MATERIAL SAFETY DATA SHEET

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[In accordance with COMMISSION REGULATION (EU) 2020/878 of 18 June 2020 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union No L.203 z 26.06.2020]

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

TRADE NAME:

Lead-free alloys with flux CF48 / 1.1.3

OTHER NAME:

Sn97Ag3	1.1.3/1,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/1,5% (1.1.3.B)
Sn97Ag3	1.1.3/1/1,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/1/1,5% (1.1.3.B)
Sn97Ag3	1.1.3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3/1,5% (1.1.3.B)
Sn97Ag3	1.1.3/3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/2,0% (1.1.3.B)
Sn96,5Ag3,5	1.1.3/3/2,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/1/2,0% (1.1.3.B)
Sn96,3Ag3,7	1.1.3/2,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3/2,0% (1.1.3.B)
Sn96,3Ag3,7	1.1.3/3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3,0% (1.1.3.B)
Sn96,3Ag3,7	1.1.3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/1/3,0% (1.1.3.B)
Sn95,5Ag4Cu0,5	1.1.3/3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3/3,0% (1.1.3.B)
Sn95,5Ag4Cu0,5	1.1.3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3,5% (1.1.3.B)
Sn99Cu0,7Ag0,3	1.1.3/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/1/3,5% (1.1.3.B)
Sn99Cu0,7Ag0,3	1.1.3/1/3,0% (1.1.3.B)	Sn96,5Ag3Cu0,5	1.1.3/3/3,5% (1.1.3.B)
Sn99Cu0,7Ag0,3	1.1.3/3/3,0% (1.1.3.B)	Sn97Cu3	1.1.3/1/1,0% (1.1.3.B)
Sn99Cu0,7Ag0,3	1.1.3/3,3% (1.1.3.B)	Sn97Cu3	1.1.3/3,0% (1.1.3.B)
Sn99Cu0,7Ag0,3	1.1.3/3/3,3% (1.1.3.B)	Sn97Cu3	1.1.3/1/3,0% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/1,5% (1.1.3.B)	Sn97Cu3	1.1.3/3/3,0% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/1/1,5% (1.1.3.B)		
Sn99,3Cu0,7	1.1.3/3/1,5% (1.1.3.B)	Sn99,3Cu0,7	CF48/1,5% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/2,0% (1.1.3.B)	Sn99,3Cu0,7	CF48/3/1,5% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/1/2,0% (1.1.3.B)	Sn99,3Cu0,7	CF48/3,0% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/3/2,0% (1.1.3.B)	Sn99,3Cu0,7	CF48/3/3,0% (1.1.3.B)
Sn99,3Cu0,7	1.1.3/3,0% (1.1.3.B)		
Sn99,3Cu0,7	1.1.3/3% (1.1.3.B)		

1.2 Relevant identified uses of the substance or mixture and uses advised against

RELEVANT IDENTIFIED USES:

Lead-free solder alloy with flux. Product used for soft manual and automatic soldering.

USES ADVISED AGAINST:

All other than identified

1.3 Details of the supplier of the safety data sheet

SUPPLIER:

Cynel-Unipress Sp z o.o.

ADDRESS:

ul. Białołęcka 231B, 03-253 Warszawa, Poland

Supplier: Transfer Multisort Elektronik Ltd.
Coleshill, Birmingham Coleshill House Suite 1C, 1 Station Road
+44 1675790026 e-mail: office@tme-uk.eu

TELEPHONE/FAX NUMBER:
+48 22 519 29 48/ 22 519 29 46

E-MAIL ADDRESS:
marketing@cynel.com.pl

1.4 Emergency telephone number

Emergency Phone in Poland (open: 8.00 a.m.-4.00 p.m.)
+48 22 519 29 48 or +48 22 519 29 49

Section 2: Hazards identification

2.1 Classification of the substance or mixture

CLASSIFICATION ACCORDING TO REGULATION (EC) NO 1272/2008
None

HARMFUL EFFECTS OF HUMAN HEALTH EFFECTS:
If you use rightly, does not pose a threat to the human health
EFFECTS OF OPERATION ON THE ENVIRONMENT:
If you use rightly, does not pose a threat to the environment.
EFFECTS OF ACTION RELATED TO PHYSICOCHEMICAL PROPERTIES:
Not applicable

2.2 Label elements

HAZARD SYMBOLS:
None

SUBSTANCE NAME FOR LABELING:
Not applicable

RISK PHRASES:
None

SAFETY PHRASES:
None

OTHER INFORMATION:
EUH210 — Safety data sheet available on request.

2.3 Other hazards

The mixture does not contain substances included on the list established in accordance with Article 59(1) as having endocrine disrupting properties and substances with endocrine disrupting properties in accordance with the criteria laid down in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.
The criteria for PBT or vPvB according to Annex XIII of Regulation REACH do not apply to inorganic substances.

Section 3: Composition/Information on ingredients

3.1 Substances

Not applicable

3.2 Mixtures:

TIN (Sn):

Range of percentages:	94,50 – 99,50 %
CAS number:	7440-31-5
EC number:	231-141-8
Registration number:	01-2119486474-28-0000
Classification acc. to 1272/2008/EC:	not classified

Substance with defined value of the permissible concentration in the working environment at Community level.

COPPER (Cu):

Range of percentages:	0,00 – 3,50 %
CAS number:	7440-50-8
EC number:	231-159-6
Registration number:	01-2119480154-42-0045
Classification acc. to 1272/2008/EC:	not classified

Substance with defined value of the permissible concentration in the working environment at Community level.

SILVER (Ag):

Range of percentages:	0,00 – 4,00 %
CAS number:	7440-22-4
EC number:	231-100-4
Registration number:	01-2119555669-21-0029
Classification acc. to 1272/2008/EC:	not classified

Substance with defined value of the permissible concentration in the working environment at Community level.

HYDROGENATED ROSIN:

Range of percentages:	≤ 3%
CAS number:	65997-06-0
EC number:	266-041-3
Registration number:	01-2119487113-41-0000
Classification acc. to 1272/2008/EC:	not classified

Section 4: First aid measures

4.1 Description of first aid measures

GENERAL INFORMATION:

at room temperature (outside of the dangers of a mechanical nature). But in the process of soldering the main risks are: high temperature, solder fumes and vapours.
During production and some uses, the hazardous respirable silver-bearing particles may occur/be formed.
In case of health problems, immediately contact to a doctor or poison control center. Please check vital functions. If victim is unconscious, please provide adequate ventilation. Prevent the victim from cooling down.

SKIN CONTACT:

Solder alloy: In case of exposure wash the affected skin thoroughly with soap and water.
In the process of soldering: possible thermal burn. Rinse damaged skin with cold water. Apply a sterile dressing. Consult with the doctor.

EYE CONTACT:

Solder alloy: if filings get into the eyes, immediately rinse with plenty of water with the eyelids wide open, for at least 10-15 min. Consult an ophthalmologist.
In the process of soldering: In the process of soldering: splashes of molten metal can cause burns. Apply a sterile dressing. Immediately consult an ophthalmologist.

INGESTION:

Rinse mouth with water. Do not induce vomiting without medical advice. Consult a physician.
The form of the product causes that exposure is unlikely. Consume the product may be a consequence of not following basic hygiene rules, e.g. washing hands after work or exposure to high concentrations of dust and fumes in the workplace.

INHALATION:

Wire: exposure not possible.
In the process of soldering: take the affected person to fresh air and obtain medical ensure help.

4.2 Most important symptoms and effects, both acute and delayed

Prolonged exposure on dust/fume cause metallic taste in mouth, loss of appetite, headache and general weakness. It can also cause bluish or grayish discoloration of the skin, eyes and mucous membranes (argyria). It occurs slowly, it may take several years before it develops. These stains are irreversible.
Gastro-intestinal symptoms are the first symptoms for high oral intakes of soluble copper compounds. Vomiting may occur. The most critical organ for delayed effects from “copper” excess is the liver. Nose-lung irritation may be a symptom occurring after inhalation of copper containing fumes/dusts/mists.

EYE CONTACT:

may cause irritation, redness, tearing.

SKIN CONTACT:

may cause redness, burning sensation, bums (during soldering).

INHALATION:

irritation of respiratory tract, cough, headaches and dizziness. Symptoms of exposure may only appear after a few days.

INGESTION:

Gastro-intestinal symptoms are the first symptoms for high oral intakes of soluble mixture. Swallowing of silver compounds may cause irritation of the gastrointestinal tract.

4.3 Indication of any immediate medical attention and special treatment needed

A decision regarding further medical treatment by a physician should be made after thorough examination of the injured.

Section 5: Firefighting measures

5.1 Extinguishing media

SUITABLE EXTINGUISHING MEDIA:

extinguishing powder, sand
Extinguishing with extinguishing powders or sand promotes the limitation of the release of toxic fumes of metals.

UNSUITABLE EXTINGUISHING MEDIA:

CO_2, foam, water jet – risk of the propagation of the flame

5.2 Special hazards arising from the substance or mixture

Non-combustible product. During the combustion at > 400° C may be create products with toxic and irritating fumes contains copper, silver and tin. Do not inhale combustion products – it can be dangerous to health.

5.3 Advice for firefighters

Personal protection typical in case of fire. Self-contained breathing apparatus and protective clothing should be worn.

Section 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Limit the access to the breakdown area for the outsiders, until the suitable cleaning operations are completed. Use personal protective equipment. Ensure that the consequences of failure are removed by trained personnel only. Do not inhale dust. Avoid direct contact with the product. There must be adequate ventilation. Wear a face mask if the ventilation is insufficient.

FOR NON-EMERGENCY PERSONNEL

Use protective clothing made of natural materials (cotton) or synthetic fibers, gloves made of nitrile. Use safety goggles. Do not inhale dust, smoke, vapour. Remove sources of ignition. . Ensure that the consequences of failure are removed by trained personnel only.

FOR EMERGENCY RESPONDERS

Use protective clothing made of natural materials (cotton) or synthetic fibers. Use full safety mask. Do not inhale dust, smoke, vapour. Remove sources of ignition. Mark the contamination of the area.

6.2 Environmental precautions

Prevent entry into drains, surface and ground water and soil. In case of release of large amounts of the product, notify the appropriate emergency services.

6.3 Methods and material for containment and cleaning up

Pick it up mechanically. Avoid dust formation during collection. The waste must be collected and transported in sealed container. Treat collected material like a waste or reuse it. Hand over the waste to waste management companies.

6.4 Reference to other sections

Appropriate conduct with waste product – section 13
Appropriate personal protective clothing – section 8

Section 7: Handling and storage

7.1 Precautions for safe handling

Handle in accordance with good occupational hygiene and safety practices Before break and after work wash hands carefully. Avoid contact with eyes and skin. Do not breathe fumes in the process of soldering. Ensure proper ventilation during soldering process. Do not eat, drink and smoke during the handling. Avoid creating dust in the workplace. Use as intended. Wear personal protective equipment.

7.2 Conditions for safe storage, including any incompatibilities

Keep in properly labeled original packaging. Keep in a dry and well-ventilated place. Keep away from strong acids and oxidants. Store at temp. 5-30˚C. The recommended humidity level of 20-80%. Keep away from food and beverages.

7.3 Specific end use(s)

Applications are listed in section 1.2.

Section 8: Exposure controls/personal protection

8.1 Control parameters

MAXIMUM ADMISSIBLE CONCENTRATIONS AND INTENSITIES FOR AGENTS HARMFUL TO HEALTH IN THE WORKING ENVIRONMENT IN POLAND, DZ.U. 2018 POZ. 1286 AS AMENDED

Specification	NDS [mg/m^3]	NDSCh [mg/m^3]	NDSP [mg/m^3]	Number of fibers [cm^3]	Remark [2)]
Tin and its inorganic compounds, except for stannane - calculated as Sn, inhalable fraction [1)]	2,00	—	—	—	—
Dusts are not classified due to toxicity	10,00	—	—	—	—
Copper and its inorganic compounds	0,20	—	—	—	—
Silver - inhalation fraction [1)]	0,05	—	—	—	—
Silver - insoluble compounds - calculated as Ag	0,05	—	—	—	—
Silver - soluble compounds - calculated as Ag	0,01	—	—	—	—

1) Inhalable fraction - an aerosol fraction penetrating through the nose and mouth, which when deposited in the airways poses a health hazard, determined in accordance with the PN-EN 481 standard.

2) Labeling the substance with the term "skin" means that the absorption of substances through the skin can be just as important as with inhalation

LIST OF MAK AND BAT VALUES 2022 COMMISSION FOR THE INVESTIGATION OF HEALTH HAZARDS OF CHEMICAL COMPOUNDS IN THE WORK AREA

Specification	MAK [ppm]	MAK [mg/m^3]	Peak limitation	Pregnancy risk group
Silver	0,1 I mg/m^3		II (8)	D
copper	0,01 R		II (2)	C
Tin	—		—	—

R I see Section
I see Section Vd see Section Vd
C, D – see Section VIII

THE FOLLOWING CURRENT NATIONAL OCCUPATIONAL EXPOSURE LIMIT VALUES APPLY (EUROPEAN UNION):

Specification	TLV-TWA [mg/m^3] *	TLV-STEL [mg/m^3]
Silver, metallic	0,10	—
Silver (soluble compounds as Ag)	0,01	—

Tin and its inorganic compounds	—	—
Copper and its inorganic compounds	10	—

* Measured or calculated in relation to a reference period of eight hours as a time-weighted average.

Please check also any national occupational exposure limit values in your country.

Follow the procedures for monitoring the concentrations of hazardous components in the air and the procedures for the control of air quality in the workplace - as long as they are available and reasonable on a given workplace - according to the relevant European Standards. Take into account the conditions at the site of exposure and appropriate measurement methodology adapted to working conditions.

TIN

DNEL inhalation (long-term) worker 71 mg / m³
DNEL skin (long-term) worker 10 mg / kg body weight / day
DNEL inhalation (long-term) consumer 17 mg / m³
DNEL skin (long-term) consumer 80 mg / kg body weight / day
DNEL oral (long-term) consumer 5 mg / kg body weight / day

COPPER

DNEL skin (long-term) worker 137 mg / kg body weight / day
DNEL skin (long-term) consumer 137 mg / kg body weight / day
DNEL oral (long-term) consumer 0.041 mg / kg body weight / day
PNEC freshwater 6.3 µg / L (assessment factor 1)
PNEC marine waters 5.2 µg mg / l (assessment factor 1)
PNEC sewage treatment plant 230 µg / l (assessment factor 1)
PNEC freshwater sediments 87 mg / kg (assessment factor 1)
PNEC marine sediments 676 mg / kg
PNEC soil 65 mg / kg (assessment factor 2)

INHALATION DNELS (LONG-TERM AND ACUTE EFFECTS):

Worekrs	
Soluble silver compound	0,01 * mg Ag/m^3
Poorly / insoluble silver compound	0,1 ** mg Ag/m^3
General population	
Soluble silver compound	0,004 * mg Ag/m^3
Poorly / insoluble silver compound	0,04 * mg Ag/m^3

* Value for re-calculation only
** Value applicable to the substance “silver metal”

ORAL DNELS (LONG-TERM EFFECTS):

General population	
Soluble silver compound	0,02 * mg Ag/m^3
Poorly / insoluble silver compound	1,2 ** mg Ag/m^3
Children	
Soluble silver compound	0,002 * mg Ag/m^3
Poorly / insoluble silver compound	0,12 * mg Ag/m^3

* Value for re-calculation only
** Value applicable to the substance "silver metal"

8.2 Exposure controls

APPROPRIATE ENGINEERING CONTROLS

Ensure adequate general and local ventilation. In case of insufficient ventilation use respiratory protection. When handling do not eat, drink, take medicine and smoke. Before break and after work carefully wash hands. Avoid dusting. Avoid contact with skin, eyes and inhalation of dust, fumes and vapors produced during processing of the product.
Employer is obliged to ensure equipment adequate to activities carried out, with quality demands, cleaning and maintenance.

INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection
In the event of exceedances of limit values use respiratory protection with filter type ABEK P1 or depending on the concentration exceeded (P2, P3)
If you work in closed spaces or where there is a risk of an uncontrolled expansion use insulating respiratory protective equipment.
Skin, hand and body protection
Use protective clothing made of natural materials (cotton) or synthetic fibers, gloves made of nitrile or latex (thickness 0,4 ± 0,05 mm, breakthrough time > 60 min)
Eye protection
Use safety goggles that protect against splatter during soldering.
Handle in accordance with good industrial hygiene and safety procedures. Do not allow the crossing of the environment, the work place concentration limits for hazardous constituents.
After work, remove soiled clothing. Wash hands and face thoroughly after handling product, before eating, smoking and at the end of the working period. Do not eat, drink or smoke when working.

ENVIRONMENTAL EXPOSURE CONTROLS

Prevent entry into sewage collection system and watercourses.

Section 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	solid

Colour	gray
Odour	odorless
Melting point/freezing point	
Sn95,5Ag4Cu0,5	217 / 220˚C
Sn96,3Ag3,7	221 / 228 ˚C
Sn96,5Ag3,5	221 ˚C
Sn97Ag3	221 / 224 ˚C
Sn96,5Ag3Cu0,5	217 / 220˚C
Sn97Cu3	227 / 310 ˚C
Sn99,3Cu0,7	227 ˚C
Sn99Cu0,7Ag0,3	217 / 227 ˚C
Sn96Ag3,5Cu0,5	217 / 218 ˚C
Boiling point or initial boiling point and boiling range	the temperature cannot be determined for the mixture, the boiling point for the component with the lowest boiling point: hydrogenated rosin> 275 ˚C
Flammability	not data
Lower and upper explosion limit	does not apply to solids
Flash point	does not apply to solids
Auto-ignition temperature	does not apply to solids
Decomposition temperature	> 300 ° decomposition temperature of hydrogenated resin
pH	not applicable, the mixture is insoluble in water
Kinematic viscosity	does not apply to solids
Solubility	insoluble in water
Partition coefficient n-octanol/water (log value)	not applicable the mixture
Vapour pressure	not applicable
Density and/or relative density	
Sn96,3Ag3,7	7,38 g/cm^3
Sn97Ag3	7,36 g/cm^3
Sn96,5Ag3Cu0,5	7,38 g/cm^3
Sn97Cu3	7,32 g/cm^3
Sn99,3Cu0,7	7,31 g/cm^3
Sn99Cu0,7Ag0,3	7,33 g/cm^3
Sn95,5Ag4Cu0,5	7,44 g/cm^3
Sn96,5Ag3,5	7,37 g/cm^3
Sn96Ag3,5Cu0,5	7,38 g/cm^3
Relative vapour density	does not apply to solids

Particle characteristics

diameter / [mm]	> 1,00	≤ 1,00 ; 2,50 >	≤ 2,50 ; 3,00 >	< 3,00 ; 6,00 >
tolerance / [mm]	±0,05	±0,10	±0,15	±0,30

9.2 Other safety information

No relevant physical and chemical parameters for safe use of the mixture

Section 10: Stability and reactivity

10.1 Reactivity

Under normal conditions of storage and use, hazardous decomposition products not be reactivity

10.2 Chemical stability

The product is stable under normal conditions.

10.3 Possibility of hazardous reactions

In contact with incompatible materials reacts violently with emission of heat.

10.4 Conditions to avoid

Extreme temperature and humidity.

10.5 Incompatible materials

Strong oxidizing agents, bases and acids (nitric acid, hot sulfuric acid, hydrogen sulfide)

10.6 Hazardous decomposition products

None under normal conditions of use and storage.

Section 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

TOXICITY OF MIXTURE

Based on available data, the classification criteria are not met.

TOXICITY OF COMPOUNDS:

Tin

LD50 (oral, rat) > 2 000 mg/kg
LD50 (skin, rat) > 2 000 mg/kg
LC50 (inhalation, rat) > 4,75 mg/l/4h
Irritating in the form of dust or vapors. May cause shortness of breath, fever, general weakness, sweating, and feverish inflammation of the smoke. Dust can cause mechanical irritation of the conjunctiva with tears, pain, and embolism.
NOEL for effects on reproduction and development:> 1000 mg / kg / day (rat), 56 consecutive doses - OECD 421. Tests - both the Ames test and in vitro chromosome aberration (CHO cells) are negative.
Repeated dose target organ toxicity (oral gavage) NOEL> 1000 mg / kg / day (rat). 28 days study - OECD 407.
It does not cause any inhalation hazard.

Tin in the form of dust or fumes is irritating. May cause shortness of breath, fever, general weakness, sweating, and feverish inflammation of the smoke. Tin dust can cause mechanical irritation of the conjunctiva with tears, pain, and embolism.

Silver

Reliable animal experiments indicate a low acute toxicity of elemental silver when exposed by the oral, dermal or inhalation route. No mortality or any significant clinical signs of acute toxicity were observed and the following levels of action were established for silver:

LD50 orally> 5000 mg / kg,

LD50 skin> 2000 mg / kg

LC50 inhalation> 5.16 mg / l.

LD50 (rat, orally): 3702 mg / kg body weight (Ag2O);

In vivo studies on skin and eye irritation with silver (OECD guidelines 404 and 405).

Based on these studies, silver does not irritate the skin or eyes. No effects related to the respiratory irritation test items could be shown in acute inhalation toxicity studies.

Information on likely routes of exposure:

Absorption routes: respiratory system, digestive system, skin, eyes.

Respiratory system: Inhalation of silver fumes or dust may irritate the mucous membranes and the upper respiratory system. Exposure to high concentrations of smoke / dust can cause lung damage and pneumothorax.

Digestive system: ingestion of silver may irritate the stomach.

Skin and eyes: direct contact may cause mild local irritation to the skin or eye.

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

Detailed information on the symptoms related to the product properties and the possible effects of exposure are described in section 4.2.

Copper

ORAL: High concentrations of dissolved copper ions may cause gastrointestinal disturbances. Animal acute studies by the oral route are available with CuO (Sanders, 2002a), copper sulfate (Lheritier, 1994), and coated copper flakes (Sanders, 2001a). The comparison of the toxicity profiles confirms that solubility / bioavailability is important for the read-across of the toxicity data of copper-bearing substances. The available animal studies combined with the in-vitro bioavailability studies assessed the acute toxicity of copper powder and its block form. The evaluation concluded that, in accordance with Regulation (EC) No 1272/2008 and Directive 67/548 / EEC, copper sulphate and coated copper flakes met the criteria as harmful when ingested (LD50> 300 mg / kg bw rats). that in accordance with Regulation (EC) No 1272/2008 and Directive 67/548 / EEC,

copper (solid and powder) and CuO do not meet the criteria for classification due to ingestion (LD50> 2000 mg / kg bw). In humans, the acute effects on the gastrointestinal tract associated with the addition of copper sulphate to drinking water were investigated (Araya et al, 2001 and 2003), the NOAEL was determined at 4 mg Cu / L. At higher doses (from 6 to 8 mg Cu / L as CuSO4, given in dragees on an empty stomach), the most frequently reported symptom was nausea (10% to 6 mg / l, and 18% to 8 mg / l), usually occurring within 15 minutes after serving. Other gastrointestinal symptoms (vomiting, diarrhea, abdominal pain) were reported less frequently and abdominal pain was not related to concentration.

Acute inhalation toxicity:

solid copper has a particle size> 10 µm and downstream users do not come into contact with particles with a d50 diameter <10 µm. Therefore, according to Regulation (EC) No 1272 and Directive 67/548 / EEC, the criteria for classification as harmful by inhalation are not met.
INHALATION: The available acute inhalation toxicity data on coated copper flakes (Wesson, 2001) and copper oxychloride (Wesson, 2003) indicate that these soluble materials should be classified as "harmful by inhalation" (LD50: 1-5 g / m3 air, rats). Inhalation toxicity was characterized by local damage at the site of particle deposition (effect on the respiratory tract and lungs). Solid copper has a particle size> 10 µm and downstream users do not come into contact with particles with a d50 diameter <10 µm. Therefore, according to Regulation (EC) No 1272 and Directive 67/548 / EEC, the criteria for classification as harmful by inhalation are not met.
THROUGH THE SKIN: Taking into account the acute dermal toxicity data available for copper (coated copper flakes (Sanders, 2001 b)), copper compounds (copper sulphate (Lheritier, 1993), and copper oxide (Sanders, 2002b)) (LD50> 2000 mg / kg bw) and classification criteria according to Regulation (EC) 1272/2008 and Directive 67/548 / EEC, it was specified that neither copper nor any of the tested copper compounds require classification for acute dermal toxicity. The classification criteria for finely divided and soluble copper compounds according to Regulation (EC) No 1272/2008 and Acute Toxicity Directive 67/548 / EEC lead to classification as harmful by ingestion and inhalation.
For solid copper and copper powder, the classification criteria for acute toxicity are not met according to Regulation (EC) No 1272/2008 and Directive 67/548 / EEC.
Hydrogenated rosin
LD50 skin> 2000 mg / kg
Oral LD50> 2000 mg / kg

ACUTE TOXICITY
based on available data, the classification criteria are not met

SKIN CORROSION/IRRITATION
based on available data, the classification criteria are not met

SERIOUS EYE DAMAGE/IRRITATION
based on available data, the classification criteria are not met

RESPIRATORY OR SKIN SENSITISATION
based on available data, the classification criteria are not met

GERM CELL MUTAGENICITY
based on available data, the classification criteria are not met

CARCINOGENICITY
based on available data, the classification criteria are not met

REPRODUCTIVE TOXICITY
based on available data, the classification criteria are not met

STOT-SINGLE EXPOSURE
based on available data, the classification criteria are not met

STOT-REPEATED EXPOSURE

based on available data, the classification criteria are not met

ASPIRATION HAZARD

based on available data, the classification criteria are not met

HEALTH EFFECTS OF LOCAL EXPOSURE

Skin contact:
may cause redness, dry skin, burning sensation, bums (during soldering)
Eye contact:
may cause irritation, redness, tearing.
Ingestion:
may cause stomach disorders (nausea, vomiting, abdominal pain)
Inhalation:
may cause cough, headaches and dizziness

11.2 Information on other hazards

The mixture does not cause adverse health effects due to endocrine disrupting properties.

Section 12: Ecological information

12.1 Toxicity

No specific toxicity test results. This product is not classified as dangerous for the environment.
Silver:
Fish:
Acute toxicity:
LC50 (96 h), Pimephales promelas: 1.2 µg Ag /L
LC50 (96 h), Oncorhynchus mykiss: 1.48 µg Ag /L
LC50 (96 h), Salmo gairdneri: 6.5 µg Ag /L (soft water)
LC50 (96 h), Salmo gairdneri: 13 µg Ag /L (hard water)
Chronic toxicity:
EC10 (217 d), Salmo trutta: 0.19 µg Ag/L
EC10 (217 d), Salmo trutta: 1.23 µg Ag/L
EC10 (196 d), Oncorhynchus mykiss: 0.17 µg Ag/L
NOEC (32 d), Pimephales promelas: 0.351 µg Ag/L (growth inhibition)
EC10 (32 d), Pimephales promelas: 0.39 µg Ag/L (growth inhibition)
EC10 (32 d), Pimephales promelas: 0.44 µg Ag/L (lethality)
Crustaceans:
Acute toxicity:
LC50 (48 h), Daphnia magna: 0.22 µg Ag/L
LC50 (48 h), Ceriodaphnia dubia: 0.76 µg Ag/L
Chronic toxicity:
EC10 (7 d), Ceriodaphnia dubia: 2.48 µg Ag/L (effects on reproduction)
EC10 (21 d), Daphnia magna: 2.14 µg Ag/L (growth inhibition)
NOEC (7 d), Ceriodaphnia reticulata: 1 µg Ag/L (effects on reproduction)

Algae:
Acute toxicity:
EC10 (24 h), Chlamydomonas reinhardtii : 0.54 µg Ag/L (growth inhibition)
EC10 (24 h), Pseudokirchneriella subcapitata: 0.41 µg Ag/L (growth inhibition)
Chronic toxicity:
NOEC (14 d), Champia parvula: 1.2 µg Ag/L
Predected No-Effect Concentrations:
PNEC (freshwater): 0.04 µg/L
PNEC (marine water): 0.86 µg/L
PNEC (freshwater sediment): 1.2 mg/kg sediment (dry mass)
PNEC (marine water sediment): 1.2 mg/kg sediment (dry mass)
Hydrogenated rosin:

LL50 (fish, 96 h):	< 10 mg/l
LL50 (Toggle Miniature, 96 h):	> 1.000 mg/l
EC50 (Ceriodaphnia dubia, 48 h):	726 mg/l
EL50 (Ceriodaphnia dubia, 48 h):	911 mg/l
EL50 (Selenastrum capricornutum, 72 h):	> 100 mg/l

12.2 Persistence and degradability

Not biodegradable.

12.3 Bioaccumulative potential

Not determined for mixture
According to the Chemical Safety Report for silver on silver bioaccumulation in living organisms there are several test results available on a variety of organisms. To develop silver safety assessment the study carried out on carp (Cyprinus carpio) was taken into account, in which the fish were exposed to approx. 0.2 mg Ag/L for 30 days. Bioconcentration factor (BCF) i.e. concentration coefficient of the substance (in this case silver) in the body in relation to its concentration in the surrounding aqueous environment for carp was 70. The BCF in fish of ≥ 500 is an indicative of the ability to bioconcentration.

12.4 Mobility in soil

Poorly mobile in soil and aquatic environment. Heavier than water, sinks to the bottom and remains here.
Silver ions react in the soil with CO_3^{-2}, S^{-2}, SO_3^{-2}, Cl^- forming very slightly water-soluble compounds, therefore, they remain in the top layer of soil.

12.5 Results of PBT and vPvB assessment

Does not apply to inorganic substances

12.6. Endocrine disrupting properties

The mixture does not contain substances with endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605.

12.7. Other adverse effects

This product has no influence on the global warming or the ozone layer depletion.
Silver is toxic to freshwater fish, as it causes abnormal sodium and chloride transport through membranes of gills cells. It is one of the most toxic metals for bacteria.

Section 13: Disposal considerations

13.1 Waste treatment methods

The one introducing hazardous agents in packages is obliged to organize the collection system and ensure recycling including the recycling of hazardous agents packaging. The one introducing hazardous agents performs above duties on their own or by agreement with local government.

SPECIAL PRECAUTIONS:

Dispose of this material safely.

DISPOSAL METHODS FOR THE PRODUCT:

Do not dispose of the product together with domestic waste,do not release to sewage system. Do not allow contamination of groundwater and surface water. Recommended way of disposing of waste: recycling.

DISPOSAL METHODS FOR USED PACKAGING:

Contaminated packaging (after a thorough emptying) and unused product to pass to the designated recipient of waste.

Section 14: Transport information

14.1 UN number or ID number

Not applicable, product is not classified as hazardous in transportation.

14.2 UN proper shipping name

Not applicable.

14.3 Transport hazard class(es)

Not applicable.

14.4 Packing group

Not applicable.

14.5 Environmental hazards

Not classified as dangerous for the environment.

14.6 Special precautions for user

Not necessary.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable.

Section 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

1. REGULATION (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.
2. REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with later changes
Commission Regulation (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (adaptation to technical and scientific progress 1 – 18 ATP)
3. DIRECTIVE 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations
4. Commission Regulation (EU) 2020/878 of 18 June 2020 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
5. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), concluded in Geneva on 30 September 1957
6. List of MAK and BAT Values 2022 Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area
7. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
8. Consolidated text: European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste
9. European Commission Employment, Social Affairs & Inclusion Health and Saftety at work – The Scientific Committee on Occupational Exposure Limits (SCOEL)
10. Regulation of the Minister of Labour and Social Policy of 12 June 2018 on Maximum Permissible Concentration and Intensity of Agents Harmful to Health in the Working Environment (Dz.U. 2018 poz. 1286 as amended)

15.2 Chemical Safety Assessment

Chemical safety assessment of the mixture has not been performed.

Section 16: Other information

TRAININGS

Before commencing working with the product, the user should learn the Health & Safety regulations regarding handling chemicals, and in particular undergo proper workplace training.

Silver and copper are listed as substances with an informal risk assessment for endocrine disrupting properties. The assessment is currently under development.
https://echa.europa.eu/en/substance-information/-/substanceinfo/100.028.301
https://echa.europa.eu/en/substance-information/-/substanceinfo/100.028.326

EXPLANATION OF ABBREVIATIONS AND ACRONYMS

PEL	Permissible Exposure Limit
PBT	Persistent, Bioaccumulative and Toxic substance
vPvB	very Persistent, very Bioaccumulative substance
DNEL	Derived No Effect Level
PNEC	Predicted No Effect Concentration
LD50	lethal dose is an indication of the lethal toxicity of a given substance or type of radiation.
LC50	lethal concentration
EC50	Half maximal effective concentration
EC10	effect concentration - substance concentration expressed in milligrams per litre causing the given pharmacological effect (e.g. inhibition of growth) at 10% of the examined population within specified time.
CAS	unique numerical identifier assigned by Chemical Abstracts Service
WE	unique seven-digit identifier that was assigned to substances for regulatory purposes within the European Union by the European Commission
NDS/MAK	The highest acceptable concentration
NDSCh	The highest permissible instantaneous concentration
NDSP	Concentration value of toxic chemical or dust
TLV-TWA	the highest admissible concentration/threshold limit value – weighted average value – concentration of toxic chemical whose impact on a worker during 8-hour daily shift and average weekly time of work provided in the Labour Code during the period of his occupational activity should not cause negative changes of his health condition and of health condition of his next generations.
TLV-STEL	the highest admissible short term concentration/short term exposure limit – weighted average of concentration of the specified, toxic chemical compound which should not cause negative changes of a worker's health if present in the work environment for not longer than 15 minutes and not more often than twice per shift with occurrences separated by more than 1 hour
BCF	bioconcentration factor - calculated by considering pesticide tissue concentrations with respect to environmental pesticide concentrations.

The above information is based on the currently available data characterizing the product as well as the experience and knowledge of the manufacturer in this field. They do not constitute a quality description of the product or a promise of specific properties. They should be treated as an aid for safe handling in transport, storage and use of the product. This does not absolve the user from responsibility for the improper use of the above information and from compliance with all legal standards in this area.

Other data Classification of the substances based on the information from ECHA. Classification of mixture was prepared based on the data concerning the contents of dangerous components using calculation method based on the Regulation (EC) No 1272/2008 (CLP).

The information contained in the SDS is to describe the product only in terms of safety requirements. The user is the one responsible for creating conditions for the safe use of the product, and assumes the responsibility for the consequences resulting from improper use of this product.

Update: update of the legal acts in section 15.1
card point update: 1.1, 2.3, 7.3, 8.1, 9.1, 9.2, 10.3, 11.1, 11.2, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 14.1, 14.7