PONGSAN		SDS		
		(SAFETY DATA SHEET)		
Control Number	Revision	number	MSDS Submission number	Date of issue
PS-SDS-13	1		AA07087-000000032	2022. 06. 29
Product name			Naval Brass	-
SECTION 1		Identification o	f the substance or mixture and of the supplier	
A. product name		Naval Brass		
* Product Specification		C4641		
B. Recommended use of the	e chemical and res			
* Recommended use		-	s, Ships, Other Parts	
* Restrictions on use		Not available		
C. Manufacturer / Importer	/ Distributor Inforr		-	
* Company name		Poongsan Ulsan		
* Address * Emergency phone num	ber		nsan-eup, Ulju-gun, Ulsan 9114 (representative telephone), FAX: +82) 52 - 2	31 - 9400
* Department in charge		Quality Assurance	• • •	51 5400
limited to: burning, mel	ting, cutting, grin	ding, machining	oducts can be emitted under ceratin processing and welding. which may be released during processing.	
SECTION 2		Hazards identif		
A. GHS classification of the	substance/mixture			
		-	xicity : Category 1A organ toxicity(Repeated exposure) : Category 2(Lun	
			oxicity : Category 1	ig)
		-	toxicity : Category 1	
B. GHS label elements, inclu	Iding precautionary	/ statements		
* Pictogram and symbol				
* Signal word		Danger		
* Hazard statements		H350 May cause	e cancer	
			age of fetus and reproductive ability	
			e damage to organs(Lung) through prolonged or r	repeated exposure
		H400 Very toxic	•	
* Precautionary statemer	atc	H410 Very toxic	to aquatic life with long lasting effects	
- Precaution	115	P201 Obtain spe	ecial instructions before use.	
			ndle until all safety precautions have been read ar	nd understood.
			eathe dust/fume.	
			ase to the environment.	
			ective gloves/protective clothing/eye protection/fa	ace protection/hearing
Treatment		protection.		
- Treatment		P314 Get medic P391 Collect spi	al advice/attention if you feel unwell. llage.	

- P308+P313 IF exposed or concerned: Get medical advice/attention.
- P405 Store locked up.
- Disposal P501 Dispose of contents/container to an approved waste disposal plant.

In the case of dust, powder, and fine particles, there is a possibility of an explosion when in contact with an ignition source

- Storage

C. GHS label elements, including precautionary statements

SECTION 3

Composition/information on ingredients

Alloy no	Chemical Name	Common Name(Synonyms)	CAS number	Content (%)
C4641	Copper	-	7440-50-8	59.0 ~ 62.0
	Zinc	-	7440-66-6	Balance
	Lead	-	7439-92-1	≤ 0.5
	Tin	-	7440-31-5	0.5 ~ 1.0

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

SECTION 4	First aid measures
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 .
SECTION 5	Fire fighting measures
A. Suitable (and unsuitable) extinguishing	Suitable extinguishing media: Covered fire extinguishers and powder fire extinguishers for
media	dry sand, expanded vermiculite, expanded pearlite, 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	Move containers from fire area if you can do it without risk.
precautions for fire-fighters	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 or fire: Use personal protective equipment as required.
	Fire involving Tanks; Always stay away from tanks engulfed in fire.
SECTION 6	Accidental release measures
A. Personal precautions, protective equipment	Clean up spills immediately, observing precautions in Protective Equipment section.
and emergency procedures	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
procedures	

C. The methods of purification and removal	Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container. Absorb the liquid and scrub the area with detergent and water. Avoid release to the environment. Collect spillage.
SECTION 7	Handling and storage
A. Precautions for safe handling	Obtain special instructions before use. Follow all MSDS/label precautions even after container is emptied because they may retain product residues. Avoid release to the environment. Please note that materials and conditions to avoid. Please work with reference to engineering controls and personal protective equipment. Do not handle until all safety precautions have been read and understood. Do not eat, drink or smoke when using this product. Wash the handling area thoroughly after handling.
B. Conditions for safe storage	Store locked up. Store in a closed container. Store in cool and dry place. Empty drums should be completely drained, properly bunged, and promptly returned to a drum control, or properly placed. Keep away from food and drinking water.
SECTION 8	Exposure controls/personal protection
A. Occupational Exposure limits	

* Domestic regulations	2 2
Copper	TWA 1mg/m ³ , STEL 2mg/m ³ (dust and mist)
	TWA 0.1mg/m ³ (fume)
Lead	TWA 0.05mg/m ³
Tin	TWA 2mg/m ³ (metal)
	TWA 0.1mg/m ³ (organic compound)
* ACGIH regulation	
Copper	TWA 0.2mg/m ³ (fume)
	TWA 1mg/m ³ (metal dust)
Lead	TWA 0.05mg/m ³
Tin	TWA 2mg/m ³ (metal)
	TWA 0.1mg/m ³ (organic compound)
* Biological exposure index	
Lead	30 μg/100ml medium: Blood time: Not important. Parameter: Lead (CAUTION): Women whose
	blood Pb of a child with potential exceeds 10 µg/dL are currently at risk of degrading their
	ability as the blood Pb of these children conTinues to increase in the current disease center
	10 μg/dL.
	The child's blood Pb shall be closely monitored and appropriate measures shall be taken to
	minimize the child's exposure to environmental Lead.
Appropriate engineering controls	Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.
Personal protective equipment	
* Respiratory protection	Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
	In case exposed to particulate material, the respiratory protective equipments as follow are recommended. ; facepiece filtering respirator or air-putifying respirator, high-efficiency particulate air(HEPA) filter media or respirator equipped with powered fan, filter media of use(dust, fume) In lack of oxygen(< 19.6%), wear the supplied-air respirator or self-contained breathing
* Eye protection	apparatus. Wear safety goggles as follow if eye irritation or other disorder occur.
^ EVE DIDIECTION	

* Hand protection * Body protection	 In case of vapour state organic material: safety goggles or breathable safety goggles In case of particulate material: breathable safety goggles An eye wash unit and safety shower station should be available nearby work place. Wear appropriate protective gloves by considering physical and chemical properties of chemicals. Wear appropriate protective clothing by considering physical and chemical properties of chemicals.
SECTION 9	Physical and chemical properties
A. Appearance * Description	Solid
* Color	Yellow
B. Odor	Odorless
C. Odor threshold	Not available(No Data)
D. pH	Not available(No Data)
E. Melting point/freezing point	985 ℃
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	8.4 (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
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Coral	ATEmix >2000 (mg/kg) \rightarrow Not classified
Copper	LD50 >2500mg/kg rat(male)(OECD Guideline 423)(read-aross: Copper oxide)(ECHA)
Zinc	LD50 > 2000 mg/kg bw rat (OECD Guideline 401)(ECHA)
Lead	LD50 > 2000mg/kg rat (OECD Guideline 423)(ECHA)
Tin	LD50 > 2000mg/kg rat(female)(OECD Guideline 423)(ECHA)
Dermal	$ATEmix > 2000 (mg/kg) \rightarrow Not classified$
Copper	LD50 >2000mg/kg rat(OECD Guideline 402)(read-aross: Copper oxide)(ECHA)
Zinc	Not available(No Data)
Lead	LD50 >2000mg/kg rat (OECD Guideline 402)(ECHA)
Tin	
Inhalation	LD50 >2000mg/kg rat (OECD Guideline 402)(ECHA)
	Dust/mist ATEmix >1 (mg/L) \rightarrow Not classified
Copper	Dust/mist LC50 > 5.11mg/L 4hr rat (OECD Guideline 436)(Coated copper flakes)(ECHA)
Zinc	Dust LC50 > 5.41mg/L 4hr rat (OECD Guideline 403)(ECHA)
Lead	Aerosol LC50 > 5.05mg/L 4hr rat (OECD Guideline 403)(ECHA)
Tin	Dust LC50 >4.75mg/L 4hr rat (OECD Guideline 403)(ECHA)
kin corrosion/ irritation	Not classified
Copper	No irritation observed (Species: rabbit) (OECD Guideline 404) (read-aross: Copper oxide)
	(ECHA)
Zinc	Not classified as an irritant (Species: rabbit) (ECHA)
Lead	Except for mild erythema, no irritating symptoms were found (species: rabbit) (OECD
	Guideline 404) (ECHA)
Tin	In vivo- No irritant results from skin corrosion/irritation test (Species: rabbit) (EU Method B.4)
	(ECHA)
Serious eye damage/ irritation	Not classified
Copper	No irritation observed (Species: rabbit) (OECD Guideline 405) (read-aross: Copper oxide)
	(ECHA)
Zinc	Not classified as an irritant (species: rabbit) (OECD Guideline 405) (ECHA)
Lead	Not classified as an irritant (species: rabbit) (OECD Guideline 405) (ECHA)
Tin	In vivo- No irritation as a result of severe eye damage/irritation (Species: rabbit)(OECD
	Guideline 405)(ECHA)
Respiratory sensitization	Not available(No Data)
Skin sensitization	Not classified
Copper	Not sensitizing (species: guinea pig) (OECD Guideline 406) (analog: Copper oxide) (ECHA)
Zinc	Not available(No Data)
Lead	Not classified as hypersensitivity (species: guinea pig) (OECD Guideline 406) (ECHA)
Tin	As a result of skin sensitization test, the substance does not show sensitization (ECHA)
	Category 1B
Carcinogenicity	
	Lead: (SMM; Special Management Materials)
ACT	
	Lead: 1B(Lead and norganic compound), 2(Metal)
and Labor	
IARC	Lead: 2A
OSHA	Lead: Applicable
ACGIH	Lead: A3
	Tin: A4 (Tin and organic compounds, as Sn)
NTP	Lead: R
EU CLP	Not classified
/utagenicity	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)(OECDGuideline 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)
Zinc	Not available(No Data)
Zinc	Not available(No Data) Not available(No Data)

in vitro-cytogenicity / drivenosome aberration study in mammalian cells results : NEGATIVE(Species: Chinese hamster Ovary (CHO))(OECD Guideline 473)(ECHA) in vitro-cytogenicity / drivenosome aberration study in mammalian cells results : NEGATIVE(Species: Chinese hamster Ovary (CHO))(OECD Guideline 476)(ECHA) * Reproductive toxicity Category 1A Ac a result of the second generation reproductive toxicity test, no reproductive toxicity was observed at any concentration (species: rab) (ECHA) As a result of the developmental toxicity test, no reproductive toxicity was slightly lower and the in vitro-cytogenicity of the developmental toxicity test, the mean fetal weightly lower and the incidence of skellar huration was slightly lincreased, but was not related restogenesis, preimplantation loss, or fetal death 6 mg/kg (Species: rab)ti (OECD Guideline 414) (read-across: copper (1+) hydroxide CAS No. 1344-69-0) (ECHA) Zinc Not available(No Data) Lead Fertility test results showed that testosterone production could inhibits permatogenesis in the pre-meiosis stage. At all test doess, ascobic acid in the testes was significantly reduced, and seminferous tubule diameter and sperm count were statistically significantly reduced (Species: rat) (ECHA) As a result of the developmental toxicity test, if metal ions are continuously present in early embryonic development, adaptation to the organizing effect may ouccur in sexual differentiation, which may include mechanisms similar to those in response to continuous reguired for testostrone concentration to be suppressed (species: rat) (ECHA) Eu CLP Category 1A 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 5 days FI NOEL > 1000mg/kg (Species: Rat)(OECD Guideline 414)(ECHA) Not classified (single exposure) Copper As a result of the dempental coxite to		
NEGATIVE(Species: Chinese hamster Ovary (CHO)(OECD Guideline 473)(ECHA) in vitro-cytogenicity / chromosome aberration study in mammalian cells results : NECATIVE(Species: Chinese hamster Ovary (CHO)(OECD Guideline 476)(ECHA) * Reproductive toxicity Category 1A Copper As a result of the second generation reproductive toxicity test, no reproductive toxicity was observed at any concentration (species: rat) (OECD Guideline 476)(ECHA) (read-across: Copper subphate pentalydrate 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 terratogenesis, preimplantation loss or fetal death of mg/kg (Species: rabbit) (OECD Guideline 414) (read-across: copper (1+) hydroxide CAS No. 1344-69-0) (ECHA) Zinc Not available(No Data) Lead Fertility test results showed that testosterone production could inhibit spermatogenesis in the pre-meiosis stage. At all test doses, ascorbic acid in the tests was significantly reduced. and seminiferous tubule diameter and sperm count were statistically significantly reduced (Cpacies: rat) (ECHA) As a result of the developmental toxicity test, if metal ions are continuously present in early embypoinc development, adoptation to the organizing effect may occur in sexual differentiation, which may include mechanisms similar to those in response to continuous lead exposure, delayed reproductive toxicity test, no clinical signs indicative of harmful or serious toxicity were observed. no deaths were found (read-across: Copper sulphate pentalydrate) (ECHA) EU CLP Category 1A As a result of the developmental toxicity test, no clinical signs in		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))(OEED Guideline 476)(CCHA) * Reproductive toxicity Category 1A Copper As a result of the second generation reproductive toxicity test, no reproductive toxicity was observed at any concentration (species: rat) (OEED Guideline 416) (reed-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) (OEED Guideline 414) (read-across: copper (1+) hydroxide CAS No. 1344-69-0) (ECHA) Zinc Not available(ND Data) Lead Fertility test results showed that testosterone production could inhibit spermatogenesis in the pre-meiosis stage. At all test doses, ascorbic acid in the testes was significantly reduced, dispecies: rat) (ECHA) As a result of the developmental toxicity test, if metal ions are continuously present in early embryonic development, adaptation to the organizing effect may occur in sexual differentiation, which may include mechanisms similar to those in response to continuous lead deposure, delayed reproductive development. Continuous sequence to heavy metals is required for testosterone concentration to be suppressed (species: rat) (ECHA) EU CD Category 1A 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 Guidelinel 211) (ECHA) Copper		
INEGATIVE(Species: Chinese hamster Ovary (CHO))(OECD Guideline 476)(ECHA) * Reproductive toxicity Category 1A 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 pentaty/drate 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 of mg/k (Species: rabbit) (OECD Guideline 414) (read-across: copper (1-1) hydroxide CAS No. 1344-69-0) (ECHA) Zinc Not available/No Data) Lead Fertility test results showed that testosterone production could inhibit spermatogenesis in the pre-meiosis stage. At all test doses, ascorbic acid in the testes was significantly reduced, and seminiferrous tubule diameter and sperm count were statistically significantly reduced (Species: rat) (ECHA) As a result of the developmental toxicity test, if metal ions are continuous lead exposure, delayder reproductive development. Continuous exposure to heavy metals is required for testosterone concentration to be suppressed (species: rat) (ECHA) EU CUP Category 1A 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 414)(ECHA) As a result of the developmental toxicity test, no clinical signs indicative of harmful or serious toxicity were observed, no deatts were found (read-across: Copper suphate pentalydrate) (ECH		
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Lead No clinical observations related to acute toxicity test (ECHA) 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) * Specific target organ toxicity (repeat exposure) Copper Oral (subchronic)- LOAELs 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		(read-across: Copper sulphate pentahydrate) (ECHA)
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 * Specific target organ toxicity (repeat exposure) Copper Oral (subchronic)- LOAELs 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 		
Acute toxicity Signs of toxic reactions not evident after inhalation exposure (ECHA) * Specific target organ toxicity (repeat exposure) Category 2(Lung) Copper Oral (subchronic)- LOAELs 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	Tin	Fine particles may cause physical irritation of the respiratory tract (ICSC) (Irritation due to the
* Specific target organ toxicity (repeat exposure) Copper Oral (subchronic)- LOAELs 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		physical properties of metal particles does not apply to this classification)
(repeat exposure) Copper Oral (subchronic)- LOAELs 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		Acute toxicity Signs of toxic reactions not evident after inhalation exposure (ECHA)
CopperOral (subchronic)- LOAELs 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	[•] Specific target organ toxicity	Category 2(Lung)
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	(repeat exposure)	
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	Copper	Oral (subchronic)- LOAELs for liver damage were 1000 ppm (cancer) and 2000 ppm (male),
(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		
Inhalation (subacute)- Not classified as no serious effects were observed as a result of the test		
		(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)		(Species: rat) (OECD Guideline 412) (read-across: Copper oxide) (ECHA)
Zinc Not available(No Data)	Zinc	Not available(No Data)
Lead An aqueous concentration of 0.03 mg/l of oral (chronic)-lead may be considered safe for	Lead	An aqueous concentration of 0.03 mg/l of oral (chronic)-lead may be considered safe for
public health and may be recommended for inclusion in public health standards for		public health and may be recommended for inclusion in public health standards for
drinking water (species: rat) (ECHA)		drinking water (species: rat) (ECHA)
Inhalation (Chronic) - A locally expressed immune response is essential for the host's defense		Inhalation (Chronic) - A locally expressed immune response is essential for the host's defense
against antigens and pathogens deposited in the lungs, and contaminants capable of		against antigens and pathogens deposited in the lungs, and contaminants capable of
inhibiting this effect can harm the health of the host. Air pollutants have been shown to		inhibiting this effect can harm the health of the host. Air pollutants have been shown to
reduce animal resistance to subsequent infection and pulmonary immunity	1	reduce animal resistance to subsequent infection and pulmonary immunity
(Species: mouse) (ECHA)		
Tin Oral (subacute)- no associated toxicity was observed in test species administered at dose		(opecies: mouse) (Lenny
levels of 30, 300 and 1000 mg/kg for 28 days (species: rat) (OECD Guideline 407) (ECHA)	Tin	
	Tin	Oral (subacute)- no associated toxicity was observed in test species administered at dose
benign pneumoconiosis in humans.	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)
* Aspiration Hazard Not available(No Data)	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

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)
Zinc	LC50 439µg/L 96hr (ECHA)
Lead	LC50 1170µg/L 96hr Oncorhynchus mykiss (ECHA)
Tin	LC50 >12.4mg/L 96hr Pimephales promelas(OECD Guideline 203)(ECHA)
* Crustacean	
Copper	EC50 31.8µg/L 48hr Ceriodaphnia dubia(ECHA)
Zinc	EC50 860µg/L 48hr (ECHA)
Lead	LC50 596.83µg/L 48hr Ceriodaphnia dubia (ECHA)
Tin	Not available(No Data)
* Algae	
Copper	EC50 32~245µg/L 72hr Pseudokirchneriella subcapitata
	(read-across: Copper sulphate pentahydrate CAS No. 7758-99-8)(ECHA)
Zinc	Not available(No Data)
Lead	EC50 123µg/L 72hr Pseudokirchneriella subcapitata (ECHA)
Tin	EC50 >19.2µg/L 72hr Pseudokirchneriella subcapitata (OECD Guideline 201)(ECHA)

B. Persistence and degradability

* Persistence	
* Degradability	

Not available(No Data) Not available(No Data)

C. Bioaccumulative potential

* Bio	accumulation	
	Copper	Not available(No Data)
	Zinc	Not available(No Data)
	Lead	BCF 1553 (ECHA)
	Tin	Not available(No Data)
* Bio	degradation	Not available(No Data)

- * Biodegradation
- 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)
Zinc	Fish: NOEC 50µg/L 5month Phoxinus phoxinus (ECHA)
	Crustacean: NOEC 25µg/L 1week Ceriodaphnia dubia (ECHA)
	Algae: NOEC 50µg/L 3day Pseudokirchneriella subcapitata (OECD Guideline 201)(ECHA)
Lead	Not available(No Data)
Tin	Crustacean: NOEC 100µg/L 7day Ceriodaphnia dubia (ECHA)

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
A. UN Number	Transport information Not regulated
	•

D. Packing group	Not regulated	
E. Environmental hazards	Not regulated	
F. Special precautions * in case of fire * in case of leakage	Not regulated	
SECTION 15	Regulatory information	
A. U.S.A Regulatory information & Other regulations * U.S.A Regulatory information		

0.5.7 Regulatory information	
- U.S.A management information	Copper(2270 kg (5000 lb))
(CERCLA Regulation)	Zinc(454 kg (1000 lb))
(Lead(4.54 kg (10 lb))
USA management information	Not regulated
- 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)	Zinc(regulated)
	Lead(regulated)
* 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	Zinc(zinc dust (pyrophoric): Pyr. Sol. 1, Water-react. 1, Aquatic Acute 1, Aquatic Chronic 1)
1272/2008 (CLP Regulation)	(zinc dust (stabilised): Aquatic Acute 1, Aquatic Chronic 1)
	Lead (lead massive: [particle diameter ≥ 1 mm]: Lact., Repr. 1A)
	(lead powder; [particle diameter < 1 mm]: Lact., Aquatic Acute 1, Aquatic Chronic 1,
	Repr. 1A)
SECTION 16	Other information
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)
	Zinc (Flammability, pyrophoric, water reactivity)(ECHA)
B. Issuing date	March 25, 2022
C. Revision number and date	
* revision number	Ver. 1
* date of the latest revision	June 29, 2022
	June 23, 2022
D. Others	This Material Safety Data Sheet (SDS) is propared according to the CUS (Clabelly Usersaniand
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

In addition, this information may be revised without prior notice, and materials can be provided through our website (www.poongsan.co.kr).

For other details, please contact our Safety Environment Team or Quality Assurance Team.