



SECTION 1 – PRODUCT INFORMATION

GHS PRODUCT IDENTIFIER: Copper and copper alloys

OTHER MEANS OF IDENTIFICATION: Includes all copper and copper alloys

RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS ON USE: Solid copper & alloy products, various forms and uses. Manufacture of articles.

SUPPLIER'S DETAILS: TECNOFIL S.A.C., Isidro Bonifaz 471 - Independencia (Lima - Perú)

EMERGENCY PHONE NUMBER: T (511) 613 9200

F (511) 613 9201

SECTION 2 – HAZARDOUS INGREDIENTS / IDENTIFY INFORMATION

CLASSIFICATION: Copper and copper alloys are considered an “article” and not hazardous in its solid form. However, certain process such as cutting, milling, grinding, melting and welding could result in some hazardous materials being emitted. The GHS Classification below pertains to these emitted products during these processes.

SIGNAL WORD, HAZARD STATEMENTS & SYMBOLS: WARNING

SYMBOLS	HAZARD	GHS	HAZARD STATEMENTS
	Carcinogenicity Respiratory Sensitizer Toxic to Reproduction STOT (repeated exposure)	Category – 2 Category – 1 Category – 1B Category – 1	May cause cancer May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause genetic effects. Causes damage to organs through prolonged or repeated exposure.
	Skin Sensitizer STOT (single exposure)	Category – 1 Category – 1	May cause allergic skin reaction. May cause respiratory irritation.
	Acute Toxic to Aquatic Life Chronic Toxic to Aquatic Life	Category – 1 Category – 1	Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
N/A	Eye Irritation	Category – 2B	Causes eye irritations.

PRECAUTIONARY STATEMENTS:

PREVENTION	FIRST AID RESPONSE
Do not breathe dust/fume/gas/vapour/spray. Use in a well-ventilated area. Avoid generating dust. Dusts and fines from processing may be ignitable. Use personal protective equipment as required. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read & understood. Contaminated work clothing should not be allowed out of the workplace.	EYES: Flush eyes with plenty of water for at least 15 minutes. Seek medical attention if eye irritation persists. SKIN: Wash affected area with mild soap and water. Seek medical attention if skin irritation persists. INHALATION: Remove to fresh air. Check for clear airway, breathing and presence of pulse. If necessary administer CPR. Consult a physician immediately. INGESTION: Dust may irritate mouth and gastrointestinal tract. If ingested, seek medical attention.
STORAGE	DISPOSAL

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Store away from strong acids, alkalis and oxidizers.
Store away from mercury, acetylene and halogens.
Store in accordance with federal/ provincial/state or local regulations.

Copper should be recycled whenever possible.
Otherwise, dispose of in accordance with applicable federal/ provincial/state or local regulations.

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): Not applicable.

NOTES: STOT – Specific Target Organ Toxicity

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

BASE METAL: (ALL VALUES ARE EXPRESSED AS WEIGHT PERCENT AND ARE APPROXIMATES)

CHEMICAL NAME	CAS NUMBER	% BY WEIGHT
Copper	7440-50-8	Remainder
Alloying elements:		
Zinc(zn)	7440-66-6	0.30
Lead (Pb)	7439-92-1	0.05
Iron (Fe)	7439-89-6	0.10
Phosforous(P)	7723-14-0	0.08 - 0.20
Tin(Sn)	7440-31-5	4.5-4.90

NOTES: For exact composition, refer to analysis or specifications.

SECTION 4 – FIRST AID MEASURES

DESCRIPTION OF NECESSARY FIRST AID MEASURES:

EYE CONTACT: Dust acts as a foreign body. Flush eyes with plenty of water for at least 15 minutes. Seek medical attention if eye irritation persists.

SKIN CONTACT: Maintain good personal hygiene. Wash affected area with mild soap and water. Seek medical attention if skin irritation persists.

INHALATION: Remove to fresh air. Check for clear airway, breathing and presence of pulse. If necessary, administer CPR. Consult a physician immediately.

INGESTION: Rare in industry. Dust may irritate mouth and gastrointestinal tract. If ingested, seek medical attention promptly.

MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DELAYED: Copper and copper alloys as sold and shipped is not likely to present an acute or chronic health effects. However, during processing (cutting, milling, grinding, melting or welding) emitted byproducts may cause irritations, difficulty in breathing, coughing or wheezing. May cause allergic skin reactions.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED, IF NECESSARY: Notes to physician: May cause sensitization by skin contact or inhalation. Treat symptomatically.

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SECTION 5 – REACTIVITY DATA

SUITABLE EXTINGUISHING MEDIA: Non-flammable. Not applicable for solid product. Use Class D extinguishing agents or sand on fires involving dusts or fines. Use extinguishers appropriate for surrounding materials. Do NOT use water on molten metal. Do NOT use water on dust, powder or fume fires.

SPECIFIC HAZARDS ARISING FROM MATERIAL: Dusts from grinding operation may burn if they are ignited. Dust, powder and fumes are flammable when exposed to flame or by chemical reaction with oxidizing agents.

HAZARDOUS COMBUSTION PRODUCTS: At temperatures above the melting point, fumes containing copper oxides and smaller amounts of other alloying elements may be liberated.

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS: Firefighters should wear self-contained NIOSH-approved breathing apparatus and full protective clothing.

EXPLOSION DATA: Molten metal in contact with water may be explosive.

SENSITIVITY TO MECHANICAL IMPACT: None.

SENSITIVITY TO STATIC DISCHARGE: N/A.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES: Not applicable to copper in solid state. Avoid dust formation. Ensure adequate ventilation. Clean-up personnel should be protected against contact with eyes and skin protection.

ENVIRONMENTAL PRECAUTIONS: Not applicable to copper in solid state. Do not flush into surface water or sanitary sewer system.

METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP: Solid metal does not pose any problems. Dust spills should be cleaned up avoiding dust generation. Wash down with water if in contact with acids. Avoid inhalation of dusts. Collect scrap copper for recycling.

SECTION 7 – HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Not applicable to copper in solid state. Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid generating dusts. Avoid breathing metal fumes and/or dust. Avoid contact with sharp edges or heated metal. Eating, drinking or smoking should not be allowed in areas where this alloy is processed, handled or stored.

CONDITIONS FOR SAFE STORAGE: Other than incompatibles, no special storage conditions for copper in solid state.

INCOMPATIBLE PRODUCTS: Store away from strong acids, alkalis and oxidizers. Store away from mercury, acetylene and halogens.

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SECTION 8 – EXPOSURE CONTROLS /PERSONAL PROTECTION

CONTROL PARAMETERS: The exposure limit for copper and copper alloy dusts has been established at 1 mg/m³ and metal fumes at 0.2 mg/m³ with ACGIH's TWA. The individual complex compounds within the fume may have lower exposure limits than the general fume.

CHEMICAL NAME	CAS NUMBER	TLV ACGIH (mg/m ³)
Copper	7440-50-8	1.0 (Dust)
Iron	7439-89-6	5.0 (Respirable)
Lead	7439-92-1	0.05 (Elemental)
Zinc	7440-66-6	2.0 (As zinc oxide - respirable)

NOTES: Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH - 2011) are 8-hour Time Weighted. Average concentrations unless otherwise noted.

APPROPRIATE ENGINEERING CONTROLS: Provide general or local exhaust to minimize airborne concentrations during milling, grinding, melting and welding operations.

INDIVIDUAL PROTECTIVE MEASURES: Dependent upon process being performed on material each operation must be addressed for suitable equipment.

- **GLOVES (Specify):** Wear gloves as required.
- **EYES (Specify):** Safety glasses or goggles as required.
- **CLOTHING (Specify):** N/A
- **FOOTWEAR (Specify):** N/A
- **RESPIRATOR (Specify):** If concentrations exceed established limits use NIOSH/MSHA approved particulate respirators (dust & fume or high efficiency dust fume) when grinding or welding.
- **OTHER (Specify):** With molten metal, use full body cover clothing suitably treated to prevent burns.

SECTION 9 – CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE:	Solid	APPEARANCE:	Gold / Yellow colored, no odor.
ODOUR:	Not Applicable	ODOUR THRESHOLD:	Not Applicable
pH:	Not Applicable	MELTING POINT:	1049°C (1920°F)
BOILING POINT:	954 °C(1750 °F)	FLASH POINT (°C):	N/A
EVAPORATION RATE:	Not Applicable	FLAMMIBILITY (solid, Gas):	Not flammable
UPPER FLAMMABLE	Not Applicable	LOWER FLAMMABLE LIMIT %:	Not Applicable
VAPOUR PRESSURE:	Not Applicable	VAPOUR DENSITY:	Not Applicable
RELATIVE DENSITY:	Not Applicable	SPECIFIC GRAVITY:	8.86
SOLUBILITY:	Not soluble	PARTITION COEFFICIENT:	No data
AUTO-IGNITION TEMP	Not Applicable	DECOMPOSITION TEMPERATURE:	No data
VISCOSITY:	Not Applicable		
OTHER INFORMATION:	Not Applicable		

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SECTION 10 – STABILITY AND REACTIVITY

REACTIVITY: Not determined for product in solid form.

CHEMICAL STABILITY: Yes. Copper and its alloys are stable under normal storage and handling conditions.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization cannot occur.

CONDITIONS TO AVOID: Reacts violently with hydrogen peroxide and other oxidizers. Reaction with acids could produce noxious gases. In contact with acids, hydrogen gas may evolve. Avoid dust formation. Molten metal can react violently with water or moisture.

INCOMPATIBLE MATERIALS: Yes, strong acids, alkalis and oxidizers. Also, mercury, acetylene and halogens.

HAZARDOUS DECOMPOSITION PRODUCTS: None. Products other than fire or explosion – does not decompose. Toxic metal oxides, COx & NOx may be produced during a fire involving copper and copper alloys.

SECTION 11 – TOXICOLOGICAL INFORMATION

TOXICITY:

COMPONENT	LD50 ORAL	LD50 DERMAL	LD50 INHALATION	OTHER
Copper	Unknown	-	-	-
Iron	30,000 mg/kg Oral-Rat	-	-	-
Lead	Unknown	-	-	-
Zinc	Unknown	-	-	-

LIKELY ROUTES OF ENTRY: None for copper & alloys in their natural solid form. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects. In finely divided form, skin contact may produce localized irritation and/or contact dermatitis.

EYES: High concentrations of dust may cause irritation to the eyes. Fumes can cause eye irritations.

SKIN: May cause skin irritations. Prolonged skin contact with coated copper may cause skin irritation in sensitive individuals. Workers with anemia, kidney damage, digestive, respiratory, nervous systems, pregnant women and fertile females warrant particular attention.

INHALATION: Dust may irritate nose and throat. If heated, copper fumes may cause metal fume fever, a delayed, benign, transient flu-like condition.

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL AND TOXICOLOGICAL CHARACTERISTICS: None for copper & copper alloys in their natural solid state.

EFFECTS OF ACUTE EXPOSURE TO MATERIAL:

COPPER & ZINC: Can cause metal fume fever, a metallic taste in the mouth, dryness or irritation of the throat, and coughing. After 4-48 hours symptoms can include sweating, shivering, headache, fever, muscle aches, nausea, vomiting, weakness, and tiredness.

TELLURIUM: Poison by ingestion.

EFFECTS OF CHRONIC EXPOSURE TO MATERIAL:

NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans". Nickel may cause skin sensitivity

COBALT: Cobalt dust may result in an asthma-like condition (cough, shortness of breath). IARC lists metallic cobalt under its Group 2B category - "possibly carcinogenic to humans".

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IRON: Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with few or no symptoms.

MANGANESE: Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.

LEAD: May damage kidneys, liver, blood system and reproductive system. IARC lists lead under its Group 2B category - "possibly carcinogenic to humans".

STOT (Single Exposure): Causes damage to organs (kidneys, respiratory system).

STOT (Repeated Exposures): Respiratory system. Allergic skin reactions. Reproductive system.

MUTAGENICITY OF MATERIAL: Suspected of causing genetic effects.

REPRODUCTIVE EFFECTS: Lead is suspected as causing damage to the reproductive system.

TERATOGENICITY OF MATERIAL: N/A

CARCINOGENICITY OF MATERIAL:

NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans".

COBALT: IARC lists metallic cobalt under its Group 2B category - "possibly carcinogenic to humans".

LEAD: IARC lists lead under its Group 2B category - "possibly carcinogenic to humans".

SYNERGISTIC MATERIALS: N/A

ASPIRATION HAZARD: No data.

SENSITIZATION OF MATERIAL: N/A

LD50 (of Material): Not established

LC50 (of Material): Not established

NOTES: STOT – Specific Target Organ Toxicity, International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008). 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP).

SECTION 12 – ECOLOGICAL INFORMATION

ECOTOXICITY: No data available for copper & alloys in their natural solid state. However, individual components of the material have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife.

COMPONENT	TOXICITY TO FISH	TOXICITY TO ALGAE	TOXICITY TO MICROORGANISMS
Copper	LC50 Fathead Minnow 96 hr. 0.0068-0.0156 mg/l	EC50 Freshwater Algae 72 hr. 0.0426-0.0535 mg/l	EC50 Water Flea 48 hr. 0.03 mg/l
Iron	LC50 Common Carp 96 hr. 0.56 mg/l	-	-
Lead	LC50 Common Carp 96 hr. 0.44 mg/l	-	EC50 Water Flea 48 hr. 0.0006 mg/l
Zinc	LC50 Fathead Minnow 96 hr. 2.16-3.05 mg/l	EC50 Freshwater Algae 72 hr. 0.09-0.125 mg/l	EC50 Water Flea 48 hr. 0.139-0.908 mg/l

PERSISTENCE AND DEGRADABILITY: No data available.

BIOACCUMULATIVE POTENTIAL: No data available.

MOBILITY IN SOIL: No data available for copper & alloys in their natural solid state. Individual metal dusts may migrate into soil and groundwater and be absorbed by plants.

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OTHER ADVERSE EFFECTS: None known.

SECTION 13 – DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Recover copper for recycling.

CONTAINER CLEANING & DISPOSAL: Dispose of in accordance with applicable federal, provincial/state or local regulations.

SECTION 14 – TRANSPORTATION INFORMATION

GENERAL SHIPPING INFORMATION: Material not regulated for shipping.

SHIPPING NAME AND DESCRIPTION: N/A

UN NUMBER: N/A

HAZARD CLASS: N/A

PACKING GROUP/RISK GROUP: N/A

TRANSPORT REGULATIONS: Canadian Transportation of Dangerous Goods Regulations (TDG) March 2011. US Department of Transport (DOT) Hazardous Materials shipping information (Title 49 - Transportation March 2011).

SECTION 15 – REGULATORY INFORMATION

REGULATORY INFORMATION: The following listing of regulations relating to a Tecnofil S.A.C product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

ADDITIONAL CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: Class D2A/D2B: Materials Causing Other Toxic Effects.

DOMESTIC SUBSTANCES LIST: The components of this material are on the federal DSL Inventory.

OTHER CANADIAN REGULATIONS: N/A

ADDITIONAL U.S. REGULATIONS:

SARA: The components of this material are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA – Oct. 2006), as follows:

CHEMICAL NAME	SARA 302	SARA 304	SARA 313	CERCLA
Copper	No	No	Yes	5,000 lb.
Lead	No	No	Yes	10 lb.
Zinc	No	No	No	1,000 lb.

SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb. (4,540 kg) therefore applies, per 40 CFR 370.20.

TSCA INVENTORY STATUS: The components of this material are listed on the Toxic Substances Control Act Inventory.

CERCLA REPORTABLE QUANTITY (RQ): RQ's for Hazardous Substances in the Comprehensive Environmental Response, Compensation, and Liability Act are: Copper = 5000 lb. (2270 kg); Zinc = 1000 lb. (454 kg).

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CALIFORNIA (PROPOSITION 65): The Lead component of this material is known in the State of California to cause cancer, and/or birth defects (or other reproductive harm). The Nickel component of this material is known in the State of California to cause cancer. The Cobalt component of this material is known in the State of California to cause cancer.

OTHER U.S. FEDERAL REGULATIONS: Lead is regulated under 29 CFR 1910.1025.

ADDITIONAL EUROPEAN UNION REGULATIONS:

RoHS & WEEE: This MSDS follows the European Union Directive "Restriction on the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment" (2002/95/EC) and the "Waste Electrical and Electronic Equipment (WEEE)" Directive (2002/96/EC).

Lead (Pb): Lead is present in this copper alloy at levels above the EU Directive limit of 0.1%. Note: the EU Directive has a lead exemption limit of up to 4.0% as an alloying element in copper.

Chromium VI (Cr +6): The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

SECTION 16 – OTHER INFORMATION

HAZARD LABEL RATING SYSTEMS:

NATIONAL FIRE PROTECTION CODE: NFPA CODE: H=0 F=0 R=0

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: HMIS CODE: H=1* F=0 R=0 PPE: See Section 8 (* Denotes possible chronic hazard if airborne dusts or fumes are generated)

DISCLAIMER: the information contained herein based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.

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