


SAFETY DATA SHEET

<p>MATERIAL IDENTIFICATION AND USE</p> <p>MATERIAL NAME: COPPER & ALLOYS</p> <p>SYNONYMS: COPPER, COPPER ALLOY ASTM UNS C11000, C12200, C14500, C22000, C26000, C36000, C51000, C54400, C65000, C70400, C70600, C71000, C71500, C93200 AND C95400.</p>		<p>SUPPLIER: RUSSEL METALS INC.</p> <p>ADDRESS: 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6.</p> <p>TEL: 905-819-7295 FAX: 905-819-7262</p> <p>FORM #: SDS-03-2014 DATE: AUGUST 2014</p>
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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: RUSSEL METALS INC., 6600 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO. CANADA. L5N 7J6

EMERGENCY PHONE NUMBER: 905-819-7295

2. HAZARDOUS INGREDIENTS

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

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): Not applicable.

NOTES:

- STOT – Specific Target Organ Toxicity

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	70-99.9
Zinc	7440-66-6	0-34.0
Nickel	7440-02-0	0-30.0
Aluminum	7429-90-5	0-11.0
Lead	7439-92-1	0-9.0
Iron	7439-89-6	0-4.0
Silicon	7440-21-3	0-3.0
Tin	7440-31-5	0-3.0
Manganese	7439-96-5	0-1.0
Tellurium	13494-80-9	0.50
Phosphorus	7723-14-0	0-0.25

NOTES:

- For exact composition, refer to analysis or specifications.

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.

5. FIRE FIGHTING MEASURES

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.

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.

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.

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) 0.2 (Fume)		
Iron	7439-89-6	5.0 (Respirable)		
Lead	7439-92-1	0.05 (Elemental)		
Manganese	7439-96-5	0.2 (as inorganic Mn)		
Nickel	7440-02-0	1.5 (Metal) 0.2 (Insoluble) 0.1 (Soluble)		
Phosphorus	7723-14-0	0.1 (yellow or white)		
Silicon	7440-21-3	10.0 (Inhalable) 3.0 (Respirable)		
Tin	7440-31-5	2.0		
Zinc	7440-66-6	2.0 (As zinc oxide - respirable)		
Tellurium	13494-80-9	0.1		
Aluminum	7429-90-5	1.0 (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.		

9. CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE:	Solid	APPEARANCE:	Reddish metallic solid
ODOUR:	Not Applicable	ODOUR THRESHOLD:	Not Applicable
pH:	Not Applicable	MELTING POINT:	1150°C (2102°F)
BOILING POINT:	2324°C (4215°F)	FLASH POINT (°C):	N/A
EVAPORATION RATE:	Not Applicable	FLAMMIBILITY (solid, Gas):	Not flammable
UPPER FLAMMABLE LIMIT %:	Not Applicable	LOWER FLAMMABLE LIMIT %:	Not Applicable
VAPOUR PRESSURE:	Not Applicable	VAPOUR DENSITY:	Not Applicable
RELATIVE DENSITY:	8.90	SPECIFIC GRAVITY:	No data
SOLUBILITY:	Not soluble	PARTITION COEFFICIENT:	No data
AUTO-IGNITION TEMP (°C):	Not Applicable	DECOMPOSITION TEMPERATURE:	No data
VISCOSITY:	Not Applicable		
OTHER INFORMATION:	Not Applicable		

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.

11. TOXICOLOGICAL INFORMATION

TOXICITY:

COMPONENT	LD ₅₀ ORAL	LD ₅₀ DERMAL	LD ₅₀ INHALATION	OTHER
Copper	Unknown	-	-	-
Iron	30,000 mg/kg Oral-Rat	-	-	-
Lead	Unknown	-	-	-
Manganese	9,000 mg/kg Oral-Rat	-	-	-
Nickel	>9,000 mg/kg Oral-Rat	-	-	-
Phosphorus	Unknown	-	-	-
Silicon	3,160 mg/kg Oral-Rat	-	-	-
Tin	Unknown	-	-	-
Zinc	Unknown	-	-	-
Tellurium	20 mg/kg Oral-Mouse	-	-	-
Aluminum	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".
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).

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
Manganese	-	-	EC50 Water Flea 48 hr. 40 mg/l
Nickel	LC50 Common Carp 96 hr. 1.3 mg/l	EC50 Freshwater Algae 72 hr. 0.18 mg/l	EC50 Water Flea 48 hr. 1.0 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
Aluminum	LC50 Rainbow Trout 96 hr. 0.16 mg/l	-	EC50 Water Flea 24 hr. 3.5 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.

OTHER ADVERSE EFFECTS: None known.

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.

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).

15. REGULATORY INFORMATION

REGULATORY INFORMATION: *The following listing of regulations relating to a Russel Metals Inc. 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 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)	CERCLA Reportable Quantities
Aluminum	No	No	Yes	None listed
Copper	No	No	Yes	5,000 lb.
Lead	No	No	Yes	10 lb.
Manganese	No	No	Yes	None listed
Nickel	No	No	Yes	100 lb.
Phosphorus	Yes	Yes	Yes	1 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); Nickel = 100 lb. (45 kg).
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 SDS 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%.

Chromium VI (Cr +6):

Note, the EU Directive has a lead exemption limit of up to 4.0% as an alloying element in copper.
The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

16. OTHER INFORMATION

COPPER & COPPER ALLOYS

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

HEALTH	1
FLAMMIBILITY	0
REACTIVITY	0
OTHER	*

* Denotes possible chronic hazard if airborne dusts or fumes are generated.

PREPARED BY: RUSSEL METALS INC. AND ENVIROTEST INC.

DATE: AUGUST 2014

TELEPHONE: 905-819-7295

NOTE: CONTACT SUPPLIER FOR ADDITIONAL PRODUCT INFORMATION

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.