1 Identification of substance:
- Product details:
- Trade name: Silver nanoparticles
- Manufacturer/Supplier:
  PlasmaChem GmbH, Berlin
  Rudower Chaussee 29, D-12489
  Tel.: 030 6392-6313
- Revision number: 1.1 / 1 October 2006

2 Composition/Data on components:
- Chemical characterization:
  Description: (CAS#)
  Silver colloidal solution (CAS# 7440-22-4): min 0,01%
- Identification number(s):
  EINECS Number: 231-131-3

3 Hazards identification
- Not hazardous according to Directive 67/548/EEC.

4 First aid measures
- After inhalation
  Supply fresh air. If required, provide artificial respiration. Call a physician.
- After skin contact
  Immediately wash with water and soap and rinse thoroughly.
- After eye contact
  Rinse opened eye for several minutes under running water. Then consult a doctor.
- After swallowing
  Wash mouth with plenty of water provided a person is conscious. Seek medical advice.

5 Fire fighting measures
- Suitable extinguishing agents:
  Not flammable
- For safety reasons unsuitable extinguishing agents: No
- Protective equipment:
  Wear self-contained respirator.
  Wear fully protective impervious suit.

6 Accidental release measures
- Procedures of personal precautions:
  Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.
- Methods of cleaning up:
  Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 Handling and storage
- Handling
  Information for safe handling:
  Keep container tightly sealed.
  Store in cool, dry place in tightly closed containers.
  Ensure good ventilation at the workplace.
- Information about protection against explosions and fires:
- Storage
8 Exposure controls and personal protection
Information below is relevant to dry silver powder.

- **Engineering controls**
  Safety shower and eye bath. Mechanical exhaust required.
- **General hygiene measures**
  Wash thoroughly after handling.
- **Exposure limits**
  Source Type Value
  OEL OEL 0.1 mg/m³
- **EXPOSURE LIMITS – DENMARK**
  Source Type Value
  OEL TWA 0.01 mg/m³
- **EXPOSURE LIMITS – GERMANY**
  Source Type Value
  TRGS 900 OEL 0.1 mg/m³, E
  Remarks: 4
- **EXPOSURE LIMITS – NORWAY**
  Source Type Value
  OEL 0.1 mg/m³
- **EXPOSURE LIMITS – SWEDEN**
  Source Type Value
  LLV (Level 0.1 mg/m³)
- **EXPOSURE LIMITS – SWITZERLAND**
  Source Type Value
  OEL OEL 0.1 mg/m³
  0.01 ppm
  Remarks: E
- **EXPOSURE LIMITS – UNITED KINGDOM**
  Source Type Value
  OEL OEL 0.01 mg/m³
  Remarks: as Ag
  OEL OEL 0.1 mg/m³
- **PERSONAL PROTECTIVE EQUIPMENT**
  Respiratory Protection: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks.
- **Hand Protection**: Protective gloves.
- **Eye Protection**: Chemical safety goggles.

9 Physical and chemical properties:

- **General Information**
- **Form**: Liquid
- **Color**: dark yellow to red
- **Odor**: Odorless

<table>
<thead>
<tr>
<th>Change in condition</th>
<th>Value/Range</th>
<th>Unit</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range</td>
<td>0 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiling point/Boiling range</td>
<td>100 °C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 10 Stability and reactivity
- **Heat of decomposition / conditions to be avoided:**
  Decomposition will not occur if used and stored according to specifications.
- **Materials to be avoided:**
  - Oxidizing agents
  - Strong acids, strong bases
- **Dangerous reactions:** Not known
- **Dangerous products of decomposition:** Toxic metal oxide fume

### 11 Toxicological information
- **RTECS NUMBER:** VW3500000
- **Signs and symptoms of exposure:**
  May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver). To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
- **Route of exposure:**
  - Skin Contact: May cause skin irritation.
  - Skin Absorption: May be harmful if absorbed through the skin.
  - Eye Contact: May cause eye irritation.
  - Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
  - Ingestion: May be harmful if swallowed.
- **Chronic exposure – carcinogen**
  - **Rat**
    - Route of Application: Multiple
    - Exposure Time: 43W
    - Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.
  - **Mouse**
    - Route of Application: Implant
    - Result: Tumorigenic:Tumors at site or application. Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.

### 12 Ecological information:
- **No data available.**

### 13 Disposal considerations
### 14 Transport Information
- **RID/ADR**: Non-hazardous for road transport.
- **IMDG**: Non-hazardous for sea transport.
- **IATA**: Non-hazardous for air transport.

### 15 Regulations
- Not hazardous according to Directive 67/548/EEC.

**COUNTRY SPECIFIC INFORMATION**
- **Germany**
  - **WGK**: No hazard to waters.
  - **ID-Number**: 1443
  - **KBwS-Decision**

### 16 Other Information:
Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

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