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Version 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name Copper Base Alloy Powder

Other means of identification

Synonyms Copper Base Alloy Powder: Cu-Cr Alloy, GRCop-84 Alloy, GRCop-42 Alloy, Cu-Zr Alloy, Cu-Nb Alloy, Narloy-Z, Amzirc Alloy

Recommended use of the chemical and restrictions on use

Recommended Use Alloy product manufacture.

Uses advised against

Details of the supplier of the safety data sheet Manufacturer Address

Stanford Advanced Materials

E-mail : sales@samaterials.com

Tel : (949) 407-8904

Address : 23661 Birtcher Dr., Lake Forest, CA 92630 U.S.A.

Emergency Telephone (949) 407-8904

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Acute toxicity - Oral	Category 4
Acute aquatic toxicity	Category 1
Chronic aquatic toxicity	Category 1

Label elements

Emergency Overview

Warning

Hazard statements

Harmful if swallowed

Very toxic to aquatic life

Very toxic to aquatic life with long lasting effects



Appearance Powder

Physical state Solid

Odor Odorless

Precautionary Statements - Prevention

Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product
Avoid release to the environment

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Collect spillage

Precautionary Statements - Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Other Information

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated:: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer.
Zinc, copper, magnesium, or cadmium fumes may cause metal fumes fever.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms

Copper Base Alloy Powder: Cu-Cr Alloy, GRCop-84 Alloy, GRCop-42 Alloy, Cu-Zr Alloy, Cu-Nb Alloy, Narloy-Z, Amzirc Alloy.

Chemical Name	CAS No.	Weight-%
Copper	7440-50-8	70 - 99.85
Chromium	7440-47-3	0 - 27
Niobium (Columbium)	7440-03-1	0 - 9
Silver	7440-22-4	0 - 3
Zirconium	7440-67-7	0 - 0.5

4. FIRST AID MEASURES

First aid measures

Eye contact

In the case of particles coming in contact with eyes during processing, treat as with any foreign object.

Skin Contact

None under normal use conditions.

Inhalation

If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Most important symptoms and effects, both acute and delayed

Symptoms

May cause acute gastrointestinal effects if swallowed.

Indication of any immediate medical attention and special treatment needed

Note to physicians

Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product.

Small Fire

Smother with salt (NaCl) or class D dry powder fire extinguisher.

Large Fire Isolate fire and allow to burn out.

Unsuitable extinguishing media Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with the burning material.

Specific hazards arising from the chemical

Intense heat. Very fine, high surface area material resulting from processing this product may ignite spontaneously at room temperature. **WARNING:** Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Hazardous combustion products Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer. Zinc, copper, magnesium, or cadmium fumes may cause metal fumes fever.

Explosion data

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

Protective equipment and precautions for firefighters

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Use personal protective equipment as required.

For emergency responders Use personal protective equipment as required. Follow Emergency Response Guidebook, Guide No. 171, EXCEPT for FIRE follow Emergency Response Guidebook, Guide No. 170.

Environmental precautions

Environmental precautions Collect spillage to prevent release to the environment.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Sweep or shovel material into dry containers. Avoid creating uncontrolled dust.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

Incompatible materials Dissolves in hydrofluoric acid.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL
Copper 7440-50-8	TWA: 0.2 mg/m ³ fume TWA: 1 mg/m ³ Cu dust and mist	TWA: 0.1 mg/m ³ fume TWA: 1 mg/m ³ dust and mist
Chromium 7440-47-3	TWA: 0.5 mg/m ³	TWA: 1 mg/m ³
Niobium (Columbium) 7440-03-1	-	-
Silver 7440-22-4	TWA: 0.1 mg/m ³ dust and fume	TWA: 0.01 mg/m ³
Zirconium 7440-67-7	STEL: 10 mg/m ³ STEL: 10 mg/m ³ Zr TWA: 5 mg/m ³ TWA: 5 mg/m ³ Zr	TWA: 5 mg/m ³ Zr (vacated) STEL: 10 mg/m ³ (vacated) STEL: 10 mg/m ³ Zr

Appropriate engineering controls**Engineering Controls**

Avoid generation of uncontrolled particles.

Individual protection measures, such as personal protective equipment**Eye/face protection**

When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

Skin and body protection

Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Wear protective gloves.

Respiratory protection

When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES**Information on basic physical and chemical properties**

Physical state	Solid	Odor	Odorless
Appearance	Powder	Odor threshold	Not applicable
Color	copper yellow		
Property	Values	Remarks • Method	
pH	-		
Melting point/freezing point	No information available / 2220 °F		
Boiling point / boiling range	-		
Flash point	-		
Evaporation rate	-	Not applicable	
Flammability (solid, gas)	-	Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product	
Flammability Limit in Air			
Upper flammability limit:	-		
Lower flammability limit:	-		
Vapor pressure	-	Not applicable	
Vapor density	-	Not applicable	
Specific Gravity	7.63 - 8.9		
Water solubility	Insoluble	Insoluble	
Solubility in other solvents	-	Not applicable	
Partition coefficient	-	Not applicable	
Autoignition temperature	-	Not applicable	

Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidizing properties	Not applicable	

Other Information

Softening point	-
Molecular weight	-
VOC Content (%)	Not applicable
Density	-
Bulk density	-

10. STABILITY AND REACTIVITY

Reactivity

Not applicable

Chemical stability

Stable under normal conditions.

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid

Dust formation and dust accumulation;

Incompatible materials

Dissolves in hydrofluoric acid.

Hazardous Decomposition Products

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated: Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure**Product Information**

Inhalation	Product not classified.
Eye contact	Product not classified.
Skin Contact	Product not classified.
Ingestion	Harmful if swallowed.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Copper 7440-50-8	481 mg/kg bw	>2000 mg/kg bw	>5.11 mg/L
Chromium 7440-47-3	> 3400 mg/kg bw	-	> 5.41 mg/L
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Silver 7440-22-4	2000	-	-
Zirconium	> 5000 mg/kg bw	-	>4.3 mg/L

7440-67-7

Information on toxicological effects

Symptoms May cause acute gastrointestinal effects if swallowed.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Acute toxicity Harmful if swallowed.
Skin corrosion/irritation Product not classified.
Serious eye damage/eye irritation Product not classified.
Sensitization Product not classified.
Germ cell mutagenicity Product not classified.
Carcinogenicity Product not classified.

Chemical Name	ACGIH	IARC	NTP	OSHA
Chromium 7440-47-3		Group 3		

Reproductive toxicity Product not classified.
STOT - single exposure Product not classified.
STOT - repeated exposure Product not classified.
Aspiration hazard Product not classified.

12. ECOLOGICAL INFORMATION

This product contains a chemical which is listed as a severe marine pollutant according to DOT.

Ecotoxicity

This product as shipped is classified for aquatic chronic toxicity. This product as shipped is classified for aquatic acute toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Copper 7440-50-8	The 72 h EC50 values of copper chloride to <i>Pseudokirchneriella subcapitata</i> ranged between 30 µg/L (pH 7.02, hardness 250 mg/L CaCO ₃ , DOC 1.95 mg/L) and 824 µg/L (pH 6.22, hardness 100 mg/L CaCO ₃ , DOC 15.8 mg/L).	The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Copper sulfate ranged from 256.2 to 38.4 µg/L with water hardness increasing from 45 to 255.7 mg/L.	The 24 h NOEC of copper chloride for activated sludge ranged from 0.32 to 0.64 mg of Cu/L.	The 48 h LC50 values for <i>Daphnia magna</i> exposed to copper in natural water ranged between 33.8 µg/L (pH 6.1, hardness 12.4 mg/L CaCO ₃ , DOC 2.34 mg/L) and 792 µg/L (pH 7.35, hardness 139.7 mg/L CaCO ₃ , DOC 22.8 mg/L).
Chromium 7440-47-3	-	-	-	-
Niobium (Columbium) 7440-03-1	-	-	-	-
Silver 7440-22-4	The 24 h EC10 of silver nitrate to <i>Pseudokirchnerella subcapitata</i> was 0.41 µg of Ag/L.	The 96 h LC50 of silver nitrate to <i>Pimephales promelas</i> was 1.2 µg of Ag/L.	The 13.3 min NOEC of silver nitrate for nitrifying bacteria was 0.025 mg Ag/L.	The 48 h LC50 of silver nitrate to <i>Daphnia magna</i> was between 0.18 and 0.26 µg of Ag/L.
Zirconium 7440-67-7	The 14 d NOEC of zirconium dichloride oxide to <i>Chlorella vulgaris</i> was greater than 102.5 mg of Zr/L.	The 96 h LL50 of zirconium to <i>Danio rerio</i> was greater than 74.03 mg/L.	-	The 48 h EC50 of zirconium dioxide to <i>Daphnia magna</i> was greater than 74.03 mg of Zr/L.

Persistence and degradability**Bioaccumulation****Other adverse effects**

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national and local laws and regulations.

Contaminated packaging Disposal should be in accordance with applicable regional, national and local laws and regulations.

Chemical Name	RCRA - D Series Wastes
Chromium 7440-47-3	5.0 mg/L regulatory level
Silver 7440-22-4	5.0 mg/L regulatory level

This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. TRANSPORT INFORMATION

DOT Regulated per 49 CFR, if transported in bulk or by vessel or if quantity with particles smaller than 100 micrometers (0.004 inches) in an individual package equals or exceeds the reportable quantity (RQ) of 5000 pounds of chromium, 5000 pounds of copper, 100 pounds of nickel.

Proper shipping name UN/ID No. 3077 Environmentally hazardous substance, solid, n.o.s. (copper silver alloy powder) [include ", RQ" if RQ is exceeded]

Hazard Class 9

Packing Group III

Reportable Quantity (RQ) "(, RQ)", if quantity with particles smaller than 100 micrometers (0.004 inches) in an individual package equals or exceeds the Reportable Quantity (RQ) of 5000 pounds of chromium, 5000 pounds of copper, or 100 pounds of nickel.

Special Provisions 8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33

Marine pollutant This product contains a chemical which is listed as a severe marine pollutant according to DOT.

Description Copper silver metal powder

Emergency Response Guide Number Follow Emergency Response Guidebook, Guide No. 171, EXCEPT for FIRE follow Emergency Response Guidebook, Guide No. 170

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Not Listed
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Copper - 7440-50-8	7440-50-8	70 - 99.85	1.0
Chromium - 7440-47-3	7440-47-3	0 - 27	1.0
Silver - 7440-22-4	7440-22-4	0 - 3	1.0

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Copper 7440-50-8		X	X	
Chromium 7440-47-3		X	X	
Silver 7440-22-4		X	X	

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs
Copper 7440-50-8	5000 lb
Chromium 7440-47-3	5000 lb
Silver 7440-22-4	1 lb

US State Regulations**California Proposition 65**

This product contains the following Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Copper 7440-50-8	X	X	X
Chromium 7440-47-3	X	X	X
Silver 7440-22-4	X	X	X
Zirconium 7440-67-7	X	X	X

U.S. EPA Label Information

EPA Pesticide Registration Number. Not applicable

16. OTHER INFORMATION

NFPA	Health hazards 1	Flammability 0	Instability 0	Physical and Chemical Properties -
HMIS	Health hazards 2	Flammability 1	Physical hazards 0	Personal protection X

Chronic Hazard Star Legend * = Chronic Health Hazard

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Revision Note

Updated to comply with GHS

Note:

The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of Safety Data Sheet

Additional information available from: Safety data sheets and labels available at samaterials.com