# Metalon® HPSC-U590 silver-coated copper ink

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Issue date: 10/30/2026 Revision date: 10/30/2026 Version: 1.0

## SECTION 1: Identification

### 1.1. Identification

Product form : Mixture

Trade name : Metalon® HPSC-U590 silver-coated copper ink

### 1.2. Recommended use and restrictions on use

Use of the substance/mixture : Ink

### 1.3. Supplier

NCC Nano LLC dba NovaCentrix

400 Parker Dr, Suite 1110

Austin, TX 78728

T 512-491-9500

### 1.4. Emergency telephone number

Emergency number : Chem Tel, Inc. 1-888-255-3924 (US, Canada, Puerto Rico, US Virgin Islands)
24/7

## SECTION 2: Hazard(s) identification

### 2.1. Classification of the substance or mixture

**GHS-US classification**

| | |
|---|---|
| Acute Tox. 4 (Oral) | H302 |
| Eye Irrit. 2 | H319 |
| Skin Sens. 1 | H317 |
| Repr. 2 | H361 |
| Aquatic Acute 1 | H400 |
| Aquatic Chronic 1 | H410 |

### 2.2. GHS Label elements, including precautionary statements

**GHS US labelling**

Hazard pictograms (GHS US) :



Signal word (GHS US) : Warning

Hazard statements (GHS US) :
H302 - Harmful if swallowed.
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H361 - Suspected of damaging fertility or the unborn child.
H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.

Precautionary statements (GHS US) :
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P261 - Avoid breathing dust, mist, vapors.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P272 - Contaminated work clothing must not be allowed out of the workplace.
P273 - Avoid release to the environment.
P280 - Wear eye protection, protective gloves, protective clothing.
P301+P312 - If swallowed: Call a POISON CENTER if you feel unwell.
P302+P352 - If on skin: Wash with plenty of soap and water.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P308+P313 - If exposed or concerned: Get medical advice/attention.
P330 - Rinse mouth.
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P363 - Wash contaminated clothing before reuse.
P391 - Collect spillage.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in

accordance with local, regional, national and/or international regulation.

### 2.3. Other hazards which do not result in classification

No additional information available

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable

### 3.2. Mixtures

| Name | Product identifier | %* |
|---|---|---|
| Copper | (CAS-No.) 7440-50-8 | 45 – 90 |
| Silver | (CAS-No.) 7440-22-4 | 10 – 40 |
| Diethylene glycol monobutyl ether | (CAS-No.) 112-34-5 | 5 – 10 |
| Diethylene glycol monobutyl ether acetate | (CAS-No.) 124-17-4 | 5 – 10 |
| Vinyl acetal polymers, butyrals | (CAS-No.) 63148-65-2 | 1 – 5 |
| Catalytic curing agent | Proprietary | 0.1 – 1 |

***In accordance with paragraph (i) of the OSHA Hazard Communication Standard (29 CFR §1910.1200), the specific chemical identity or exact weight % has been withheld as a trade secret**

## SECTION 4: First-aid measures

### 4.1. Description of first aid measures

First-aid measures general : If exposed or concerned, get medical attention/advice. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use. Never give anything to an unconscious person.

First-aid measures after inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if breathing is affected. If breathing is difficult, supply oxygen.

First-aid measures after skin contact : IF ON SKIN (or clothing): Remove affected clothing and wash all exposed skin with water for at least 15 minutes. If irritation develops or persists, get medical attention.

First-aid measures after eye contact : IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses if present and easy to do so. Continue rinsing if pain, blinking, or irritation develops or persists, get medical attention. Continue rinsing.

First-aid measures after ingestion : IF SWALLOWED: rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Get medical attention if you feel unwell.

### 4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : Harmful if swallowed. May cause an allergic skin reaction. Causes serious eye irritation. May damage fertility or the unborn child.

Symptoms/effects after inhalation : May cause respiratory irritation.

Symptoms/effects after skin contact : May cause an allergic skin reaction.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Harmful if swallowed.

Chronic symptoms : Suspected of damaging fertility or the unborn child.

### 4.3. Immediate medical attention and special treatment, if necessary

No additional information available

## SECTION 5: Fire-fighting measures

### 5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Foam. Carbon dioxide. Dry powder. Water spray.

### 5.2. Specific hazards arising from the chemical

Fire hazard : Not flammable.

Explosion hazard : Product is not explosive.

Reactivity : No dangerous reactions known under normal conditions of use.

### 5.3. Special protective equipment and precautions for fire-fighters

Precautionary measures fire : Eliminate all ignition sources if safe to do so.

Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers. Do not dispose of fire-fighting water in the environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Self-contained breathing apparatus.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate area. Ventilate area. Keep upwind. Spill should be handled by trained cleaning personnel properly equipped with respiratory and eye protection.

#### 6.1.1. For non-emergency personnel

Protective equipment : Wear Protective equipment as described in Section 8.

Emergency procedures : Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

Protective equipment : Wear suitable protective clothing, gloves and eye or face protection. Approved supplied-air respirator, in case of emergency.

### 6.2. Environmental precautions

Avoid release to the environment. Prevent entry to sewers and public waters.

### 6.3. Methods and material for containment and cleaning up

For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Prevent entry to sewers and public waters.

Methods for cleaning up : Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal. This material and its container must be disposed of in a safe way, and as per local legislation.

### 6.4. Reference to other sections

See Sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Keep container closed when not in use. Avoid contact with skin and eyes. Do not eat, drink or smoke when using this product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in original container. Keep container closed when not in use. Containers which are opened should be properly resealed and kept upright to prevent leakage. Store in a dry, cool and well-ventilated place.

Incompatible materials : No data available.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

| **Copper (7440-50-8)** | | |
|---|---|---|
| ACGIH | ACGIH OEL TWA | 0.2 mg/m³ (fume) |
| ACGIH | Remark (ACGIH) | TLV® Basis: Irr; GI; metal fume fever |
| ACGIH | Regulatory reference | ACGIH 2023 |
| OSHA | OSHA PEL TWA [1] | 0.1 mg/m³ (fume) |
| OSHA | Regulatory reference (US-OSHA) | OSHA Annotated Table Z-1 |
| IDLH | IDLH | 100 mg/m³ (dust, fume and mist) |
| NIOSH | NIOSH REL TWA | 1 mg/m³ (dust and mist)<br>0.1 mg/m³ (fume) |

| **Silver (7440-22-4)** | | |
|---|---|---|
| ACGIH | ACGIH OEL TWA | 0.1 mg/m³ (dust and fume) |
| ACGIH | Remark (ACGIH) | TLV® Basis: Argyria |
| ACGIH | Regulatory reference | ACGIH 2023 |
| OSHA | OSHA PEL TWA [1] | 0.01 mg/m³ |
| OSHA | Regulatory reference (US-OSHA) | OSHA Annotated Table Z-1 |

| Silver (7440-22-4) | | |
|---|---|---|
| IDLH | IDLH | 10 mg/m³ (dust) |
| NIOSH | NIOSH REL TWA | 0.01 mg/m³ (dust)<br>0.9 µg/m³ (nanoparticles <100 nm) |

| Diethylene glycol monobutyl ether (112-34-5) | | |
|---|---|---|
| ACGIH | ACGIH OEL TWA [ppm] | 10 ppm (inhalable fraction and vapor) |
| ACGIH | Remark (ACGIH) | TLV® Basis: Hematologic, liver & kidney eff |
| ACGIH | Regulatory reference | ACGIH 2023 |
| OSHA | Remark (OSHA) | OELs not established |

| Diethylene glycol monobutyl ether acetate (124-17-4) | | |
|---|---|---|
| ACGIH | Remark (ACGIH) | OELs not established |
| OSHA | Remark (OSHA) | OELs not established |

| Vinyl acetal polymers, butyrals (63148-65-2) | | |
|---|---|---|
| ACGIH | Remark (ACGIH) | OELs not established |
| OSHA | Remark (OSHA) | OELs not established |

| Catalytic curing agent (Proprietary) | | |
|---|---|---|
| ACGIH | Remark (ACGIH) | OELs not established |
| OSHA | Remark (OSHA) | OELs not established |

### 8.2. Appropriate engineering controls

Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Ensure adequate ventilation, especially in confined areas.

### 8.3. Individual protection measures/Personal protective equipment

**Personal protective equipment symbol(s):**



**Personal protective equipment:**

Gloves. Protective goggles. Protective clothing.

**Hand protection:**

Use gloves chemically resistant to this material when prolonged or repeated contact could occur. Gloves should be classified under Standard EN 374 or ASTM F1296. Suggested glove materials are: Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, PVC or vinyl. Suitable gloves for this specific application can be recommended by the glove supplier.

**Eye protection:**

Wear eye protection, including chemical splash goggles and a face shield when possibility exists for eye contact due to spraying liquid or airborne particles.

**Skin and body protection:**

Wear long sleeves, and chemically impervious PPE/coveralls to minimize bodily exposure.

**Respiratory protection:**

Use NIOSH (or other equivalent national standard) -approved dust/particulate respirator. Where vapor, mist, or dust exceed PELs or other applicable OELs, use NIOSH-approved respiratory protective equipment.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state : Solid

| | | |
|---|---|---|
| Appearance | : | Viscous. Paste. |
| Color | : | Light Dark Grey |
| Odor | : | Characteristic glycol |
| Odor threshold | : | No data available |
| pH | : | 6 – 8 |
| Melting point | : | No data available |
| Freezing point | : | No data available |
| Boiling point | : | No data available |
| Flash point | : | No data available |
| Relative evaporation rate (butylacetate=1) | : | No data available |
| Flammability (solid, gas) | : | No data available |
| Vapor pressure | : | No data available |
| Relative vapor density at 20°C | : | No data available |
| Relative density | : | No data available |
| Density | : | 2.5 – 4 g/cm³ |
| Solubility | : | No data available |
| Partition coefficient n-octanol/water (Log Pow) | : | No data available |
| Auto-ignition temperature | : | No data available |
| Decomposition temperature | : | No data available |
| Viscosity, kinematic | : | Not applicable |
| Viscosity, dynamic | : | No data available |
| Explosive limits | : | No data available |
| Explosive properties | : | No data available |
| Oxidising properties | : | No data available |

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No dangerous reactions known under normal conditions of use.

### 10.2. Chemical stability

Stable under recommended handling and storage conditions (see section 7).

### 10.3. Possibility of hazardous reactions

None under normal use.

### 10.4. Conditions to avoid

None under normal use.

### 10.5. Incompatible materials

None known.

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

| | | |
|---|---|---|
| Acute toxicity (oral) | : | Harmful if swallowed. |
| Acute toxicity (dermal) | : | Not classified |
| Acute toxicity (inhalation) | : | Not classified |

| **Copper (7440-50-8)** | |
|---|---|
| LD50 oral rat | 300 – 500 mg/kg Source: ECHA |
| LD50 dermal rat | > 2000 mg/kg Source: ECHA |
| LC50 Inhalation - Rat | > 5.11 mg/l/4h |

| **Silver (7440-22-4)** | |
|---|---|
| LD50 oral rat | > 2000 mg/kg |

| **Silver (7440-22-4)** | |
|---|---|
| LD50 dermal rat | > 2000 mg/kg (Source: EU_CLH) |
| LC50 Inhalation - Rat | > 5.16 mg/l/4h |

| **Diethylene glycol monobutyl ether (112-34-5)** | |
|---|---|
| LD50 oral rat | 5660 mg/kg (Source: NLM_CIP) |
| LD50 dermal rabbit | 2700 mg/kg (Source: NLM_CIP) |

| **Diethylene glycol monobutyl ether acetate (124-17-4)** | |
|---|---|
| LD50 oral rat | 6500 mg/kg (Source: NLM_CIP) |
| LD50 dermal rabbit | 14500 mg/kg (Source: NLM_CIP) |
| LC50 Inhalation - Rat | 72500 mg/m³ (Exposure time: 4 h Source: NLM_CIP) |

Skin corrosion/irritation : Not classified
pH: 6 – 8

Serious eye damage/irritation : Causes serious eye irritation.
pH: 6 – 8

Respiratory or skin sensitisation : May cause an allergic skin reaction.

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Suspected of damaging fertility or the unborn child.

STOT-single exposure : Not classified

STOT-repeated exposure : Not classified

| **Silver (7440-22-4)** | |
|---|---|
| LOAEL (oral, rat, 90 days) | 125 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents) |

| **Diethylene glycol monobutyl ether (112-34-5)** | |
|---|---|
| NOAEL (oral, rat, 90 days) | 250 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents), Guideline: EU Method B.26 (Sub-Chronic Oral Toxicity Test: Repeated Dose 90-Day Oral Toxicity Study in Rodents), Guideline: EPA OPPTS 870.3100 (90-Day Oral Toxicity in Rodents) |

Aspiration hazard : Not classified

Viscosity, kinematic : Not applicable

Symptoms/effects : Harmful if swallowed. May cause an allergic skin reaction. Causes serious eye irritation. May damage fertility or the unborn child.

Symptoms/effects after inhalation : May cause respiratory irritation.

Symptoms/effects after skin contact : May cause an allergic skin reaction.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : Harmful if swallowed.

Chronic symptoms : Suspected of damaging fertility or the unborn child.

## SECTION 12: Ecological information

### 12.1. Toxicity

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

| **Copper (7440-50-8)** | |
|---|---|
| LC50 - Fish [1] | < 0.3 mg/l Pimephales promelas (96 hr) |
| EC50 - Crustacea [1] | 0.03 mg/l Daphnia magna (48 hr) |
| LC50 - Fish [2] | 0.052 mg/l Oncorhynchus mykiss (96 hr) |

| **Silver (7440-22-4)** | |
|---|---|
| LC50 - Fish [1] | 0.00155 – 0.00293 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: EPA) |
| EC50 - Crustacea [1] | 0.00024 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static]) |
| LC50 - Fish [2] | 0.0062 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through] Source: EPA) |

| **Diethylene glycol monobutyl ether (112-34-5)** | |
|---|---|
| LC50 - Fish [1] | 1300 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static] Source: EPA) |
| EC50 - Crustacea [1] | > 100 mg/l (Exposure time: 48 h - Species: Daphnia magna) |

| Diethylene glycol monobutyl ether acetate (124-17-4) | |
|---|---|
| LC50 - Fish [1] | 50 – 70 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static] Source: IUCLID) |
| EC50 - Crustacea [1] | 665 mg/l (Exposure time: 48 h - Species: Daphnia magna) |
| LC50 - Fish [2] | 77 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: IUCLID) |

### 12.2. Persistence and degradability

| Copper (7440-50-8) | |
|---|---|
| Persistence and degradability | Not readily biodegradable. |

### 12.3. Bioaccumulative potential

| Copper (7440-50-8) | |
|---|---|
| Partition coefficient n-octanol/water (Log Pow) | -0.57 Source: EPISUITE |

| Diethylene glycol monobutyl ether (112-34-5) | |
|---|---|
| BCF - Fish [1] | (no bioconcentration expected) |
| Partition coefficient n-octanol/water (Log Pow) | 1 (at 20 °C (at pH 7) |

| Diethylene glycol monobutyl ether acetate (124-17-4) | |
|---|---|
| Partition coefficient n-octanol/water (Log Pow) | 1.7 (at 23 °C (at pH 6.4) |

### 12.4. Mobility in soil

No additional information available

### 12.5. Other adverse effects

Other adverse effects : No data available.

## SECTION 13: Disposal considerations

### 13.1. Disposal methods

Waste treatment methods : Do not discharge to public wastewater systems without permit of pollution control authorities. No discharge to surface waters is allowed without a permit.

Product/Packaging disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Do not allow the product to be released into the environment.

## SECTION 14: Transport information

**Department of Transportation (DOT)**

In accordance with DOT

Transport document description (DOT) : UN3082 Environmentally hazardous substances, liquid, n.o.s. (contains: Silver), 9, III

UN-No.(DOT) : UN3082

Proper Shipping Name (DOT) : Environmentally hazardous substances, liquid, n.o.s.
contains: Silver

Class (DOT) : 9 - Class 9 - Miscellaneous hazardous material 49 CFR 173.140

Packing group (DOT) : III - Minor Danger

Hazard labels (DOT) : 9 - Class 9 (Miscellaneous dangerous materials)




Dangerous for the environment : Yes

Marine pollutant : Yes



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. |
| Emergency Response Guide (ERG) Number | : | 171 |
| Other information | : | No supplementary information available. |

**Transport by sea (IMDG)**

| | | |
|---|---|---|
| Transport document description (IMDG) | : | UN 3082 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains: Silver), 9, III |
| UN-No. (IMDG) | : | 3082 |
| Proper Shipping Name (IMDG) | : | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. |
| Class (IMDG) | : | 9 - Miscellaneous dangerous substances and articles |
| Packing group (IMDG) | : | III - substances presenting low danger |
| Limited quantities (IMDG) | : | 5 L |
| Marine pollutant | : | Yes |



**Air transport (IATA)**

| | | |
|---|---|---|
| Transport document description (IATA) | : | UN 3082 Environmentally hazardous substance, liquid, n.o.s. (contains: Silver), 9, III |
| UN-No. (IATA) | : | 3082 |
| Proper Shipping Name (IATA) | : | Environmentally hazardous substance, liquid, n.o.s. |
| Class (IATA) | : | 9 - Miscellaneous Dangerous Substances and Articles |
| Packing group (IATA) | : | III - Low danger |

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

| **Metalon® HPSC-U037 silver-coated copper ink** | |
|---|---|
| All chemical substances in this product are listed as “Active” in the EPA (Environmental Protection Agency) “TSCA Inventory Notification (Active-Inactive) Requirements Rule” (“the Final Rule”) of Feb. 2019, as amended Feb. 2021, or are otherwise exempt or regulated by other agencies such as FDA or FIFRA | |
| SARA Section 311/312 Hazard Classes | Health hazard - Acute toxicity (any route of exposure)<br>Health hazard - Respiratory or skin sensitization<br>Health hazard - Serious eye damage or eye irritation<br>Health hazard - Reproductive toxicity |

| **Copper (7440-50-8)** | |
|---|---|
| Subject to reporting requirements of United States SARA Section 313 | |
| CERCLA RQ | 5000 lb |

| **Silver (7440-22-4)** | |
|---|---|
| Subject to reporting requirements of United States SARA Section 313 | |
| CERCLA RQ | 1000 lb |

| **Butyraldehyde (123-72-8)** |
|---|
| Subject to reporting requirements of United States SARA Section 313 |

### 15.2. International regulations

No additional information available

### 15.3. US State regulations

This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

| Component | State or local regulations |
|---|---|
| Copper(7440-50-8) | U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Pennsylvania - RTK (Right to Know) List; U.S. - Massachusetts - Right To Know List; U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List |
| Silver(7440-22-4) | U.S. - New Jersey - Right to Know Hazardous Substance List; U.S. - Massachusetts - Right To Know List; U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List |

## SECTION 16: Other information

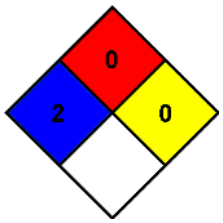
Revision date : 09/23/2024

Other information : Author: BCS.

NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA fire hazard : 0 - Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.

NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.




HMIS Hazard Rating

Health : 2

* - Chronic (long-term) health effects may result from repeated overexposure

Flammability : 0

Physical : 0

Indication of changes:
Revision 1.0: New SDS Created.

*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.*