Safety Data Sheet

1. Goods and Manufacturers information

Item Name	**Copper Cement**		
Other Name	Copper precipitate, Cement copper, Copper Powder, Copper Concentrate		
Almost Use	Use for recommended use only		
Manufacturer, importer or supplier's name, address	Hou Jan Industrial Co., Ltd.	Add	5 Ching Chien 3rd Rd. Kuan-Yin Industrial Park Taoyuan Taiwan(R.O.C.)
Emergency Phone	TEL : +886-3-4837583		FAX : +886-3-4839026

2. Hazard Identification Information

Hazard Classification :

Aquatic Acute 1, H400, M = 10

Aquatic Chronic 1, H410, M = 1

Labeling :

Signal Word: Warning

Hazard statement(s):

H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273: Avoid release to the environment.

P391: Collect spillage.

P501: Dispose of contents/ container to a licenced waste disposal site.

3. Component Identification Information

Component	Range % W/W	CAS No.
Copper	>70%	7440-50-8
Copper oxide	10 – 20%	1317-38-0
Water	<10%	7732-18-5
Other Ingredients	Balance	

4. First Aid Measures

Description of first aid measures:

Skin Contact :

After contact with skin, wash affected area thoroughly with soap and water. If symptoms develop, seek medical attention.

Eye Contact :

If substance has got into the eye(s), immediately wash out with plenty of water, holding the eyelid(s) open. Take care not to rinse contaminated water into the non-affected eye. If irritation develops and persists, seek medical attention.

Ingestion :

In case of accident by inhalation: remove casualty to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration if not breathing. If symptoms develop seek medical attention.

Ingestion:

Do NOT induce vomiting. Immediately wash out mouth with water. Seek medical attention.

Most important symptoms and effects, both acute and delayed:

Gastro-intestinal symptoms are the first symptoms following high oral intake of copper compounds. Vomiting may occur. The most critical organ for delayed effects of "copper" excess is the liver. Nose/lung irritation may occur after inhalation of dusts

5.Fire Extinguishing Measures

For fire extinguishers: As appropriate for surrounding fire. Extinguish with carbon dioxide, dry chemical, foam or waters pray.

Special hazards arising from the substance or mixture: Copper Cement is non-combustible but dust and fumes containing copper and oxides may be released from a fire. Fumes from a metallic fire are an extreme health hazard.

Advice for fire-fighters: Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

6. Accidental Release Measures

Personal Precautions:

Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation

Environmental Precautions:

Avoid release to the environment. Do not allow to enter drains, sewers or watercourses. If this does occur, the relevant environmental protection or waste management authority should be informed.

Methods for Containment and Clean Up:

Clean up spill immediately. Avoid dust generation. Transfer to a container for disposal. Use appropriate container to avoid environmental contamination.

7. Handling and Storage

Precautions for safe handling

Avoid generating dust, using the smallest possible amounts in designated areas with adequate ventilation. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Label containers and keep them closed when not in use. Wear appropriate protective equipment to prevent inhalation, skin and eye contact. Ensure a high level of personal hygiene is maintained when using this product: always wash hands before eating, drinking, smoking, or using the toilet.

Conditions for safe storage, including any incompatibilities:

Non-combustible. Store in a dry, well-ventilated place. Store in a labelled, corrosion-resistant, closed container.

Storage Temperature: Keep in a cool place out of direct sunlight.

Storage Life: Stable under normal conditions.

Incompatible materials: May react with acids.

8. Exposure Controls

Occupational Exposure Standards:

Occupational Exposure Standards: Copper (Dusts & mist)
PEL (OSHA) / TLV (ACGIH)
1 mg/m³ (8hr TWA)

The following national occupational exposure limit values for copper and copper compounds apply*:

Country	LTEL (8 hr TWA mg/m³)**	STEL (mg/m³) (ca.15 min)	Note:
Taiwan	1	-	Copper, Dusts & mists (as Cu)
	0.2	-	Copper (Fume)

* Sources: SAFEWORK AUSTRALIA: WORKPLACE EXPOSURE STANDARDS FOR AIRBORNE CONTAMINANTS DATE OF EFFECT: 27 APRIL 2018

** TWA is the Time-Weighted Average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life.

Biological limit value: No information available

Appropriate Engineering Controls:

Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposures. If dusts are produced local exhaust ventilation should be used.

Appropriate engineering controls

Provide adequate ventilation when using the material and follow the principles of good occupational hygiene to control personal exposures. If dusts are produced local exhaust ventilation should be used.

Eye Protection:

As a precautionary measure, wear suitable safety glasses with side-shields, goggles, or a full-face shield. Final choice of appropriate eye/face protection will vary according to risk assessments undertaken.

Skin protection:

As a precautionary measure, wear gloves made of an impervious material such as PVC. Final choice of appropriate gloves will vary according to risk assessments undertaken. Wear appropriate clothing including chemical resistant apron.

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment (P1 or P2 particulate filter respirator). Final choice of appropriate breathing protection is dependent upon actual airborne concentrations. An overview of the assigned protection factors (APFs) of different RPE (according to BS EN 529:2005) can be found in the glossary of MEASE (www.ebrc.de/industrial-chemicals- reach/projects-and-references/mease.php).

9.Physical and Chemical Properties

Color: Red/ Brown	**Odor:** Odorless.

Physical State: powder	**Melting Point:** >400℃
Thick Liquid pH : no data	**Boiling Point :** -
Shape: no data	**Vapor Density** (air = 1): no data
Vapor Pressure: no data	**Density**(Water = 1) : no data
Autoignition Temperature: No data	**Explosion Limits:** no data
Flash Point: no data	**Test Method:** not available

10.Stability and Reactivity

Reactivity: Thermally stable

Chemical stability: Stable under normal conditions.

Possibility of hazardous reactions: Will not occur. Polymerization will not occur.

Conditions to avoid: Avoid extremes of temperature and dust generation.

Incompatible materials: Incompatible with oxidising agents (e.g. hypochlorites) and acids (e.g. nitric acid). Reacts violently with chlorine, fluorine, ethylene oxide, acetylene and hydrogen sulphide.

Hazardous decomposition products: In the event of exposure to high temperatures or fire, toxic or irritating fumes may be released, including copper oxides and copper fumes.

11.Toxicological information

Information on toxicological effects

Comparative bioavailability:

Solubility and toxicity studies show that sparingly soluble copper and associated copper compounds are less bioavailable than more soluble copper salts, e.g. copper sulphate. Therefore, in order to reduce animal testing, all long- term studies have been conducted on soluble copper salts.

Absorption:

Copper is an essential element, and therefore its concentration in the body is strictly and efficiently regulated by homeostatic mechanisms.

Oral:

An oral absorption of 25% is used, based on studies in the rat.

Inhalation:

The "respirable" and "inhalable" fraction is assumed by default to be 100%. If necessary, the Multiple Path Model of Particle Deposition (MPPD) can be used to quantify particle size dependent absorption of the "inhalable" fraction.

Dermal:

A dermal absorption of 0.3% has been adopted for soluble and insoluble copper substances in solution or suspension, based on in- vitro percutaneous tests with human skin. For dry exposure, a dermal absorption value of 0.03% applies.

Acute toxicity:

Oral:

Copper powder: No acute oral toxicity data is available. Predicted LD_{50} is > 2000 mg/kg body weight based on read across from other copper compounds and no classification is required.
Copper oxide: LD50 > 2500 mg/kg bw (male rats). Copper oxide does not meet the criteria for classification.Based on above, Copper Cement does not meet the criteria for classification.

Dermal:

Copper Powder: No acute oral toxicity data is available. Predicted LD_{50} is > 2000 mg/kg body weight based on read across from other copper compounds and no classification is required.
Copper oxide: LD50 > 2000 mg/kg (male and female rats). Copper oxide does not meet the criteria for classification. Based on above, Copper Cement does not meet the criteria for classification.

Inhalation:

Copper powder. No acute oral toxicity data is available. Predicted LD_{50} is > 2000 mg/kg body weight based on read across from other copper compounds and no classification is required.
Copper oxide: Copper oxide showed little/no toxicity when administered to test animals by other routes. Copper oxide does not meet the criteria for classification. Based on above, Copper Cement does not meet the criteria for classification.

Skin corrosion/irritation:

No sensitisation reaction is observed for copper compounds. Copper Cement does not meet the criteria for classification

Serious Eye:

Eye irritation data for Copper oxide found that it does not meet the lowest category for eye irritation. Copper Cement does not meet the criteria for classification.

Respiratory or skin sensitization:

No respiratory sensitisation data is available for copper compounds. Copper Cement does not meet the criteria for classification. For skin sensitization, a guideline study on Copper oxide irritation data is available. Data for Copper oxide supports no classification for Copper oxide and Copper Cement.

Germ cell mutagenicity:

Based on a weight of evidence approach, it was concluded that copper compounds do not have carcinogenic potential. Copper cement does not meet the criteria for classification.

Carcinogenicity:

Based on a weight of evidence approach, it was concluded that copper compounds do not have carcinogenic potential. Copper cement does not meet the criteria for classification.

Reproductive toxicity:

NOAEL for toxicity to reproduction of copper sulphate pentahydrate in rats is > 1500 ppm in food. Test guideline OECD 416 [Mylchreest, 2005]. The NOAEL for maternal toxicity and developmental effects in rabbits in a study according to OECD 414 was 6 mg Cu/kg/bw/day [Munley, 2003].
Copper cement does not meet the criteria for classification.

STOT-single exposure:

Copper Cement does not meet the criteria for classification as STOT for a single exposure.

STOT-repeated exposure:

A 90-day oral repeat dose study (Hébert, 1993) conducted with copper sulphate pentahydrate in rats and mice in accordance with a test method equivalent to EU B.26 gave the following results:
Forestomach lesions:
NOAEL in the rat: 16.7 mg Cu/kg bw/day

NOAEL in male mice: 97 mg Cu/kg bw/day
NOAEL in female mice: 126 mg Cu/kg bw/day
Liver and kidney damage: 16.7 mg Cu/kg bw/day
The NOAEL rat study was used to calculate an oral and systemic DNEL of 0.041 mg Cu/kg bw/day (including a Safety factor of 100 and an oral absorption of 25%). Copper cement does not meet the criteria for classification.

12. Ecological Information

Acute aquatic toxicity test results and environmental classification

Acute toxicity of copper ions was assessed using 451 L(E)C50 values from studies on soluble copper compounds. The lowest species-specific geometric mean reference value of 25.0 µg Cu/L was an L(E)C50 obtained for Daphnia magna at pH 5.5 - 6.5 [Van Sprang et al., 2010]. See section 2 for environmental hazards classification.

Chronic Freshwater toxicity test results and PNEC derivation

Chronic toxicity of copper ions was assessed using 139 NOEC/EC10 values from 27 species representing different trophic levels. Species- specific NOECs were normalised using Biotic Ligand Models and used to derive Species Sensitivity Distributions (SSD) and a lowest HC5 (median fifth percentile of the SSD) of 7.8 µg dissolved Cu/L. Applying an assessment factor of 1, a chronic freshwater PNEC of 7.8 µg dissolved Cu/L is assigned to assess local risks.

Chronic marine waters toxicity test results and PNEC derivation

Chronic toxicity of copper ions was assessed using 51 NOEC/EC10 values from 24 species representing different trophic levels. Species-specific NOECs were calculated after normalizing to dissolved organic carbon (DOC) and were used to derive SSDs and HC5 values. Normalization at a typical DOC for coastal waters of 2 mg/l resulted in an HC5 of 5.2 µg dissolved Cu/L. Applying an assessment factor of 1, a default chronic marine PNEC of 5.2 µg dissolved Cu/L is assigned to assess local risks.

Chronic freshwater sediment toxicity test results and PNEC derivation

Toxicity of copper ions was assessed using 62 NOEC values from 6 benthic species. The NOECs were related to DOC and Acid Volatile Sulphide (AVS) and were used to derive SSDs and HC5 values. An HC5 of 1741 mg Cu/kg OC, corresponding to 87 mg Cu/kg dry weight, was calculated for a low AVS sediment with a default OC of 5%. Applying an assessment factor of 1, a default chronic freshwater sediment PNEC of 87 mg Cu/kg dry weight is assigned to assess local risks.

Chronic marine sediment toxicity test results and PNEC derivation

Toxicity of copper ions from soluble copper compounds was assessed using 62 NOEC values from 6 benthic species. The NOECs were related to DOC and Acid Volatile Sulphide (AVS) and were used to derive SSDs and HC5 values. An HC5 of 1741 mg Cu/kg OC, corresponding to 87 mg Cu/kg dry weight, was calculated for a low AVS sediment with a default OC of 5%. Applying an assessment factor of 1, a

default chronic marine water sediment PNEC of 676 mg Cu/kg dry weight is assigned to assess local risks.

Chronic terrestrial toxicity test results and PNEC derivation

Toxicity of copper ions was assessed using 252 NOEC/EC10 values from 28 different species representing different trophic levels. NOEC values were adjusted to account for differences between lab-spiked soils and field-contaminated soils by the addition of a leaching ageing factor of 2. The adjusted values were then normalized to a range of EU soils using regression bio-availability models and used to derive SSDs and a lowest HC5 value of 65.5 mg Cu/kg dry weight [Orts et al., 2010]. Applying an assessment factor of 1, a default chronic soil PNEC of 65.5 mg Cu/kg dry weight is assigned.

Toxicity to Sewage Treatment Plant (STP) micro-organisms

The toxicity of copper ions was assessed using NOEC and EC50 values from high quality studies with STP bacteria and protozoa. The NOEC was0.23 mg Cu/L in the STP [Cha et al., 2004]. Applying an assessment factor of 1, a PNEC of 0.23 mg Cu/L is assigned for Sewage Treatment Plant.

Persistence and degradability

Copper cement does not meet the criteria for "persistent". Copper ions derived from Copper cement cannot be degraded.

Bioaccumulative potential

Copper is an essential nutrient regulated by homeostatic mechanisms and does not bioaccumulate.

Mobility in soil

Copper ions bind strongly to soil. The median water-soil partitioning coefficient (kp) is 2120 l/kg.

Results of PBT and vPvB assessment

The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances, such as copper and its inorganic compounds. Copper (as Copper cement) is not PBT or vPvB.

Other adverse effects

Copper cement does not contribute to ozone depletion, ozone formation, global warming or acidification.

13. Waste Disposal Method

Waste Disposal Methods :

Dispose surplus or waste materials in accordance with local or national regulatory guidelines. Refer to Section 8- Exposure Controls and Personal Protection.

14. Transport Information

Item Name: Copper

Hazard Class : Class 9

UN Number : UN 3077

Packing Group: III

Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s

15. Legal Information

Safety, health and environmental regulations/legislation specific for the substance or mixture:

Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP): Poison Schedule 6, Copper Compounds.

Other information:

Copper cement is not an ozone-depleting substance and not a persistent organic pollutant.

16. Other Information

References :

1. Industrial Technology Research Institute of Industrial Safety and Health Technology Development Center, Material Safety Data Sheet.
2. Council of Labor Affairs, Emergency Response Guide.

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