table below.

3.2 Ingredients	3.2. Content (mass %)	3-4. Ordinance no. (Only for substances included in SDS)				3.5 CAS No.
		ENCS (PRTRs)		ISHL		
		0.1%≤	1%≤	0.1%≤	1%≤	
Copper (Cu)	99.55≤	-	-	379	-	7440-50-8
Phosphorus (P)	0.015≤0.040	-	-	-	-	7723-14-0
Tin (Sn)	0.24≤0.30	-	-	322	-	7440-31-5
Zirconium (Zr)	0.03≤0.05	-	-	-	-	7440-67-7

4. First-Aid Measures

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

4-1. Copper

If inhaled: Remove the victim to fresh air, and keep the victim calm in a position comfortable for breathing.
Seek medical advice if the victim feels sick.

If on skin: Remove contaminated clothing.
Immediately wash the skin.
Seek medical attention and treatment if the victim feels sick.
Wash the contaminated clothes before reusing.

If in eyes: Wash the eyes carefully with water for a few minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
Seek medical attention and treatment.

If swallowed: Immediately rinse mouth with water, and seek medical advice.

Expected acute and delayed symptoms: Redness of eyes and skin, ocular pain, cough, headache, shortness of breath, sore throat, abdominal pain, nausea, vomiting. Delayed symptom: Metal fume fever

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

Special precautions for physicians: The victim requires rest and medical follow-up observation.

4-2. Tin

If inhaled	Remove the victim to fresh air, and keep the victim calm in a position comfortable for breathing. Seek medical advice. Special measures (If emergency administration of an antidote is required, refer to the supplementary first-aid instructions)
If on skin	Immediately wash the skin. Seek medical advice. Wash the contaminated clothes before reusing.
If in eyes	Wash the eyes carefully with water for a few minutes. Seek medical advice. Special measures (If emergency treatment is required, refer to the supplementary first-aid instructions)
If swallowed	Rinse mouth with water. Seek medical advice. Special measures (If emergency treatment is required, refer to the supplementary first-aid instructions)
Expected acute and delayed symptoms	If inhaled: Vapor and mist irritate the lungs and upper trachea. If on skin: Irritates the skin. If in eyes: Irritates the mucosa.

5. Fire-Fighting Measures

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

5-1. Copper

Extinguishing media	Special powder extinguisher, dry sand.
Incompatible extinguishing media	Water jet, foam extinguisher, CO_2.
Specific hazards	May product irritative, toxic, or corrosive gases and fumes in fire. Using water on a metal fire may produce hydrogen gas.
Specific fire-fighting measures	Remove the containers from the area of the fire if not dangerous to do so. It is desirable to use sealing and suffocation methods in extinguishing a metal fire.
Protection of firefighters	Wear appropriate air respirators and chemical protective clothing for fire fighting.

5-2. Tin

Extinguishing media:	Special powder extinguisher, dry sand. 1)
Incompatible extinguishing media:	Use of other extinguishers is prohibited. 1)
Specific hazards:	The substance is flammable. 1) If the substance is in powder form, the dust may cause an explosion.

	Reacts with strong oxidizers 1)
Specific fire-fighting measures	Fire should be extinguished from a distance and only close enough for effective fire fighting. Remove the containers from the area of the fire if not dangerous to do so. If the containers are not movable, cool the container by pouring water on and around the containers. After the fire is extinguished, continue to pour a large amount of water to cool the containers sufficiently.
Protection of firefighters	Wear complete protective clothing (heat-resistant), including appropriate air respirators.

6. Accidental Release Measures

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

6-1. Copper

Personal precautions, protective equipment, and emergency measures

	Prohibit unauthorized access. Do not touch the spillage or walk in it. The personnel working on the spillage must wear appropriate clothing (refer to the section 8 “Exposure Control/Personal Protection") and avoid contact with eyes and skin, as well as the inhalation of gases and fumes.
Environmental precautions	Avoid discharging into waterways as it has an impact on the environment.
Retrieval and neutralization	Collect the spillage into an empty sealable container and dispose of it afterwards.

Methods and apparatus for containment and cleaning

	Stop the spillage if not dangerous to do so.
Prevention of secondary disasters	Quickly remove all sources of fire as well as flammable substances. (Prohibit smoking, sparks, and fire nearby) Prevent release to drainage, sewer, basements, and enclosed locations.

6-2. Tin

Personal precautions, protective equipment, and emergency measures

	Do not touch the spillage or walk in it. Immediately isolate the area around the spillage at an appropriate distance in all directions. Prohibit unauthorized access. The personnel working on the spillage must wear appropriate clothing (refer to the section 8 “Exposure Controls/Personal

Protection") and avoid contact with eyes and skin, as well as the inhalation of gases.
If fire is not occurring with the spillage, wear highly sealed and no-permeable protective clothing.
Stay on the windward side.
Keep away from low grounds.
Broken containers or the spillage must not be touched without wearing appropriate protective clothing.

Environmental precautions: Avoid discharging into waterways as it has an impact on the environment.
The substance must not be released into the environment.

Retrieval and neutralization: If the amount of spillage is small, collect the spillage into a dry, clean container using a clean antistatic equipment, cover the top loosely, and dispose of it afterwards.
If there is a large amount of spillage, wet with water and set up protective fences, then dispose of it afterwards.

Methods and apparatus for containment and cleaning, prevention of secondary disasters
Stop the spillage if not dangerous to do so.
Quickly remove all sources of fire. (Prohibit smoking, sparks, and fire nearby)
The removal process should be conducted carefully, as the substance remaining on the floor surface may cause slipping.

7. Handling and Storage

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

7-1. Copper

<Handling>

Technical measures: Carry out facility measures described in the section 8 “Exposure Controls/Personal Protection” and wear protective equipment.

Local exhaust ventilation and general ventilation
Local exhaust ventilation and general ventilation are to be carried out as described in the section 8 “Exposure Controls/Personal Protection.”

Safety precautions: Do not eat, drink, or smoke when using this product.
Carry out antistatic measures and use conductive protective clothing and conductive safety shoes.
The product must only be used outdoors or in a well-ventilated location.
Do not touch, inhale, or ingest.
Do not inhale dust or fumes.
Wash the hands thoroughly after handling.

Avoiding of contact: Refer to section 10 “Safety and Reactivity.”

<Storage>

Technical measures	Storage location must be equipped with lighting, illumination, and ventilation facility necessary for the storage and handling of dangerous goods.
Incompatible materials	Refer to section 10 “Safety and Reactivity.”
Storage conditions	Container must be sealed and stored in a well-ventilated, cool place. The product must be stored away from sources of fire, such as heat, sparks, and open flame. - Smoking is prohibited. The product must be stored away from incompatible materials. The product must be stored in a locked location.
Containers and packaging materials	No regulations are set out regarding packaging and containers; however, the product should be stored in a sealable, non-broken container.

7-2. Tin

<Handling>

Technical measures	Carry out facility measures described in section 8 “Exposure Controls/Personal Protection” and wear protective equipment.
Local exhaust ventilation and general ventilation	Local exhaust ventilation and general ventilation are to be carried out as described in section 8 “Exposure Controls/Personal Protection.”
Safety precautions	High temperature materials, sparks, and fire must not be used around the product. Risk of explosion in fire. The product must be removed from the area of the fire. Handle the product carefully so flying of dust, shock, or rubbing does not occur. The product must only be used outdoors or in a well-ventilated location. Do not touch, inhale, or ingest. Avoid contact with eyes. Do not inhale dust. Do not inhale fumes. Do not inhale mist. Do not inhale sprays. Wash the hands thoroughly after handling.
Avoiding of contact	Refer to section 10 “Safety and Reactivity.”

<Storage>

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

materials.
The roof of the storage location must be made noncombustible materials and covered with light noncombustible materials, such as metal sheets.
The storage location must not have ceilings.
The floor of the storage location must be built to avoid flowing in of water or permeation of water.
Storage location must be equipped with lighting, illumination, and ventilation facility necessary for the storage and handling of dangerous goods.

Incompatible materials: Refer to section 10 “Safety and Reactivity.”

Storage conditions: Store away from sources of fire, such as heat, sparks, and open flame. Smoking is prohibited.
Store away from oxidizers.
Store in a cool, well-ventilated place.
Container must be sealed when storing.
The product must be stored in a locked location.

Containers and packaging materials: No regulations are set out regarding packaging and containers; however, the product should be stored in a sealable, non-broken container.

8. Exposure Controls/Personal Protection

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

8-1. Copper

Administrative level: Not specified.

Permissible exposure limit (exposure limit, Biological Exposure Indices)

Japan Society for Occupational Health (2005 Edition)
Not specified.

ACGIH (2005 edition)
TLV-TWA 0.2 mg/m^3 (As fume)
TLV-TWA 0.1 mg/m^3 (As dust, mist)

Facility measures: Use appropriate explosion-proof electric, ventilation, and illumination devices.
Measures must be taken to prevent sparks from static electricity.
In order to keep the concentration of the substance in the air below the recommended administrative level, facility measures, such as enclosed processes and local exhaust ventilation must be carried out.
The worksite where the substance is stored or handled must be equipped with eye washing and safety shower facilities.

Protective equipment

Respiratory protection: Wear appropriate respiratory protection.

Hand protection: Wear appropriate hand protection.

Eye protection: Protective glasses (standard glasses, standard glasses with side

	board, goggle-type)
Skin and body protection	Wear protective equipment such as protective clothing and safety shoes.
Hygiene measures	Do not eat, drink, or smoke when using this product. Wash the hands thoroughly after handling.

8-2. Tin

Administrative level	Not specified.
Permissible exposure limit (exposure limit, Biological Exposure Indices)	
Japan Society for Occupational Health (2005 Edition)	
	Not specified.
ACGIH (2005 edition)	TLV-TWA 2 mg/m^3 (As Sn)
Facility measures	Use appropriate explosion-proof electric, ventilation and illumination devices. The worksite where the substance is stored or handled must be equipped with eye washing and safety shower facilities. Ventilate exhaust in order to keep the concentration of the product in the air below the exposure limit. If dust or fumes are produced in high-temperature processes, ventilation devices must be installed to keep the contamination substances in the air below the administrative level.
Protective equipment	
Respiratory protection	Wear appropriate respiratory protection.
Hand protection	Wear appropriate hand protection.
Eye protection	Wear appropriate eye protection. Wear safety glasses. If there is a risk that the substance may come in contact with the eyes or face due to scattering or spraying, general chemical splash goggles and face shields must be worn.
Skin and body protection	Wear appropriate face protection. Wear appropriate protective clothing and boots.
Hygiene measures:	Wash the hands thoroughly after handling.

9. Physical and Chemical Properties: the dash (-) shows no information is available.

a) Description for each product name

	Picoless
9-1. Physical state and color	Lustrous red-pink solid.
Form	Same as the form of the product.
Odor	None
9-2. pH and concentration	-
9-4. Decomposition temperature	-
9-5. Flash point	-
9-6. Auto-ignition temperature	-
9-7. Explosion properties	-
9-11. Solubility in solvents	-
9-12. Octanol/water partition coefficient	-
9-13. Other data (Radioactivity, bulk density, etc.)	-

b) Descriptions for alloy type

Alloy name	Picoless	
9-3. Melting point °C	1083	
9-10. Density g/cm^3	8.94	

c) Description for the constituting elements

	Cu	P	Sn	Zr
9-8. Vapor pressure	-	-	-	-
9-9. Vapor temperature (boiling point) °C	2582	280	2480	4409

10. Stability and Reactivity

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

10-1. Copper

Safety	Develops green color when exposed to moist air. Produces shock-sensitive compounds when in contact with acetylene compounds, ethylenoxide, and azides.
Possibility of hazardous reactions	Risk of explosion when reacted with oxidizers (chlorates, bromates, iodates, etc.).
Conditions to avoid	Contact with moisture and incompatible substances.
Incompatible substances	Acetylene compounds, ethylenoxide, azides, oxidizers

(chlorates, bromates, iodates, etc.)

Hazardous decomposition products	From combustion: Carbon monoxide, carbon dioxide, copper fume.

10-2. Tin

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

11. Toxicological Information

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

11-1. Copper

Acute toxicity	Oral rabbits LDL_0 120 μg/kg [3)]
Skin corrosion/irritation	Causes redness when in contact with skin. [14)]
Serious eye damage/eye irritation	Causes redness when in contact with the eye. Causes pain. [14)] Causes irritation. [10)]
Respiratory or skin sensitization	Respiratory sensitization: No data available. Skin sensitization: Classified as Group 2 for skin sensitization (substance that may cause sensitization in humans) by Japan Society for Occupational Health, and not classified by Japanese Society for Contact Dermatitis.
Germ cell mutagenicity	No data available.
Carcinogenicity	Classified as Group D (substances that cannot be classified as having carcinogenicity in humans) by EPA.
Reproductive toxicity	No data available
Specific target organ toxicity, systemic toxicity (single exposure)	The fume irritates upper trachea. [13)] Considered to cause respiratory tract irritation. May cause respiratory irritation (Category3)
Specific target organ toxicity, systemic toxicity (repeated exposure)	Hepatomegaly was observed in a worker exposed to a high concentration of the substance in the air (estimated amount of

200 mg/day)[11)]
Liver disorders from long-term or repeated exposure (Category 1)

Aspiration hazard: No data available.

11-2. Tin

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

Skin corrosion/irritation: No information
Serious eye damage/eye irritation: No definite data available
Respiratory sensitization: No information
Skin sensitization: No information
Germ cell mutagenicity: No data available.
Carcinogenicity: No definite data available
Toxic to reproduction: No information
Specific target organ toxicity, systemic toxicity (single exposure)
No definite data available
Specific target organ toxicity, systemic toxicity (repeated exposure)
Coniosis was observed in workers handling metallic tin. [33)]
Long-term exposure to this substance may cause benign coniosis (stannosis). [1)]
Organ damage from long-term or repeated exposure (Category 1) (Lungs)
Long-term or repeated exposure causes renal disorders.
Long-term or repeated exposure causes lung disorders.
Aspiration hazard: No data available.

12. Ecological Information

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

12-1. Copper

Short-term (acute) hazardous to the aquatic environment
Unclassifiable due to insufficient data.
Long-term (chronic) hazardous to the aquatic environment
Although there is a data which states L(E) $C_{50} \leq 100$ mg/L, the substance was classified as Category 4, as it is metal and its behavior in water is not known.

12-3. Tin — No information

13. Disposal Considerations

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

13-1. Copper

Residual waste	The substances should be disposed of in accordance with relevant legislation and local regulations. If certain industrial waste processors are licensed by prefectural premiers, or if local public bodies are in charge of processing these wastes, the waste processing should be consigned to these parties. When consigning the processing of wastes, this should be done after the waste processors are sufficiently notified of the risks and hazards.
Contaminated containers and packaging	The containers should be either washed and recycled or be disposed of in an appropriate manner, according to the relevant legislations and local regulations. When disposing of empty containers, the contents must be removed completely.

13-2. Tin

Residual waste	The substances should be disposed of in accordance with relevant legislation and local regulations. If certain industrial waste processors are licensed by prefectural premiers, or if local public bodies are in charge of processing these wastes, the waste processing should be consigned to these parties. When consigning the processing of wastes, this should be done after the waste processors are sufficiently notified of the risks and hazards. Do not discharge the waste liquid containing this substance and waste liquid after washing directly into waterways or bury or dispose of the unprocessed products.
Contaminated containers and packaging	The containers should either be washed and recycled or disposed of in an appropriate manner, according to the relevant legislations and local regulations. When disposing of empty containers, the contents must be removed completely. The method of disposing of spray cans differ for each local government. Disposal must be conducted according to the regulations of the relevant local government.

14. Transport Information

Since no regulations exist for the product as alloys, the regulations for the constitutive elements applicable for ISHA (copper, tin) are described below. (JCSCL not applicable)

14-1. Copper

<International regulations>

Information on marine transport regulations	Non-dangerous goods
Information on air transport regulations	Non-dangerous goods

<Domestic regulations>

Information on road transport regulations	No specific regulations have been set out.
Information on marine transport regulations	Non-dangerous goods
Information on air transport regulations	Non-dangerous goods

<Special safety measures> When transporting, avoid direct sunlight and the breakage, corrosion, and leakage of containers and make sure that the load is prevented from collapsing. The product must not be transported with food or animal feed. Heavy loads must not be place on top of the product.

14-2. Tin

<International regulations>

Information on marine transport regulations	Non-dangerous goods
Marine Pollutant:	Not applicable
Information on air transport regulations	Non-dangerous goods

<Domestic regulations>

Information on road transport regulations	Not applicable
Information on marine transport regulations	Non-dangerous goods
Marine pollutant:	Not applicable
Information on air transport regulations	Non-dangerous goods

<Special safety measures> Dangerous goods must be loaded so that the goods or the transport container containing the dangerous goods do not fall, invert, or break. Transport the dangerous goods so that the goods or the container containing the dangers goods do not rub against each other or roll. If there is a risk of disaster (such as significant spillage of dangerous goods) during the transport of the dangerous goods, first-aid measures to prevent disasters must be taken. Also, fire stations and other relevant authorities must be contacted.

15. Regulatory Information

15-1. Copper

Occupational Safety and Health Act	Hazardous substances for which the names, etc., must be notified (Article 57-2, Enforcement Ordinance Article 18-2 attachment table no. 9) (Ordinance number 379)

15-2. Tin

Occupational Safety and Health Act	Hazardous substances for which the names, etc., must be notified (Article 57-2, Enforcement Ordinance Article 18-2 attachment table no. 9) (Ordinance number 322)

16. Other Information (References, etc.)

Japan Copper and Brass Association webpage

Japan Advance Information Center of Safety and Health webpage

Ministry of the Environment webpage

National Institute of Technology and Evaluation webpage

Copper alloy data book (Japan Copper and Brass Association)

16-1. Copper

<References>

1) Ullmanns (E) (5th,1995)
2) Incompatible Substances Hb (2nd, 1997)
3) RTECS (2005)
4) ICSC (J) (1993)
5) Sax (8th, 1992)
6) Lange (14th, 1992)
7) Gangolli (1st, 1993) vol. 2
8) Lide (85th, 2004-2005)
9) SRC (Access on Jul 2005)
10) PATTY (4th, 1994)
11) EHC200 (1998)
12) EPA(IRIS (Access on Jul 2005))
13) ACGIH (7th, 2001)
14) Handbook on Chemical Hazards, Japan Industrial Safety & Health Association (1992)
15) Carcinogenicity Classification and Criteria 6th Edition, Japan Chemical Industry Ecology-Toxicology & Information Center (2004)
16) GHS Classification Results (Sumika Technical Information Service, Inc.)
17) Japan Chemical Industry Association "Container Yellow Card on the Guidance for Emergency First-Aid (label format)"

18) Japan Chemical Industry Association "Chemical Regulation Search System" (CD-ROM) (2005)
19) Japan Chemical Database Ltd. "Complete Chemical Database" (2005)
20) Safety DB (Revised and extended edition, 1997)
21) JETOC "Safety Check Data Collection for the Existing Chemicals in JCSCL"
22) Ministry of the Environment "Project on the Study of Chemical Impact on Environment"

16-2. Tin

<References>

1) ICSC (2004)
2) Hommel (1991)
3) Weiss (2nd. 1985)
4) HSDB (2003)
5) Dangerous Goods DB (2nd. 1993)
6) ESC SYRESS
7) ACGIH (2001)
8) DFGOT vol. 6 (1994)
9) RTECS (2004)
10) ACGIH-TLV (2005)
11) NTP (11th, 2005)
12) Howard (1997)
13) UNRTDG (13th, 2004)
14) SIDS (2002)
15) ECETOC TR4 (1982)
16) SRC (2005)
17) GESTIS (2005)
18) PATTY (5th, 2001)
19) AQUIRE (2003)
20) Merck (13th, 2001)
21) CERI Hazard Data Collection (1998)
22) BUA68 (1991)
23) TOXCENTER (Access on Feb 2005)
24) Sax (11th, 2004)
25) ECETOC TR48 (1998)
26) IUCLID (2000)
27) IARC Vol. 71 (1999)
28) ACGIH (2003)
29) RTECS (VZ200000) HSDB Full record
30) Japan Society for Occupational Health Recommendations (2005)
31) IARC39 (1986)
32) IRIS (1998)
33) EHC 15 (1980)
34) EHC (J) 134 (1997)
35) Renzo (3rd, 1986)
36) Solvents Pocket Book (1997)
37) Lange (16th, 2005)
38) Chapman(2005)

39) Ministry of the Environments, Risk Evaluation Vol. 3 (2002)
40) Incompatible Substances Handbook (2nd, 1997)
41) ATSDR (1997)
42) BSDB (2005)
43) CAMD (Access on May 2005)
44) *J Occup Health* 45:137-139 (2003)
45) *Eur Resper J* 25 (1):201-204 (2005)
46) DFGOT Vol. 12 (1999)
47) NICNAS (1999)
48) EU Annex I (2005)
49) Lide (85th, 2004)
50) EU-RAR (2005)
51) HSDB (2005)
52) ICSC(1999)
53) Ministry of Health Report (2005)
54) ESIS Data Base(2005)

Product safety data sheets are provided to the companies handling hazardous chemical product, as reference information to ensure safe handling. We ask the companies handling these chemical products to please understand that the sheet must be used as a reference for the conduct of appropriate measures suitable for the individual handling circumstance. These actions are to be carried out under the company's own responsibility. This data sheet itself is not a document to assure safety in handling these products.

Revision No.	Contents of revision	Date
0	New dawned	3rd.March.2014
1	Change the title 【Material Safety Data Sheet (MSDS)→Safety Data Sheet (SDS)】	25th.Sep. 2015
2	Change the Item names due to revised JIS Z7252	4th. Nov. 2021
3	Changed the company name has from Kobelco & Materials Copper Tube, Ltd. to KMCT Corporation	1st. Apr. 2022