1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Silver Nanowire Ink for Screen Printing
Catalog Number: NovaWire-Ag-SP
Formula: Ag

Supplier: Novarials Corporation
800 W Cummings Park, Suite 4600
Woburn, MA 01801
Email: info@novarials.com
Telephone: +1 617-276-5642
Fax: +1 781-995-0388

2. HAZARDS IDENTIFICATION

Emergency Overview

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 4), H302
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid/vapor.
H302 + H312 + H332 Harmful if swallowed, in contact with skin or if inhaled
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P242 Use only non-sparking tools.
Take precautionary measures against static discharge.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN: Wash with plenty of soap and water.

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing.

Rinse skin with water/shower.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call a POISON CENTER or doctor/physician if you feel unwell.

Rinse mouth.

If skin irritation occurs: Get medical advice/attention.

If eye irritation persists: Get medical advice/attention.

Take off contaminated clothing and wash before reuse.

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

Dispose of contents/ container to an approved waste disposal plant.

Hazard not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

Synonyms:
Silver

Formula: Ag

Molecular Weight: 107.87 g/mol
### Table

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Silver</strong></td>
<td>0.3-0.5%</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>7440-22-4</td>
</tr>
<tr>
<td>EC-No.</td>
<td>231-131-3</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>50-80%</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>7732-18-5</td>
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<tr>
<td>EC-No.</td>
<td>231-791-2</td>
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<tr>
<td><strong>Alcohol</strong></td>
<td>15-35%</td>
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<tr>
<td>CAS-No.</td>
<td>115-76-4/67-63-0/…</td>
</tr>
<tr>
<td>EC-No.</td>
<td>204-103-3/200-661-7/…</td>
</tr>
<tr>
<td><strong>Conductive resin</strong></td>
<td>0.1-0.5%</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>155090-83-8/5612-44-2</td>
</tr>
<tr>
<td><strong>Other additives</strong></td>
<td>0.1-1.0%</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>9004-62-0/9002-89-5/…</td>
</tr>
</tbody>
</table>

#### 4. FIRST AID MEASURES

**General advice**
Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water and consult a physician.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**Most important symptoms and effects, both acute and delayed**
The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

**Indication of any immediate medical attention and special treatment needed**
No data available

#### 5. FIREFIGHTING MEASURES

**Suitable extinguishing media**
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**Special protective equipment for firefighters**
Wear self contained breathing apparatus for firefighting if necessary.

**Hazardous combustion products**
No data available
6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

**Methods and materials for containment and cleaning up**
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

**Precautions for safe handling**
Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Ensure adequate ventilation. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge.

**Conditions for safe storage**
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Air and light sensitive.

8. PERSONAL PROTECTION

**Personal protective equipment**

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Eye protection**
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Body protection**
Impervious clothing. Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Hygiene measures**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>suspension</td>
</tr>
<tr>
<td>Color</td>
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</table>

**Safety data**

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<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
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</tr>
<tr>
<td>Melting point/freezing point</td>
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</tr>
<tr>
<td>Boiling point</td>
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</tr>
<tr>
<td>Flash point</td>
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</tr>
<tr>
<td>Ignition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td>Auto ignition temperature</td>
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</tr>
<tr>
<td>Lower explosion limit</td>
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</tr>
<tr>
<td>Upper explosion limit</td>
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<tr>
<td>Vapour pressure</td>
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<tr>
<td>Water solubility</td>
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</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>no data available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative vapour density</td>
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</tr>
<tr>
<td>Odour</td>
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</tr>
<tr>
<td>Odour Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
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</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

**Reactivity**

- no data available

**Chemical stability**

Stable under recommended storage conditions.

**Possibility of hazardous reactions**

Vapours may form explosive mixture with air.

**Conditions to avoid**

Heat, flames and sparks. Extremes of temperature and direct sunlight.

**Materials to avoid**

- no data available

**Hazardous decomposition products**

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

**Acute toxicity**

**Oral LD50**

- no data available

**Inhalation LC50**

- no data available
Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Teratogenicity
no data available

Specific target organ toxicity -single exposure (Globally Harmonized System)
No data available

Specific target organ toxicity -repeated exposure (Globally Harmonized System)
No data available

Aspiration hazard
no data available

Synergistic effects
no data available

Additional Information
RTECS: Not available

Central nervous system depression, prolonged or repeated exposure can cause: Nausea, Headache, Vomiting, narcosis, Drowsiness. Overexposure may cause mild, reversible liver effects.

Kidney - Irregularities - Based on Human Evidence
Kidney - Irregularities - Based on Human Evidence
12. ECOLOGICAL INFORMATION

Toxicity
no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

Other adverse effects
no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Alcohol, solution
Reportable Quantity (RQ): 20 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1219 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: Alcohol, solution
Marine pollutant: No

IATA
UN number: 1219 Class: 3 Packing group: II
Proper shipping name: Alcohol, solution

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

- **Silver**
  - CAS-No. 7440-22-4
- **Alcohol**
  - CAS-No. 115-76-4/67-63-0/…
- **Conductive resin**
  - CAS-No. 155090-83-8/5612-44-2
- **Other additives**
  - CAS-No. 9004-62-0/9002-89-5/…

**SARA 311/312 Hazards**
Fire Hazard, Acute Health Hazard, Chronic Health Hazard.

**Massachusetts Right To Know Components**
- **Silver**
  - CAS-No. 7440-22-4
- **Alcohol**
  - CAS-No. 115-76-4/67-63-0/…

**Pennsylvania Right To Know Components**
- **Silver**
  - CAS-No. 7440-22-4
- **Alcohol**
  - CAS-No. 115-76-4/67-63-0/…
- **Conductive resin**
  - CAS-No. 155090-83-8/5612-44-2
- **Other additives**
  - CAS-No. 9004-62-0/9002-89-5/…
- **Water**
  - CAS-No. 7732-18-5

**New Jersey Right To Know Components**
- **Silver**
  - CAS-No. 7440-22-4
- **Alcohol**
  - CAS-No. 115-76-4/67-63-0/…
- **Conductive resin**
  - CAS-No. 155090-83-8/5612-44-2
- **Other additives**
  - CAS-No. 9004-62-0/9002-89-5/…
- **Water**
  - CAS-No. 7732-18-5

**California Prop. 65 Components**
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

**16. DISCLAIMER**

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