

Material Safety Data Sheet
acc. to OSHA and ANSI

1 Identification of substance:

- Product details: Silver nanoparticles, 5-8 nm
- Trade name: Silver nanoparticles, 6-7 nm, PL-Ag-HPB7
- Manufacturer/Supplier:
PlasmaChem GmbH, Berlin
Rudower Chaussee 29, D-12489
Tel.: 030 6392-6313
- Revision number: 1.2 / 1 August 2008

2 Composition/Data on components:

- Chemical characterization:
Description: (CAS#)
Silver (CAS# 7440-22-4): metal basis min. 99%
- Identification number(s):
- EINECS Number: 231-131-3
R 36 / 37 / 38

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
- Requirements to be met by storerooms and receptacles:
Store in a cool location.
- Information about storage in one common storage facility:
Do not store together with oxidizing and acidic materials.
- Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

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
- | | | |
|--------------------|-------------|---------------|
| <u>Value/Range</u> | <u>Unit</u> | <u>Method</u> |
|--------------------|-------------|---------------|
- Change in condition

- Melting point/Melting range: Not applicable
- Boiling point/Boiling range: Not applicable
- Sublimation temperature / start: Not applicable
- Flash point: Not applicable
- Flammability (solid, gaseous) Not flammable if not dried
- Ignition temperature: Not applicable
- Decomposition temperature: Not applicable
- Explosion limits:
- Lower: Not applicable
- Upper: Not applicable
- Vapor pressure: Not applicable
- Density: at 20 ° C 1 g/cm³ liquid
- Solubility in / Miscibility with
- Water: Insoluble

10 Stability and reactivity

- Thermal 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.
Rat
- Route of Application: Implant
Result: Tumorigenic:Tumors at site or application.
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.
Mouse
- Route of Application: Implant
Result: Tumorigenic:Tumors at site or application.
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria.
Rat
- 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

- Product:
- Recommendation
Consult state, local or national regulations to ensure proper disposal.
- Uncleaned packagings:
- Recommendation:
Disposal must be made according to official regulations.

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.

- **Disclaimer:**
For R&D use only. Not for drug, household or other uses