


Control Number	Revision number	MSDS Submission number	Date of issue
PS-SDS-14	2	AA07087-0000000010	2023. 03. 20
<b>Product name</b>	<b>Phosphorus Bronze</b>		

**SECTION 1 Identification of the substance or mixture and of the supplier**

- A. product name Phosphorus Bronze (Contain : Tin plating material)□  
 \* Product Specification C5102, C5111, C5191, C5210, C5212, C5240
- B. Recommended use of the chemical and restrictions on use  
 \* Recommended use Electricity, Socket, Decoration, Structure, Other Parts□  
 \* Restrictions on use Not available
- C. Manufacturer / Importer / Distributor Information  
 \* Company name Poongsan Ulsan Plant  
 \* Address 94 Sanam-ro Onsan-eup, Ulju-gun, Ulsan  
 \* Emergency phone number +82) 52 - 231 - 9114 (representative telephone), FAX: +82) 52 - 231 - 9400  
 \* Department in charge Quality Assurance Team

※ **This products are solid metallic products which do generally constitute a non hazardous materials in solid. However some hazardous elements contained in these products can be emitted under ceratin processing conditions such as but not limited to: burning, melting, cutting, grinding, machining and welding. The following information is for the hazardous elements which may be released during processing.**

**SECTION 2 Hazards identification**

- A. GHS classification of the substance/mixture Acute aquatic toxicity : Category 1  
 Chronic aquatic toxicity : Category 1
- B. GHS label elements, including precautionary statements  
 \* Pictogram and symbol 
- \* Signal word Warning
- \* Hazard statements H400 Very toxic to aquatic life  
 H410 Very toxic to aquatic life with long lasting effects
- \* Precautionary statements  
 - Precaution P273 Avoid release to the environment.  
 - Treatment P391 Collect spillage.  
 - Storage none  
 - Disposal P501 Dispose of contents/container to an approved waste disposal plant.

C. GHS label elements, including precautionary statements In the case of dust, powder, and fine particles, there is a possibility of an explosion when in contact with an ignition source

**SECTION 3 Composition/information on ingredients**

Alloy no.	Chemical Name	Common Name(Synonyms)	CAS number	Content (%)
C5102	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	4.5 ~ 5.5
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35
C5111	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	3.5 ~ 4.5
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35
C5191	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	5.5 ~ 7.0
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35

C5210	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	7.0 ~ 9.0
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35
C5212	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	7.0 ~ 9.0
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35
C5240	Copper	-	7440-50-8	Balance
	Tin	-	7440-31-5	9.0 ~ 11.0
	Tricopper phosphide	Copper Phosphide (Cu <sub>3</sub> P)	12019-57-7	0.03 ~ 0.35

※ The products may contain small amounts of various elements in those specified, and are actually composed of copper, tin, phosphorus, lead, iron, zinc and unintended impurities.

<b>SECTION 4</b>		<b>First aid measures</b>
A. Eye contact		Call emergency medical service. In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes. Get medical advice/attention if you feel unwell. IF exposed or concerned: Get medical advice/attention.
B. Skin contact		Remove contaminated clothing and shoes and restrict entry to contaminated area. In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
C. Inhalation		Keep victim warm and quiet. Get medical advice/attention. Get medical advice/attention if you feel unwell.
D. Ingestion		Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Get medical advice/attention. Get medical advice/attention if you feel unwell.
E. Indication of immediate medical attention	□	Effects of contact or inhalation may be delayed. Exposures require specialized first aid with contact and medical follow-up .

<b>SECTION 5</b>		<b>Fire fighting measures</b>
A. Suitable (and unsuitable) extinguishing media		Suitable extinguishing media: Covered fire extinguishers and powder fire extinguishers for dry sand, expanded vermiculite, expanded perlite, water spray etc. Unsuitable extinguishing media : high pressure water
B. Specific hazards arising from the chemical		May be ignited by heat, sparks or flames. Containers may explode when heated. Inhalation of material may be harmful.
C. Special protective equipment and precautions for fire-fighters		Move containers from fire area if you can do it without risk. Runoff from fire control or dilution water may cause pollution. Dike fire-control water for later disposal; do not scatter the material. Fire involving Tanks; Cool containers with flooding quantities of water until well after fire is out. Fire involving Tanks; Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. In case of fire: Use personal protective equipment as required. Fire involving Tanks; Always stay away from tanks engulfed in fire.

<b>SECTION 6</b>		<b>Accidental release measures</b>
A. Personal precautions, protective equipment and emergency procedures		Clean up spills immediately, observing precautions in Protective Equipment section. Keep unnecessary and unprotected personnel from entering. Do not breathe dust/fume/gas/mist/vapours/spray. Wear protective gloves/protective clothing/eye protection/face protection.
B. Environmental precautions and protective		Prevent entry to waterways



**SECTION 9****Physical and chemical properties**

A. Appearance	
* Description	Solid
* Color	Red
B. Odor	Odorless
C. Odor threshold	Not available(No Data)
D. pH	Not available(No Data)
E. Melting point/freezing point	1027 °C
F. Initial boiling point and boiling range	Not available(No Data)
G. Flash point	Not available(No Data)
H. Evaporation rate	Not available(No Data)
I. Flammability (solid, gas)	Not available(No Data)
J. Upper/lower flammability or explosive limits	Not available(No Data)
K. Vapor pressure	Not available(No Data)
L. Solubility (ies)	Insoluble
M. Vapor density	Not available(No Data)
N. Specific gravity	8.80 (Water=1)
O. Partition coefficient n-octanol/water	Not available(No Data)
P. Auto ignition temperature	Not available(No Data)
Q. Decomposition temperature	Not available(No Data)
R. Viscosity	Not available(No Data)
S. Molecular weight	Not available(No Data)

**SECTION 10****Stability and reactivity**

A. Chemical stability and Possibility of hazardous reactions	May decompose at high temperatures into forming toxic gases. Stable at room temperature, normal pressure and normal use. Inhalation of material may be harmful. Containers may explode when heated.
B. Conditions to avoid	Ignition sources (heat, sparks or flames)
C. Incompatible materials	Flammable material, acids, oxidizing agents, alkalis
D. Hazardous decomposition products	Irritating, corrosive and/or toxic gases

**SECTION 11****Toxicological information**

## A. Information of Health Hazardous

## \* Acute toxicity

## - Oral

**ATEmix >2000 (mg/kg) → Not classified**

Copper	LD50 >2500mg/kg rat(male)(OECD Guideline 423)(read-across: Copper oxide)(ECHA)
Tin	LD50 >2000mg/kg rat(female)(OECD Guideline 423)(ECHA)
Tricopper phosphide	Not available(No Data)

- Dermal **ATEmix >2000 (mg/kg) → Not classified**

Copper	LD50 >2000mg/kg rat(OECD Guideline 402)(read-across: Copper oxide)(ECHA)
Tin	LD50 >2000mg/kg rat (OECD Guideline 402)(ECHA)
Tricopper phosphide	Not available(No Data)

- Inhalation **Dust/mist ATEmix >5 (mg/L) → Not classified**

Copper	Dust/mist LC50 >5.11mg/L 4hr rat (OECD Guideline 436)(Coated copper flakes)(ECHA)
Tin	Dust LC50 >4.75mg/L 4hr rat (OECD Guideline 403)(ECHA)
Tricopper phosphide	Not available(No Data)

\* Skin corrosion/ irritation **Not classified**

Copper	No irritation observed (Species: rabbit) (OECD Guideline 404) (read-across: Copper oxide) (ECHA)
Tin	In vivo- No irritant results from skin corrosion/irritation test (Species: rabbit) (EU Method B.4) (ECHA)
Tricopper phosphide	Not available(No Data)

\* Serious eye damage/ irritation **Not classified**

Copper	No irritation observed (Species: rabbit) (OECD Guideline 405) (read-across: Copper oxide) (ECHA)
Tin	In vivo- No irritation as a result of severe eye damage/irritation (Species: rabbit)(OECD Guideline 405)(ECHA)
Tricopper phosphide	Not available(No Data)

\* Respiratory sensitization Not available(No Data)

\* Skin sensitization **Not classified**

Copper	Not sensitizing (species: guinea pig) (OECD Guideline 406) (analog: Copper oxide) (ECHA)
Tin	As a result of skin sensitization test, the substance does not show sensitization (ECHA)
Tricopper phosphide	Not available(No Data)

\* Carcinogenicity **Not classified**

- ACGIH Tin: A4 (Tin and organic compounds, as Sn)

\* Mutagenicity **Not classified**

Copper	in vitro- gene mutation study in bacteria results : NEGATIVE(Species: S. typhimurium TA 1535, TA 1537, TA 98 and TA 100 and S. typhimurium TA 1538)(OECD Guideline 471)(ECHA)(read-across: Copper sulphate pentahydrate CAS No. 7758-99-8)(ECHA) in vivo- mammalian somatic cell study: cytogenicity / erythrocyte micronucleus results NEGATIVE(Species: mouse)(EU Method B.12)(read-across: Copper sulphate pentahydrate CAS No. 7758-99-8)(ECHA)
Tin	in vitro- gene mutation study in bacteria results : NEGATIVE(Species: S. typhimurium TA 1535, TA 1537, TA 98, TA 100 and TA 102)(OECD Guideline 471)(ECHA) in vitro- cytogenicity / chromosome aberration study in mammalian cells results : NEGATIVE(Species: Chinese hamster Ovary (CHO))(OECD Guideline 473)(ECHA) in vitro- cytogenicity / chromosome aberration study in mammalian cells results : NEGATIVE(Species: Chinese hamster Ovary (CHO))(OECD Guideline 476)(ECHA)
Tricopper phosphide	Not available(No Data)

\* Reproductive toxicity **Not classified**

Copper	As a result of the second generation reproductive toxicity test, no reproductive toxicity was observed at any concentration (species: rat) (OECD Guideline 416) (read-across: Copper sulphate pentahydrate CAS No. 7758-99-8) (ECHA) As a result of the developmental toxicity test, the mean fetal weight was slightly lower and the incidence of skeletal mutation was slightly increased, but was not related to teratogenesis, preimplantation loss, or fetal death 6 mg/kg (Species: rabbit) (OECD Guideline 414) (read-across: copper ( 1+) hydroxide CAS No. 1344-69-0) (ECHA)
Tin	As a result of the reproductive toxicity test, no treatment was achieved when the drug was administered by gavage to the test species for up to 56 days F1 NOEL >1000mg/kg (species: rat) (OECD Guideline 421) (ECHA) As a result of developmental toxicity test, the dose was not affected NOEL 1000mg/kg (Species: Rat)(OECD Guideline 414)(ECHA)
Tricopper phosphide	Not available(No Data)

\* Specific target organ toxicity **Not classified**

(single exposure)

Copper	As a result of the dermal acute toxicity test, no clinical signs indicative of harmful or serious toxicity were observed, no deaths were found (read-across: Copper sulphate pentahydrate) (ECHA)
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Tin	Fine particles may cause physical irritation of the respiratory tract (ICSC) (Irritation due to the physical properties of metal particles does not apply to this classification) Acute toxicity Signs of toxic reactions not evident after inhalation exposure (ECHA)
Tricopper phosphide	Not available(No Data)

\* Specific target organ toxicity (repeat exposure) **Not classified**

Copper	Oral (subchronic)- LOELs for liver damage were 1000 ppm (cancer) and 2000 ppm (male), and results for kidney damage were considered toxicologically insignificant due to their species-specific tendencies (species: rat). (EU Method B.26) (read-across: Copper sulphate pentahydrate CAS No. 7758-99-8) (ECHA) Inhalation (subacute)- Not classified as no serious effects were observed as a result of the test (Species: rat) (OECD Guideline 412) (read-across: Copper oxide) (ECHA)
Tin	Oral (subacute)- no associated toxicity was observed in test species administered at dose levels of 30, 300 and 1000 mg/kg for 28 days (species: rat) (OECD Guideline 407) (ECHA) When exposed to respiratory dust or fumes, it is deposited by physical action and causes benign pneumoconiosis in humans.
Tricopper phosphide	Not available(No Data)

\* Aspiration Hazard Not available(No Data)

## SECTION 12 Ecological information

### A. Ecological toxicity

#### \* Fish

Copper	LC50 38.4~256.2µg/L 96hr Pimephales promelas (read-across: copper sulfate CAS No. 7758-98-7)(ECHA)
Tin	LC50 >12.4mg/L 96hr Pimephales promelas(OECD Guideline 203)(ECHA)
Tricopper phosphide	Not available(No Data)

#### \* Crustacean

Copper	EC50 31.8µg/L 48hr Ceriodaphnia dubia(ECHA)
Tin	Not available(No Data)
Tricopper phosphide	EC50 > 0.03 mg/L 48 h (Daphnia magna)(OECD Guideline 202)(ECHA)

#### \* Algae

Copper	EC50 32~245µg/L 72hr Pseudokirchneriella subcapitata (read-across: Copper sulphate pentahydrate CAS No. 7758-99-8)(ECHA)
Tin	EC50 >19.2µg/L 72hr Pseudokirchneriella subcapitata (OECD Guideline 201)(ECHA)
Tricopper phosphide	Not available(No Data)

### B. Persistence and degradability

\* Persistence Not available(No Data)

\* Degradability Not available(No Data)

### C. Bioaccumulative potential

\* Bioaccumulation Not available(No Data)

\* Biodegradation Not available(No Data)

D. Mobility in soil Not available(No Data)

### E. Other hazardous effect

Copper	Fish: NOEC 57.8, 109µg/L 96hr 32day Cyprinodon variegatus (OECD Guideline 210) (read-across: Copper (II) chloride dihydrate CAS No. 10125-13-0)(ECHA) Crustacean: NOEC 21.5~181µg/L 21day Daphnia magna (OECD Guideline 211) (read-across: Copper sulphate CAS No. 7758-98-7)(ECHA) Algae: NOEC 37.6~170.8µg/L 72hr Pseudokirchneriella subcapitata (read-across: copper chloride)(OECD Guideline 201)(ECHA)
Tin	Crustacean: NOEC 100µg/L 7day Ceriodaphnia dubia (ECHA)
Tricopper phosphide	Not available(No Data)

## SECTION 13 Disposal considerations

A. Disposal method Waste must be disposed of in accordance with federal, state and local environmental control regulations.

B. Disposal precaution Dispose of contents/container in accordance with relevant regulation.

Refer to manufacturer or supplier for information on recovery or recycling.

SECTION 14	Transport information
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A. UN Number	Not regulated
B. UN Proper shipping name	Not regulated
C. Transport Hazard class	Not regulated
D. Packing group	Not regulated
E. Environmental hazards	Not regulated
F. Special precautions	Not regulated
* in case of fire	
* in case of leakage	

SECTION 15	Regulatory information
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A. U.S.A Regulatory information & Other regulations	
* U.S.A Regulatory information	
- U.S.A management information	Copper(2270 kg (5000 lb))
□ (CERCLA Regulation)	
- U.S.A management information	Not regulated
(EPCRA 302 Regulation)	
- U.S.A management information	Not regulated
(EPCRA 304 Regulation)	
- U.S.A management information□	Copper(regulated)
(EPCRA 313 Regulation)	
* Other regulations	
- Substance of Rotterdam Convention	Not regulated
- Substance of Stockholm Convention	Not regulated
- Substance of Montreal Protocol	Not regulated
- Harmonised classification	Copper(Aquatic Chronic 2(H411))
Annex VI of Regulation (EC) No	
1272/2008 (CLP Regulation)	

SECTION 16	Other information
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A. Information source and references	CAMEO Chemicals (steam pressure) ECHA (Generative toxicity, crustaceans, epigrams, percutaneous, other harmful effects, melting points/fish points, reproductive cell mutation, severe eye damage or irritation, fish, spontaneous combustion temperature, algae, specific target organ toxicity (repetitive exposure), dermatologic toxicity, skin corrosion or irritation, inhalation) ECHA Registered substances(Weight, characteristics) EPISUITE(Partition coefficient n-octanol / water (kow)) HSDB(Odor, color, initial boiling point and boiling point range) ICSC(solubility) pubchem(molecular weight) Self test analysis data (Ulsan site Quality Assurance Team)
B. Issuing date	March 25, 2022
C. Revision number and date	
* revision number	Ver. 2
* date of the latest revision	March 20, 2023
D. Others	This Material Safety Data Sheet (SDS) is prepared according to the GHS (Globally Harmonized System of Classification and Labeling of Chemicals) standards of Korea. This data does not guarantee product quality, but describes safety, health and environmental issues for handling under normal conditions. If the properties of the product are changed due to heating or processing according to the usage method, please check the additional safety and health information before use.

In addition, this information may be revised without prior notice, and materials can be provided through our website ([www.poongsan.co.kr](http://www.poongsan.co.kr)).  
For other details, please contact our Safety Environment Team or Quality Assurance Team.