x	**SAFETY DATA SHEET**	☐	**INFORMATION FORM FOR CHEMICALS DATA**

Date: 7.9.2006 **Former date:**

1. IDENTIFICATION OF THE CHEMICAL AND OF THE MANUFACTURER, IMPORTER OR OTHER UNDERTAKING

1.1 Identification of the substance or preparation

Trade name

Oxygen free copper OFE-OK®, OF-OK®
Outokumpu High purity copper Cu99,995; Cu99,999; Cu99,9999
Deoxidized copper Cu-DHP
Nordic Brown™, DHP copper with dark, natural oxide layer
Silver bearing oxygen free copper CuAg0,045(OF), CuAg0,04(OF), CuAg0,05(OF), CuAg0,10(OF), CuAg0,25(OF), CuAg0,45(OF), CuAg0,8(OF), CuAg1,0(OF),
Silver bearing deoxidized copper CuAg0,10P, CuAg0,04P
Zirconium bearing copper ZrK
Tellurium bearing copper TE-OK®
Aluminium bronzes Ap 105, Ap 106 (CuAl6Ni2), Ap 108, Ap 110, Ap 205
Cupronickels NK 5, NK 25, NK 102, NK 103, NK 110, NK 130
Nickel silvers CuNi9Zn10, CuNi12Zn24, CuNi18Zn20, CuNi18Zn17
Tin bronzes CuSn, CuSn0,7, CuSn4, CuSn5, CuSn6, CuSn6P, CuSn8
Silicon bronzes Pp103
Manganese bronzes CuMn10Al2Sn, CuZn15Mn10
Unalloyed brasses CuZn15, CuZn17, CuZn20, CuZn28, CuZn30, CuZn36, CuZn37

Nordic Green™, chemical treatment of oxidized DHP-copper to achieve green patina layer on copper surface. (for further information on Nordic Green™ contact the manufacturer)

Code of the preparation

1.2 Use of the chemical

1.2.1 The intended uses of the chemical
Electrical and architectural industry

1.2.2 Standard industrial classification (SIC) 3351

1.2.3 Use categories (UC62)

1.2.4 The chemical can be used by the general public x☐

1.2.5 The chemical is used by the general public only ☐

1.3 Identification of the manufacturer, importer or other undertaking

1.3.1 Manufacturer, importer, other undertaking
Luvata Pori Oy

1.3.2 Contact information:

Street address	Kuparitie
Postcode and post office	28101 Pori
Post-office box	P.O. Box 60
Postcode and post office	28101 Pori
Telephone number	+ 358 2 6266111
Telefax	+ 358 2 6265300
Y code	0709554 - 0

1.3.3 Information on foreign manufacturer

1.4 Emergency telephone

1.4.1 Telephone number, name and address
Myrkytystietokeskus,Stenbäckinkatu 11, 00290 Helsinki
Tel. +358 9 4711

2. COMPOSITION AND INFORMATION ON INGREDIENTS

2.1 Hazardous ingredients

2.1.1 CAS number or other code	2.1.2 Name of the ingredient	2.1.3 Concentration Wt-%	2.1.4 Warning symbol, R phrases and other data on the ingredient
7440-50-8	Copper	63-99,9999	n.a.
7429-90-5	Aluminium	max 11,0	n.a.
7440-47-3	Chromium	max 0,2	n.a.
	Hydrogen*		n.a.
7439-89-6	Iron	max 4,0	n.a.
7439-96-5	Manganese	max 15	n.a.
	Nitrogen*		n.a.
7440-02-0	Nickel	max 32	Xn, R: 40-43
17778-80-2	Oxygen*		n.a.
7723-14-0	Phosphorus	max 0,06	n.a.
7440-21-3	Silicon	max 0,7	n.a.
7440-22-4	Silver	max 0,95	Xn
	Sulfur*		n.a.
7440-31-5	Tin	max 8,75	n.a.
13494-80-9	Tellurium	max 0,7	Xn (harmful), R: 20/22
7440-66-6	Zinc	max 37	n.a.
7440-67-7	Zirconium	max 0,9	n.a.

n.a. = not applicable * = in compounds on the surface of prepatinated copper

2.1.5 There has been a request for confidentiality of a substance according to Annex 3 of the decree ☐

2.1.6 A substance not dangerous has been indicated as confidential ☐

2.1.7 Other information

3. HAZARDS IDENTIFICATION

There is a danger of splashing in handling melt metal especially in case of moist raw material. Copper products in solid state do not present an inhalation ingestion or contact hazard. However, operations such as melting, welding, sawing, brazing and grinding may result in the following effects in the case of overexposure.

3.1.1 Metal fumes

Inhalation of excessive fume or dust concentrations may result in shiver, metal taste in mouth, headache, respiratory tract irritation and metal fume fever. Smoke is irritating to skin and eyes. Prolonged and repeated exposure may cause hemolysis, raising of the blood pressure and damage to kidney and liver.

3.1.2 Metal dust

Mechanical irritation may result from an accumulation of dust particles in the eye.

4. FIRST AID MEASURES

4.1 Special instructions

4.2 Inhalation

Move victim to fresh air. If not breathing, give artificial respiration or oxigen. Call a physician.

4.3 Skin contact

In case of irritation or sensitation of the skin, immediately wash skin with copious amounts of water. Wash contaminated clothing before reuse. Wash hands before eating or smoking.

4.4 Eye contact

Flush thoroughly with copious amounts of water for 15 minutes. Call a physician.

4.5 Ingestion

Wash out mouth with water. Induce vomitting if conscious. Call a physician.

4.6 Information to doctor or other trained persons giving first aid

5. FIRE-FIGHTING MEASURES

Copper is not flammable. However in the form of dust the explosion hazard is slight when exposed to flame.

5.1 Suitable extinguishing media
Foam, carbon dioxide (CO_2), dry chemicals.

5.2 Extinguishing media which must not be used for safety reasons
Water with molten copper.

5.3 Special exposure hazards in a fire

5.4 Special protective equipment for fire-fighters

5.5 Other instructions
Esplosion hazards: Molten copper explodes on contact with water. Copper also forms a potentially explosive reaction with the following substances: acetylene compounds, ammonium nitrate, 3-bromopropyne, ethylene oxide and lead acid.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions
Wear gloves and approved respiratory protection if possibility of dust, mist and fume exposure exists.

6.2 Environmental precautions
Copper-containing waste is normally collected to recycle copper. Should waste disposal be deemed necessary, follow Federal, State or Local regulations.

6.3 Methods for cleaning up
Do not use compressed air for cleaning.

6.4 Other instructions
Shut off all sources of ignition. If dust is released sweeping is preferred. Place material in closed containers.

7. HANDLING AND STORAGE

7.1 Handling
Do not breath dust or smoke. Avoid activities that raise dust or smoke. Avoid contact with the eyes and skin. Wash hands thoroughly after handling.

7.2 Storage
To be stored in normal dry warehouse.

7.3 Specific use(s)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Exposure limit values

Provide sufficient ventilation to maintain the concentration of dust below the admissible limit values.

8.1.1 HTP values
Cu 1 mg/m3 (Dust and Mist “alveolijae”)/HTP-arvot vuonna 2005, Sosiaali- ja terveysministeriön oppaita 2005:10

8.1.2 Other limit values

OSHA (8h TWA)
Dust and Mist as Cu 1 mg/m3
Copper fume 0,1 mg/m3
Tellurium 0,1 mg/m3

ACGIH (8h TWA)
Dust and Mist as Cu 1 mg/m3
Copper Fume 0,2 mg/m3
Aluminium 10 mg/m3 (dust)
Chromium 0,5 mg/m3
Iron oxide Fe2O3 5 mg/m3 (dust and fumes)
Manganese 0,2 mg/m3
Nickel 0,1 mg/m3
Phosphorus 0,1 mg/m3 (dust)

Silicon 10 mg/m3
Silver 0,1 mg/m3
Tellurium and compounds 0,1 mg/m3 (dust)
Tin 2 mg/m3
Zinc 5 mg/m3
Zirconium compounds as Zr 5 mg/m3

8.1.3 Limit values in other countries

8.2 Exposure controls

8.2.1 Occupational exposure controls
When handling molten copper, protective clothing against melt splashing, face shield, protective gloves and respirator if needed must be used. Avoid ingestion and inhalation of dust and fumes. Do not eat, drink or smoke during use and wash hands before eating, drinking or smoking.

8.2.1.1 Respiratory protection
NIOSHA/MSHA approved respirator for dust, fume and mist.

8.2.1.2 Hand protection
Protective gloves against melt splashing.

8.2.1.3 Eye protection
Safety glasses or face shield in exposure to dust, fume or mist and when handling melt.

8.2.1.4 Skin protection
Protective clothing against melt splashing. Wear trouser legs outside boots to avoid melt entrance in the boots.

8.2.2 Environmental exposure controls

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 General information (physical state, colour and odour)
Solid form**,** reddish, gold, bronze or silver depending on alloy

9.2 Important health, safety and environmental information

9.2.1 pH
Not applicable for solid metal.

9.2.2 Boiling point/boiling range
Pure copper 2595°C

9.2.3 Melting range of alloys
1051-1083 °C

9.2.4 Flammability (solid, gas)
Finely devided powder may be flam

9.2.5 Explosive properties

9.2.5.1 Lower explosive limit

9.2.5.2 Upper explosive limit

9.2.6 Oxidising properties

9.2.7 Vapour pressure

9.2.8 Relative density
7,6 - 8,95 g/cm^3 depending on copper alloy

9.2.9 Solubility

9.2.9.1 Water solubility
Insoluble in water

9.2.9.2 Fat solubility (solvent-oil to be specified)

9.2.10 Partition coefficient: n-octanol/water

9.2.11 Viscosity

9.2.12 Vapour density

9.2.13 Evaporation rate

9.3 Other information

10. STABILITY AND REACTIVITY

Copper and copper alloys stable under normal conditions

10.1 Conditions to avoid

10.2 Materials to avoid

Acetylene compounds, ammonia, ammonium chloride, ammonium hydroxide, ammonium nitrate, black liquor, 3-bromopropyne, chlorine (moist), chromic acid, copper chloride, copper nitrate, ethylene oxide, ferric chloride, ferric sulfate, hydrocyanic acid, hydrogen peroxide (>10%), hydrogen sulfide, lead acid, lime sulfur, mercury or its salts, nitric acid, picric acid, potassium cyanide, potassium dichromate, silver salts, sodium cyanide, sodium dichromate, sodium sulfide, sodium thiosulfate, sulfur (molten), sulfur chloride.

10.3 Hazardous decomposition products

Copper and copper alloys may produce an explosive reaction with the following substances: acetylene compounds, ammonium nitrate, 3-bromopropyne, ethylene oxide and lead acid. At temperatures above melting point metallic oxide fumes may be evolved. When welding and brazing, dust and fume may also be emitted. Metal machining and grinding operations may produce fine particles and dust.

11. TOXICOLOGICAL INFORMATION

11.1 Acute toxicity

11.2 Irritation and corrosiveness

Possibility of irritation of the bowels by swallowing, the eyes, skin and mucous membranes.

11.3 Sensitisation

Copper is not classified as a sensitative agent.

11.4 Sub-acute, sub-chronic and prolonged toxicity

Prolonged or repeated exposure to copper fumes or dusts may cause hemolysis, raising of the blood pressure and damage to kidney and liver.

11.5 Empirical data on effects on humans

Copper fumes or dusts may result in respiratory tract irritation, metal fume fever, shivers, metal taste in mouth, headache. Smoke may be irritating to skin and mucous membrane.
Smoke may be irritating to eyes. Ingestion may result in irritation of the bowels.

11.6 Other information on health effects

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

12.1.1 Aquatic toxicity

12.1.2 Toxicity to other organisms

12.2 Mobility

12.3 Persistence and degradability

12.3.1 Biodegradation

12.3.2 Chemical degradation

12.4 Bioaccumulative potential

12.5 Other adverse effects

13. DISPOSAL CONSIDERATIONS

The material is 100 % recycleable and must be sent for remelting. The procedure is organised according to Federal, State or Local regulations.

14. TRANSPORT INFORMATION

14.1 UN number

14.2 Packing group

14.3 Land transport

14.3.1 Transport class

14.3.2 Risk code

14.3.3 Name according to bill of freight

14.3.4 Other information

14.4 Sea transport

14.4.1 IMDG class

14.4.2 Correct technical name

14.4.3 Other information

14.5 Air transport

14.5.1 ICAO/IATA class

14.5.2 Correct technical name

14.5.3 Other information

15. REGULATORY INFORMATION

15.1 Information on the warning label

15.1.1 Letter code of the warning symbol and indications of danger for the preparation

15.1.2 Names of the ingredients given on the warning label

15.1.3 R phrases

n.a

15.1.4 S phrases

n.a

15.1.5 Special regulations on certain preparations

15.2 National regulations

16. OTHER INFORMATION

16.1 List of the relevant R phrases

16.2 Training advice

16.3 Restrictions on use

16.4 Further information

The information given on this data sheet is correct to the best of our knowledge, however, no claim, warranty or guarantee is made as to accuracy, reliability or completeness of this information. Luvata Pori Oy accept no liability whatsoever regarding the use or interpretation of its contents.

16.5 Sources of key data used

Material safety data sheets of alloying elements provided by suppliers
Copper Development Association Technical Data TN27 High Conductivity Coppers
Metals Handbook, Ninth Edition, Vol. 2, the ASM Handbook Committee

16.6 Information which has been added, deleted or revised