

## Safety Data Sheet

according to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

Date of issue: 06/21/2019

Revision date: 05/22/2023

Version: 2.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Mixture  
 Trade name : Metalon<sup>®</sup> Silver Ink Diluent BKS-01  
 Technical name : Silver Ink Diluent

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

Use of the substance/mixture : Diluent for PSPI and SPI silver nanoparticle spray inks

#### 1.3. Details of the supplier of the safety data sheet

NCC Nano LLC dba Novacentrix  
 400 Parker Drive, Suite 1110  
 Austin, TX 78728  
 T (512) 491-9500  
[msds@novacentrix.com](mailto:msds@novacentrix.com)

#### 1.4. Emergency telephone number

Emergency number : ChemTel Inc. 1 (800) 255-3924 ; Intl. +01 (813) 248-0585 (24 hr)

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

Hazardous to the aquatic environment – Acute Hazard, Category 1 H400

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



GHS09

Signal word (GHS-US) : Warning  
 Hazard statements (GHS-US) : H400 - Very toxic to aquatic life  
 Precautionary statements (GHS-US) : P260 - Do not breathe dust, mist, spray, vapors, gas, fume  
 P264 - Wash hands thoroughly after handling  
 P273 - Avoid release to the environment  
 P280 - Wear protective gloves, protective clothing, eye protection  
 P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing  
 P314 - Get medical advice/attention if you feel unwell  
 P337+P313 - If eye irritation persists: get medical advice/attention  
 P391 - Collect spillage  
 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

Other hazards which do not result in classification : Contains silver nanoparticles. Silver may result in darkening of skin and cornea of eye (gray-blue patches or darkening) where the metal has contact; prolonged and heavy exposure may also affect lung function and may be manifested as mild or chronic bronchitis.

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

Not applicable

### SECTION 3: Composition/information on ingredients

#### 3.1. Substance

Not applicable

#### 3.2. Mixture

Name	Product identifier	%	GHS-US classification
Silver	(CAS No) 7440-22-4	< 0.1	Not classified

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### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

- First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If exposure symptoms persist, seek medical advice.
- First-aid measures after skin contact : Remove/Take off immediately all contaminated clothing. Rinse and then wash skin thoroughly with water and soap. If skin irritation occurs, get medical advice/attention. Wash contaminated clothing before reuse.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. If eye irritation persists, get medical advice/attention. Remove contact lenses, if present and easy to do. Continue rinsing.
- First-aid measures after ingestion : If swallowed, rinse mouth with water (only if the person is conscious). Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Seek immediate medical advice.

#### 4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries : Under normal conditions of use, no adverse effects to health have been observed. Silver may result in darkening of skin and cornea of eye (gray-blue patches or darkening) where the metal has contact; prolonged and heavy exposure may also affect lung function and may be manifested as mild or chronic bronchitis.

#### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray.
- Unsuitable extinguishing media : Do not use a heavy water stream.

#### 5.2. Special hazards arising from the substance or mixture

- Fire hazard : Cool closed containers exposed to fire with water spray. Incomplete combustion releases dangerous carbon monoxide, carbon dioxide, and other toxic gases.
- Explosion hazard : Prolonged exposure to fire may cause containers to rupture/explode.
- Reactivity : Stable.

#### 5.3. Advice for firefighters

- Firefighting instructions : In case of fire: Wear self-contained breathing apparatus. Wear proper protective equipment. Evacuate personnel to a safe area. Do not allow run-off from firefighting to enter drains or water courses. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
- Protective equipment for firefighters : Use self-contained breathing apparatus and chemically protective clothing.
- Other information : On heating, there is a risk of bursting due to internal pressure build-up. Cool down the containers exposed to heat with a water spray. Hazardous decomposition products may be released during prolonged heating like smokes, carbon monoxide and dioxide, and nitrogen oxides (NO<sub>x</sub>).

### SECTION 6: Accidental release measures

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

- General measures : Eliminate all ignition sources if safe to do so. Stop leak if safe to do so. Ensure adequate air ventilation.

##### 6.1.1. For non-emergency personnel

- Emergency procedures : Evacuate unnecessary personnel.

##### 6.1.2. For emergency responders

- Protective equipment : Avoid breathing dust, mist or spray. Wear suitable protective clothing, gloves and eye/face protection. For further information refer to section 8: Exposure-controls/personal protection.
- Emergency procedures : Evacuate unnecessary personnel. Ventilate area.

#### 6.2. Environmental precautions

Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Collect in closed containers for disposal. Avoid release to the environment. Notify authorities if liquid enters sewers or public waters.

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

- For containment : Stop leak, if possible without risk. Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Collect spillage. Put into a labeled container and provide safe disposal.

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- Methods for cleaning up : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect all waste in suitable and labeled containers and dispose according to local legislation. Wear suitable protective clothing.

### 6.4. Reference to other sections

For further information refer to section 8: Exposure-controls/personal protection. For disposal of residues refer to section 13: Disposal considerations.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

- Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking, and when leaving work. Provide good ventilation in process area to prevent formation of vapor.
- Hygiene measures : Wash hands thoroughly after handling.

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

- Storage conditions : Keep in a cool well-ventilated area away from ignition sources. Refrigerate at a temperature between 2 - 9 °C for long-term storage. Keep container closed when not in use.
- Incompatible conditions/materials : Avoid high temperatures and open flame. Avoid contact with oxidizing agents. Keep away from (strong) acids.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Silver (7440-22-4)		
ACGIH	ACGIH TWA (mg/m <sup>3</sup> )	0.1 mg/m <sup>3</sup> (dust and fume)
OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	0.01 mg/m <sup>3</sup>

### 8.2. Exposure controls

- Appropriate engineering controls : Provide local exhaust or general room ventilation. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
- Personal protective equipment : Avoid all unnecessary exposure. Gloves. Protective goggles. Protective clothing. Personal protective equipment should be selected based upon the conditions under which this product is handled or used.



- Hand protection : Wear protective gloves. It is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.
- Eye protection : Chemical goggles or safety glasses.
- Skin and body protection : Wear suitable protective clothing.
- Respiratory protection : Wear appropriate mask. Avoid breathing dust/fume/gas/mist/vapors/spray.
- Other information : Do not eat, drink, or smoke during use.

## SECTION 9: Physical and chemical properties

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

- Appearance : Low viscosity liquid
- Color : Dark brown to black
- Odor : Mildly pungent
- Odor threshold : No data available
- pH : 5.70 - 5.85
- Melting point : No data available
- Freezing point : No data available
- Boiling point : No data available
- Flash point : > 93.3 °C (>200°F)
- Relative evaporation rate (butyl acetate=1) : <= 1
- Flammability (solid, gas) : No data available
- Explosive limits : No data available
- Explosive properties : No data available

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Oxidizing properties	: No data available
Vapor pressure	: No data available
Relative density	: 1.0 - 1.1
Relative vapor density at 20 °C	: > 1
Density	: 1.0 - 1.1 gcm <sup>-3</sup>
Solubility	: Water: Disperses in water with a pH between 5.70 and 5.85
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Stable.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

### 10.4. Conditions to avoid

High temperature. Open flame. Sparks.

### 10.5. Incompatible materials

Strong oxidizers. Strong acids.

### 10.6. Hazardous decomposition products

Fume. Carbon monoxide. Carbon dioxide. Nitrogen oxides (NOx).

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Likely routes of exposure	: Ingestion; Inhalation; Skin and eye contact
Acute toxicity	: Not classified (Based on available data, the classification criteria are not met)

#### Silver (7440-22-4)

LD50 oral rat	> 2000 mg/kg
Skin corrosion/irritation	: Not classified (Based on available data, the classification criteria are not met)
Serious eye damage/irritation	: Not classified (Based on available data, the classification criteria are not met)
Respiratory or skin sensitization	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity	: Not classified (Based on available data, the classification criteria are not met)
Reproductive toxicity	: Not classified (Based on available data, the classification criteria are not met)
Specific target organ toxicity (single exposure)	: Not classified (Based on available data, the classification criteria are not met)
Specific target organ toxicity (repeated exposure)	: Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard	: Not classified (Based on available data, the classification criteria are not met)

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Potential Adverse human health effects and symptoms : Under normal conditions of use, no adverse effects to health have been observed. Silver may result in darkening of skin and cornea of eye (gray-blue patches or darkening) where the metal has contact; prolonged and heavy exposure may also affect lung function and may be manifested as mild or chronic bronchitis.

### SECTION 12: Ecological information

#### 12.1. Toxicity

Ecology - general : Very toxic to aquatic life.

##### Silver (7440-22-4)

LC50 fish 1	0.00155 - 0.00293 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Daphnia 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])

#### 12.2. Persistence and degradability

##### Metalon<sup>®</sup> Silver Ink Diluent BKS-01

Persistence and degradability	Not established.
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#### 12.3. Bioaccumulative potential

##### Metalon<sup>®</sup> Silver Ink Diluent BKS-01

Bioaccumulative potential	Not established.
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#### 12.4. Mobility in soil

No additional information available

#### 12.5. Other adverse effects

Effect on the global warming : No additional information available  
Other information : Avoid release to the environment.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.  
Ecology - waste materials : Avoid release to the environment.

### SECTION 14: Transport information

#### Department of Transportation (DOT)

In accordance with DOT  
Not regulated for transport

#### TDG

Not regulated for transport

#### Transport by sea

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  
MFAG-No : 171

#### Air transport

UN-No. (IATA) : 3082  
Proper Shipping Name (IATA) : Environmentally hazardous substance, liquid, n.o.s.  
Class (IATA) : 9 - Miscellaneous Dangerous Goods  
Packing group (IATA) : III - Minor Danger

### SECTION 15: Regulatory information

#### 15.1. US Federal regulations

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### Silver (7440-22-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory  
Subject to reporting requirements of United States SARA Section 313

RQ (Reportable quantity, section 304 of EPA's Lists of Lists)	1000 lb
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SARA Section 313 - Emission Reporting	1.0 %
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### 15.2. International regulations

#### CANADA

### Silver (7440-22-4)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification	Uncontrolled product according to WHMIS classification criteria
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#### EU-Regulations

### Silver (7440-22-4)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Aquatic Acute 1

H400

#### National regulations

### Silver (7440-22-4)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Japanese Pollutant Release and Transfer Register Law (PRTR Law)  
Listed on the Canadian IDL (Ingredient Disclosure List)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on CICR (Turkish Inventory and Control of Chemicals)

### 15.3. US State regulations

No additional information available

## SECTION 16: Other information

Indication of changes	: None.
Sources of Key data	: Data arise from reference works and literature.
Revision date	: 05/22/2023
Other information	: None.

SDS US (GHS HazCom 2012)

*The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of need that information is current, applicable and suited to the circumstances of use. Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, vendor assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed. Any questions regarding this product should be directed to the manufacturer of the product as described in Section 1.*