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

1.1. Product identifier
Product form: Mixture
Trade name: PFI-RSA6012 Reflective Silver Flexographic Ink
Technical name: Reflective Silver Flexographic Ink

1.2. Relevant identified uses of the substance or mixture and uses advised against
Use of the substance/mixture: Ink

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

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
GHS-US classification:
Not classified

2.2. Label elements
GHS-US labeling:
No labeling applicable

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)
1.49 percent of the mixture consists of ingredient(s) of unknown acute toxicity (Inhalation (Dust/Mist))

SECTION 3: Composition/information on ingredients

3.1. Substance
Not applicable

3.2. Mixture

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>(CAS No) 7440-22-4</td>
<td>56 - 65</td>
<td>Not classified</td>
</tr>
</tbody>
</table>

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


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

Precautionary measures fire: Use water spray or fog for cooling exposed containers. Prolonged exposure to fire may cause containers to rupture/explode. Use self-contained breathing apparatus and chemically protective clothing.

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 fire fighting 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 (NOx).

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.


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.

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 and 9°C for long-term storage. Keep container closed when not in use.

Incompatible conditions/materials: Avoid high temperatures and open flame. Avoid oxidizing agents.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Silver (7440-22-4)</th>
<th>ACGIH ACGIH TWA (mg/m³)</th>
<th>0.1 mg/m³ (dust and fume)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OSHA OSHA PEL (TWA) (mg/m³)</td>
<td>0.01 mg/m³</td>
</tr>
</tbody>
</table>

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.

Eye protection: Chemical goggles or safety glasses.

Skin and body protection: Wear suitable protective clothing.


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

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Viscous liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Dark gray to black</td>
</tr>
<tr>
<td>Odor</td>
<td>Mildly pungent</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>6.10 - 6.30</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>No data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>&gt; 93.3 °C</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>&lt;= 1</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>
PFI-RSA6012 Reflective Silver Flexographic Ink
Safety Data Sheet

Explosive properties: No data available
Oxidizing properties: No data available
Vapor pressure: No data available
Relative density: No data available
Relative vapor density at 20 °C: > 1
Density: 2 - 2.5
Solubility: Water: Disperses in water with a pH between 5.7 and 6.0
Log Pow: No data available
Log Kow: 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

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)

### 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.

<table>
<thead>
<tr>
<th>Silver (7440-22-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
</tr>
<tr>
<td>EC50 Daphnia 1</td>
</tr>
<tr>
<td>LC50 fish 2</td>
</tr>
</tbody>
</table>

### 12.2. Persistence and degradability
PFI-RSA6012 Reflective Silver Flexographic Ink: Not established.

### 12.3. Bioaccumulative potential
PFI-RSA6012 Reflective Silver Flexographic Ink: Not established.

### 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
PFI-RSA6012 Reflective Silver Flexographic Ink
Safety Data Sheet
according to the federal final rule of hazard communication revised on 2012 (HazCom 2012)

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
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 List of Lists) : 1000 lb
SARA Section 313 - Emission Reporting : 1.0 %

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

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 IECS (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
Revision date : 10/18/2017
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.