



This Safety Data Sheet complies with EC Directives 91/155 and 1272/2008

SECTION 1. IDENTIFICATION OF THE SUBSTANCE AND THE COMPANY

Product name	Copper
Chemical formula	Cu
Synonym	Cuivre (French), Kupfer (Deutsch)
EC # (European Chemical Substance)	231-159-6
CAS # (Chemical Abstracts Service)	7440-50-8
Use of the substance	Photovoltaic and electronic application
Supplier/manufacturer	Firebird Technologies Inc., a division of 5N Plus Inc. 9200 Industrial Road Trail, British-Columbia Canada V1R 4X7
Contact information	Maxime Cossette, 5N Plus Inc.
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Website	www.5nplus.com

SECTION 2. HAZARDS IDENTIFICATION

Physical state	Solid (slugs/shot)
Colour	Reddish, lustrous
Risk status	May cause skin and eyes irritation
Emergency overview	Slightly hazardous (copper has low toxicity)
Routes of entry	Inhalation
Potential acute health effects	
Eyes	Exposure of the eyes to copper fumes or dust can cause irritation, conjunctivitis, palpebral edema,
Skin	Skin exposure may cause irritation, itching, eczema, allergic contact dermatitis, hypersensitivity, and a
Inhalation	Inhalation of copper fumes may results in the irritation of the upper respiratory tract.
Ingestion	Ingestion of copper may produce a metallic or sweet taste.
Potential chronic health effects	Overexpose to metal fume may cause fever; discoloration of skin and hair.

For toxicological information, see Section 11

SECTION 3. COMPOSITION OF/INFORMATION REGARDING CONSTITUENTS

Name	Symbol	CAS #	EC #	IUPAC Name	Percentage (%)	Classification
Copper	Cu	7440-50-8	231-159-6	Copper	100	Not classified

SECTION 4. FIRST AID

Eye contact	Check for and remove any contact lenses. In the event of contact with eyes, rinse immediately with plenty of water. Get medical attention.
Skin contact	In case of contact, wash affected area with soap and large amounts of water. Remove and wash any contaminated clothing. Dust may provoke skin irritation.
Inhalation	If inhaled, move to fresh air. Get immediate medical attention.
Ingestion	Rare in industry. If the person is unconscious, do not give anything to drink or induce vomiting. Get immediate medical attention.
Note to attending physician	There is no specific antidote. Please contact poison center.

SECTION 5. FIRE FIGHTING MEASURES

Flammability of the product	This product may be combustible at high temperature.
Products of combustion	May evolve metal oxides fumes above melting point.
Extinguishing media	
Suitable	Use DRY chemical powder.
Not suitable	Water, CO ₂ , halogenated extinguishers.
Special exposure hazards	Metal oxides fumes can form in the event of fire.
Special protective equipment for firefighters	Firefighters should wear self-contained breathing apparatus (SCBA) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Safety glasses and impervious gloves. Wear at least a P2 type particle filter respirator if the airborne concentrations are above the exposure limit. If the airborne concentrations are unknown, wear approved self-contained breathing apparatus.

Environmental precautions

Avoid dispersal of spilled material. Prevent runoff and contact with soil, waterways, drains or sewers.

Methods for cleaning-up

Vacuum the spilled material with an appropriate Class H Vacuum and place in an appropriate container for disposal in a safe place. Avoid creating dusty conditions and prevent wind dispersal.

SECTION 7. HANDLING AND STORAGE

Handling

Avoid contact with skin. Wear protective eyewear and, in the event of insufficient ventilation, a suitable breathing apparatus. Do not eat, drink, or smoke during work. Wash hands, forearms and face thoroughly after handling this product and before eating, smoking or using the lavatory.

Storage

Keep in tightly closed containers. Keep in a dry and well ventilated area. Keep away from incompatible materials.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits values

Product Name	8-hour total weight average (TWA) permissible exposure limit (PEL)	Short Term Exposure Limits (STELs)
Copper	<p>AUSTRIA : 1 mg/m³ inhalable aerosol (as Cu)</p> <p>BELGIUM : 1 mg/m³ (as Cu)</p> <p>CANADA-QUEBEC: 1 mg/m³ (as Cu)</p> <p>DENMARK : 1 mg/m³ (as Cu)</p> <p>FRANCE : 1 mg/m³ (as Cu)</p> <p>GERMANY: 1 mg/m³ inhalable aerosol (as Cu)</p> <p>HUNGARY: 1 mg/m³ (as Cu)</p> <p>The NETHERLANDS : 1 mg/m³ (as Cu)</p> <p>POLAND : 1mg/m³ (as Cu)</p> <p>SPAIN : 1 mg/m³ (as Cu)</p> <p>SWEDEN : 1 mg/m³ (as Cu)</p> <p>SWITZERLAND : 1 mg/m³ inhalable aerosol (as Cu)</p> <p>UNITED KINGDOM : 1 mg/m³ inhalable aerosol (as Cu)</p> <p>USA - OSHA : 1 mg/m³ (as Cu)</p>	<p>DENMARK : 2 mg/m³ (as Cu)</p> <p>FRANCE : 2 mg/m³ (as Cu)</p> <p>GERMANY : 0.2 mg/m³ (as Cu)</p> <p>HUNGARY : 4 mg/m³ (as Cu)</p> <p>DENMARK : 1.0 mg/m³ (as Cu)</p> <p>POLAND: 2 mg/m³ (as Cu)</p> <p>SWITZERLAND : 0.2 mg/m³ (as Cu)</p> <p>UNITED KINGDOM : 2 mg/m³ (as Cu)</p>

Occupational exposure controls

Environmental exposure controls

Use only in well ventilated areas. If handling generates dust, fumes, gases, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Eye protection

Safety glasses

Skin protection

Lab coat. The choice of skin protection gear will depend on the nature of the work to perform.

Respiratory protection

If there is a risk of exceeding exposure limits, wear at least a P2 type particle filter respirator.

Hand protection

Natural rubber (latex)

Personal safety equipment pictograms



SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Solid ductile, malleable metal

Odor

Odorless

Color

Reddish

Molecular weight

63.546

Molecular formula

Cu

Melting point

1083°C

pH

Not applicable

Boiling point

2595°C

Flash point

Not applicable

Flammability

Not flammable

Oxidizing properties

Not applicable

Vapor pressure

> 1 mm/Hg @ 25°C

Relative density	8.94 g/cm ³
Solubility	
Water solubility	Insoluble
Fat solubility	Insoluble
Partition coefficient	Not available
Viscosity	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Conditions to avoid	Stable. Incompatible with strong acids, active halogen compounds, chlorine, fluorine, iodine, bromine, ammonia. May react explosively with strong oxidizing agents.
Materials to avoid	Strong acids, active halogen compounds, chlorine, fluorine, iodine, bromine, ammonia, strong oxidizing agents.
Hazardous decomposition products	May evolve metal oxides fumes above melting point.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological data

Product/ingredient name	Test	Result	Route/Species
Copper	LD50	>5000 mg/kg	Oral / Mouse

Acute effects

Eyes	Exposure to particulates may cause irritation
Skin	Exposure to particulates may cause skin irritation and may produce dermatitis
Ingestion	May cause gastrointestinal irritation with nausea, vomiting and diarrhea
Inhalation	Inhalation of particulates may cause respiratory tract irritation

Potential chronic health effects

Carcinogenicity	Not applicable
Mutagenicity	Not applicable
Teratogenic effects	Not applicable

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity data

Product/ingredient name	Species	Period	Test (LC50)
Copper	Anguilla rostrata	Not known	8,233 ug/L

Environmental precautions	Observe environmental regulations in place.
Breakdown products	This product is insoluble in water
Toxicity of biodegradation products	Not available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal	The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and prevent runoff and contact with soil, waterways, drains or sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional and local authority requirements.
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SECTION 14. TRANSPORTATION INFORMATION

Regulatory information	Proper shipping name	Class	UN Number	PG	Labeling
UN/IMDG/IATA Class	Not classified	Not classified	Not classified	Not classified	Not classified
ADR/RID Class	Not classified	Not classified	Not classified	Not classified	Not classified
GGVSE	Not classified	Not classified	Not classified	Not classified	Not classified

SECTION 15. REGULATORY INFORMATION

EU Regulation *This chemical substance is not classified according to the criteria of the EC Directive 1272/2008*

Hazard Statements Not applicable

SECTION 16. OTHER INFORMATION

References
 Directive 91/155/EEC
 European Commission's Joint Research Centre Databases
 EPA Ecotox Databases

Glossary
LD50: Indicates the dose of the chemical that is lethal to 50% of the exposed animals.
LC50: Indicates the concentration of the chemical that is lethal to 50% of the exposed animals.

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Version	1
Publication date	November 26, 2010
Date of previous version	New
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