

Section 1: Identification

1.1 Product Identifiers

Product Form: Mixture
Trade Name: IP-C11000 Pure Copper Powder
Product Code: IP-C11000

1.2 Recommended Use and Restrictions on Use

Recommended use: Copper powder for additive manufacturing and cold spray applications
Restrictions on use: No information available

1.3 Manufacturer

Company: Innovative Powders LLC
551 W Powerline Rd. Unit #9
Heber City UT, 84032 USA

Telephone: 717-271-2984

1.4 Emergency Telephone Number

Emergency Number: CHEMTREC US: 800-424-9300

Section 2: Hazard(s) Identification

2.1 Classification of the Substance or Mixture

GHS US Classification: Flammable solids (Category 1), H228
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

2.2 GHS Label Elements, Including Precautionary Statements

Pictogram:



Signal Word: Danger

Hazard Statements

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

Precautionary Statements

P210: Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P273: Avoid release to the environment.
P280: Wear protective gloves/ eye protection/ face protection.
P370+P378: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

P391: Collect spillage.
P501: Dispose of contents/ container to an approved waste disposal plant.

Full text of hazard classes and H-statements: see Section 16

2.3 Other Hazards Which Do Not Result in Classification

None

2.4 Unknown Acute Toxicity (GHS US)

Not Applicable

Section 3: Composition/Information on Ingredients**3.1 Substances**

Name of substance: Copper Powder
Molecular Formula: Cu
Molar Mass: 63.55 g/mol
CAS-No.: 7440-50-8
EC-No.: 231-159-6

Component	Classification	Concentration
Copper	7440-50-8	>99%

Section 4: First Aid Measures**4.1 Description of First Aid Measures**

First aid measures general: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact: Wash skin with mild soap and water.



First-aid measures after eye contact: Rinse eyes with water as a precaution. Remove contact lenses, if present and easy to do.

First-aid measures after ingestion: Rinse mouth. Do not induce vomiting. Never give anything by mouth to an unconscious person.

4.2 Most Important Symptoms and Effects (acute and delayed)

Symptoms/Effects: None known to date

4.3 Indication of Any Immediate Medical Attention and Special Treatment, if necessary

No data available

Section 5: Firefighting Measures

5.1 Suitable (and Unsuitable) Extinguishing Media

Suitable extinguishing media:	Dry powder, sand.
Unsuitable extinguishing media:	Water, foam, carbon dioxide

5.2 Specific Hazards Arising from the Chemical

Hazardous decomposition products in case of fire:	Toxic fumes may be released, such as metal oxides.
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5.3 Special Protective Equipment and Precautions for Firefighters

Protecting during firefighting:	Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.
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Section 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

General Measures:	Evacuate personnel to a safe area. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ensure adequate ventilation, especially in confined areas.
For Non-Emergency Personal:	Wear recommended personal protective equipment. Avoid contact with skin, eyes and clothes. Do not breathe dust.
Emergency Procedures:	Do not eat, drink or smoke during use. Wash thoroughly after handling.

For Emergency Personal: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

Emergency Procedures: Avoid contact with skin and eyes. Avoid dust formation. Do not breathe dust.

6.2 Environmental Precautions

Keep away from drains, surface and ground water. Retain contaminated washer water and dispose of it. If substance has entered a water course or sewer, inform the responsible authority.

6.3 Methods and material for containment and cleaning up

Advice on how to contain a spill: Covering of drains. Take up mechanically (sweeping, shoveling).

Advice on how to clean up a spill: Take up mechanically. Control of dust.

Other information relating to spills and releases: Place in appropriate containers for disposal.

6.4 Reference to Other Sections

For further information refer to Section 13.

Section 7: Handling and Storage

7.1 Precautions for Sale Handling

Precautions for safe handling: Evacuate unnecessary personnel. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use personal protective equipment as required.

Hygiene Measures: Keep away from food, drink and animal feeding stuffs. Avoid contact with skin and eyes. Avoid dust formation. Do not breathe dust. Dust can form an explosive mixture with air. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2 Conditions for Safe Storage, Including and Incompatibilities

Storage conditions: Keep cool. Store in a well-ventilated place. Containers which are opened should be properly resealed and kept upright to prevent leakage. Keep only in original container.

Incompatible materials: Acids, bases, oxidizing agents, halogenated compounds.

Section 8: Exposure Controls/Personal Protection

8.1 Control Parameters

Copper (7440-50-8)

USA - ACGIH - Occupational Exposure Limits

ACGIH OEL TWA 0.2 mg/m³ (fume)

USA - OSHA - Occupational Exposure Limits

OSHA PEL TWA [1] 0.1 mg/m³ (fume)
0.2 1 mg/m³ (dust and mist)

USA - IDLH - Occupational Exposure Limits

IDLH 100 mg/m³ (dust, fume and mist)

USA - NIOSH - Occupational Exposure Limits

NIOSH REL TWA 1 mg/m³ (dust and mist)
0.1 mg/m³ (fume)

Chromium (7440-47-3)

USA - ACGIH - Occupational Exposure Limits

ACGIH OEL TWA 0.5 mg/m³ (inhalable particulate matter)

USA - OSHA - Occupational Exposure Limits

OSHA PEL TWA [1] 1 mg/m³

USA - IDLH - Occupational Exposure Limits

IDLH 250 mg/m³

USA - NIOSH - Occupational Exposure Limits

NIOSH REL TWA 0.5 mg/m³

8.2 Appropriate Engineering Controls

Appropriate engineering controls: Ensure good ventilation of the work station.

Environmental exposure controls: Avoid release to the environment.

8.3 Individual Protection Measures/Personal Protective Equipment

Hand protection: Protective gloves (EN 374). Appropriate material: nitrile rubber

Eye protection:	Safety glasses with side shields (EN 166).
Skin and body protection:	Use chemically protective clothing.
Respiratory protection:	In case of insufficient ventilation, wear suitable respiratory equipment, respiratory filter (part): P2-P3

Section 9: Physical and Chemical Properties

9.1 Information and Basic Physical and Chemical Properties

Physical state:	Solid
Appearance:	Powder
Color:	Light red
Odor:	Odorless
Odor threshold:	No data available
pH:	No data available
Melting point/Freezing point:	1085°C/1984°F
Boiling point:	2562°C/4643°F
Flash point:	No data available
Relative evaporation rate (butyl acetate=1):	No data available
Flammability (solid, gas):	Non flammable
Vapor pressure:	No data available
Relative vapor density at 20 °C:	No data available
Relative density:	No data available
Density:	8.94 g/mL at 25°C
Solubility:	Insoluble in water
Partition coefficient n-octanol/water (Log Pow):	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity, kinematic:	No data available
Viscosity, dynamic:	No data available
Explosion limits:	No data available



Explosive properties:

No data available

Oxidizing properties:

No data available

9.2 Other Information

No additional information available

Section 10: Stability and Reactivity

10.1 Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of Hazardous Reactions

Spontaneously flammable when finely dispersed.

10.4 Conditions to Avoid

Avoid formation of dust. Protect from humid air and water.

10.5 Incompatible Materials

Acids, bases, oxidizing agents, halogenated compounds.

10.6 Hazardous Decomposition Products

Metal oxides.

Section 11: Toxicological Information

11.1 Information on Toxicological Effects

Acute toxicity (oral):

Not classified

Acute toxicity (dermal):

Not classified

Acute toxicity (inhalation):

Not classified

Skin corrosion/irritation:

Not classified

Serious eye damage/irritation:	Not classified
Respiratory or skin sensitization:	Not classified
Germ cell mutagenicity:	Not classified
Carcinogenicity:	Not classified
Reproductive toxicity:	Not classified
STOT-single exposure:	Not classified
STOT-repeated exposure:	Not classified
Aspiration hazard:	Not classified
Likely routes of exposure:	Ingestion. Skin contact. Eye contact. Inhalation.
Symptoms/effects after inhalation:	None under normal conditions.
Symptoms/effects after skin contact:	None under normal conditions.
Symptoms/effects after eye contact:	None under normal conditions.
Symptoms/effects after ingestion:	None under normal conditions.

Section 12: Ecological Information

12.1 Toxicity

Ecology - general: Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Copper (7440-50-8)

LC50 - Fish [1]	0.0068 - 0.0156 mg/L/96 h (Pimephales promelas)
LC50 - Fish [2]	< 0.3 mg/L/96 h (Pimephales promelas)
LC50 - Fish [3]	0.035 mg/L/96 h (Danio rerio, ISO TC 147/SC 5/WG3, ECHA/Read across)
NOEC - Fish [1]	0.023 mg/L/7 d (Pimephales promelas, OECD 204, ECHA)
EC50 - Crustacea [1]	0.03 mg/L/48 h (Daphnia magna)
EC50 - Crustacea [2]	0.034 - 0.792 mg/L/48 h (Daphnia magna, OECD 202, ECHA)
NOEC - Crustacea [1]	0.032 mg/L/7 d (Daphnia magna, OECD 211, ECHA)

12.2 Persistence and Degradability

No additional information available

12.3 Bioaccumulative Potential

No additional information available

12.4 Mobility in Soil

No additional information available

12.5 Other Adverse Effects

No additional information available

Section 13: Ecological Information**13.1 Disposal Methods**

Waste treatment methods:

This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

Sewage disposal-relevant information:

Do not empty into drains. Avoid release to the environment. Refer to special instructions/safety data sheets.

Product/Packaging disposal recommendations:

It is a dangerous waste; only packages which are approved (e.g. acc. to ADR) may be used. Handle contaminated packages in the same way as the substance itself. Completely emptied packages can be recycled.

Section 14: Transportation Information

In accordance with DOT / TDG / IMDG / IATA

14.1 UN Number

DOT NA No:	UN3077
UN-No. (TDG):	UN3077
UN-No. (IMDG):	UN3077
UN-No. (IATA):	UN3077

14.2 UN Proper Shipping Name

Proper Shipping Name (DOT):	Environmentally hazardous substances, solid, n.o.s. (Containing Copper)
Proper Shipping Name (TDG):	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Containing Copper)

Proper Shipping Name (IMDG):	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Containing Copper)
Proper Shipping Name (IATA):	Environmentally hazardous substance, solid, n.o.s. (Containing Copper)

14.3 Transport Hazard Class(es)

DOT

Transport hazard class(es) (DOT): 9

Hazard labels (DOT): 9



TDG

Transport hazard class(es) (TDG): 9

Hazard labels (TDG): 9



IMDG

Transport hazard class(es) (IMDG): 9

Hazard labels (IMDG): 9



IATA

Transport hazard class(es) (IATA): 9

Hazard labels (IATA): 9



14.4 Packing Group

Packing group (DOT): III

Packing group (TDG): III

Packing group (IMDG): III

Packing group (IATA): III

14.5 Environmental Hazards

Dangerous for the environment: Yes

Marine pollutant: Yes

Other information: No supplementary information available.

14.6 Special Precautions for User

DOT

UN-No.(DOT): UN3077

DOT Special Provisions (49 CFR 172.102): 8 - A hazardous substance that is not a hazardous waste may be shipped under the shipping description "Other regulated substances, liquid or solid, n.o.s.", as appropriate. In addition, for solid materials, special provision B54 applies. 146 - This description may be used for a material that poses a hazard to

the environment but does not meet the definition for a hazardous waste or a hazardous substance, as defined in 171.8 of this subchapter, or any hazard class as defined in Part 173 of this subchapter, if it is designated as environmentally hazardous by the Competent Authority of the country of origin, transit or destination. 335 - Mixtures of solids that are not subject to this subchapter and environmentally hazardous liquids or solids may be classified as "Environmentally hazardous substances, solid, n.o.s," UN3077 and may be transported under this entry, provided there is no free liquid visible at the time the material is loaded or at the time the packaging or transport unit is closed. Each transport unit must be leak-proof when used as bulk packaging. 384 - For transportation by motor vehicle, substances meeting the conditions for high viscosity flammable liquids as prescribed in §173.121(b)(1)(i), (b)(1)(ii), and (b)(1)(iv) of this subchapter, may be reassigned to Packing Group III under the following conditions: A112 - Notwithstanding the quantity limits shown in Column (9A) and (9B) for this entry, the following IBCs are authorized for transportation aboard passenger and cargo-only aircraft. Each IBC may not exceed a maximum net quantity of 1,000 kg: a.Metal: 11A, 11B, 11N, 21A, 21B and 21Nb.Rigid plastics: 11H1, 11H2, 21H1 and 21H2c.Composite with plastic inner receptacle: 11HZ1, 11HZ2, 21HZ1 and 21HZ2d.Fiberboard: 11Ge.Wooden: 11C, 11D and 11F (with inner liners)f.Flexible: 13H2, 13H3, 13H4, 13H5, 13L2, 13L3, 13L4, 13M1 and 13M2 (flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner).B54 - Open-top, sift-proof rail cars are also authorized.B120 - The use of flexible bulk containers conforming to the requirements in subpart R and subpart S of part 178 of this subchapter is permitted.IB8 - Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics(11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3,13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).IP3 - Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.N20 - A 5M1 multi-wall paper bag is authorized if transported in a closed transport vehicle.N91 - The use of a non specification sift-proof, non-bulk, metal can with or without lid, or a non specification sift-proof, non-bulk fiber drum, with or without lid is authorized when transporting coal tar pitch compounds by motor vehicle or rail freight. The fiber drum must to be fabricated with a three ply wall, as a minimum. The coal

tar pitch compound must be in a solid mass during transportation. T1 - 1.5 178.274(d)(2) Normal.....
178.275(d)(2) TP33 - The portable tank instruction assigned for this substance applies for granular and powdered solids and for solids which are filled and discharged at temperatures above their melting point which are cooled and transported as a solid mass. Solid substances transported or offered for transport above their melting point are authorized for transportation in portable tanks conforming to the provisions of portable tank instruction T4 for solid substances of packing group III or T7 for solid substances of packing group II, unless a tank with more stringent requirements for minimum shell thickness, maximum allowable working pressure, pressure-relief devices or bottom outlets are assigned in which case the more stringent tank instruction and special provisions shall apply. Filling limits must be in accordance with portable tank special provision TP3. Solids meeting the definition of an elevated temperature material must be transported in accordance with the applicable requirements of this subchapter.

DOT Packaging Exceptions
(49 CFR 173.xxx):

155

DOT Packaging Non Bulk
(49 CFR 173.xxx):

213

DOT Packaging Bulk
(49 CFR 173.xxx):

240

DOT Quantity Limitations Passenger
aircraft/rail (49 CFR 173.27):

No limit

DOT Quantity Limitations Cargo
aircraft only (49 CFR 175.75):

No limit

DOT Vessel Stowage Location:

A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

TDG

UN-No. (TDG):

UN3077

TDG Special Provisions:

16 - (1) The technical name of at least one of the most dangerous substances that predominantly contributes to the hazard or hazards posed by the dangerous goods must be shown, in parentheses, on the shipping document following the

shipping name in accordance with clause 3.5(1)(c)(ii)(A) of Part 3 (Documentation). The technical name must also be shown, in parentheses, on a small means of containment or on a tag following the shipping name in accordance with subsections 4.11(2) and (3) of Part 4 (Dangerous Goods Safety Marks).

(2) Despite subsection (1), the technical name for the following dangerous goods is not required to be shown on a shipping document or on a small means of containment when Canadian law for domestic transport or an international convention for international transport prohibits the disclosure of the technical name: (a) UN1544, ALKALOID SALTS, SOLID, N.O.S. or ALKALOIDS, SOLID, N.O.S.; (b) UN1851, MEDICINE, LIQUID, TOXIC, N.O.S.; (c) UN3140, ALKALOID SALTS, LIQUID, N.O.S. or ALKALOIDS, LIQUID, N.O.S.; (d) UN3248, MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S. or (e) UN3249, MEDICINE, SOLID, TOXIC, N.O.S. (3) Despite subsection (1), the technical name for the following dangerous goods is not required to be shown on a small means of containment: (a) UN2814, INFECTIOUS SUBSTANCE, AFFECTING HUMANS; or (b) UN2900, INFECTIOUS SUBSTANCE, AFFECTING ANIMALS, 99 - (1) Mixtures of solids that are not dangerous goods and liquids or solids that are UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. or UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. may be handled, offered for transport or transported as UN3077 if there is no visible liquid when the dangerous goods are loaded into a means of containment and during transport. (2) These Regulations, except for Part 1 (Coming into Force, Repeal, Interpretation, General Provisions and Special Cases) and Part 2 (Classification), do not apply to the handling, offering for transport or transporting of less than 450 kg of UN3077, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. or less than 450 L of UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. on a road vehicle or a railway vehicle. The dangerous goods must be contained in one or more small means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety.

Explosive Limit and Limited

Quantity Index: 10 kg

Excepted quantities (TDG): E1

Emergency Response Guide

(ERG) Number: 171

IMDG

Special provision (IMDG): 274, 335, 966, 967, 969

Limited quantities (IMDG): 10 kg

Excepted quantities (IMDG): E1

Packing instructions (IMDG): LP02, P002

Packing provisions (IMDG): PP12

IBC packing instructions (IMDG): IBC08

IBC special provisions (IMDG): B3

Tank instructions (IMDG): BK1, BK2, BK3, T1

Tank special provisions (IMDG): TP33

EmS-No. (Fire): F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE

EmS-No. (Spillage): S-F - SPILLAGE SCHEDULE Foxtrot - WATER-SOLUBLE MARINE
POLLUTANTS

Stowage category (IMDG): A

IATA

PCA Excepted quantities (IATA): E1

PCA Limited quantities (IATA): Y956

PCA limited quantity max net
quantity (IATA): 30kg

PCA packing instructions (IATA): 956

PCA max net quantity (IATA): 400kg

CAO packing instructions (IATA): 956

CAO max net quantity (IATA): 400kg

Special provision (IATA):	A97, A158, A179, A197, A215
ERG code (IATA):	9L

14.7 Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable.

Section 15: Regulatory Information

CERCLA Reportable Quantity:	This material does not contain any components with a CERCLA RQ.
SARA 304 Extremely Hazardous Substances Reportable Quantity:	This material does not contain any components with a section 304 EHS RQ.
SARA 302 Extremely Hazardous Substances Threshold Planning Quantity:	This material does not contain any components with a section 302 EHS TPQ.
SARA 311/312 Hazards:	Fire Hazard, Chronic Health Hazard
SARA 313:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know:	No components are subject to the Massachusetts Right to Know Act.
Pennsylvania Right To Know:	Copper 7440-50-8
Maine Chemicals of High Concern:	Product does not contain any listed chemicals
Vermont Chemicals of High Concern:	Product does not contain any listed chemicals

Washington Chemicals of High Concern:

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA:

All substances listed as active on the TSCA inventory

TSCA list:

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

Section 16: Other Information

Abbreviations and Acronyms

SDS	Safety Data Sheet
LC50	Median lethal concentration
LD50	Median lethal dose
EC50	Median effective concentration
IMDG	International Maritime Dangerous Goods
IATA	International Air Transport Association

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
TSCA	Toxic Substance Control Act

Safety Data Sheet (SDS), USA

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.