

# Material Safety Data Sheet

## Silver Powder

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### 1. Product and Company Identification

PRODUCT NAME: Silver Powder  
SYNONYMS: Ag, Argentum, Silver, Silver Particles, Ultra-fine Silver

MANUFACTURER:  
ADDRESS:

EMERGENCY PHONE  
(CHEMTREC):  
OTHER CALLS:  
FAX:

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### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Silver	7440-22-4	> 99.9%	No

CHEMICAL NAME: Silver  
CHEMICAL FAMILY: Metal Powder  
CHEMICAL FORMULA: Ag

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### 3. Hazards Identification

#### Safety Data

HMIS Ratings: Health=0, Flammability=0, Reactivity=1

Lab Protective Equip: Goggles, gloves, lab coat

#### Potential Health Effects

**Inhalation:** May be harmful if inhaled. Material may be irritating to nasal septum, throat, mucous membranes and upper respiratory tract.

**Ingestion:** May be harmful if swallowed. May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

**Skin Contact:** May cause skin irritation or ulceration.

**Eye Contact:** May cause eye irritation or blue-gray eyes.

**Chronic Exposure:** Absorption of silver compounds by ingestion, inhalation or through broken skin can cause argyria, a permanent bluish-gray discoloration of the skin, conjunctiva and mucous membranes.

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#### 4. First Aid Measures

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.

**Ingestion:** If conscious, wash out mouth with water. Seek medical attention immediately.

**Skin Contact:** Flush with copious amounts of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Seek medical attention if irritation develops or persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**Eye Contact:** Flush with copious amounts of water for at least 15 minutes, occasionally lifting lower and upper eyelids. Seek medical attention immediately.

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#### 5. Fire Fighting Measures

**Fire:** Any very finely divided particles (ultra-fine powder) may burn in air. Combustion of silver powder may cause the release of toxic metal oxide fume.

**Pyrophoric/Autoignition:** No

**Explosion:** This material, like most materials in powder form, is capable of creating a dust explosion.

**Fire Extinguishing Media:** Sand or dry powder type specially designed for metal powder fires. Do not use water.

**Special Information:** In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

**NFPA Ratings:** Health=0, Flammability=0, Reactivity=1

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#### 6. Accidental Release Measures

In case of a leak or spill, evacuate area, shut off all sources of ignition and use nonsparking tools. Wear eye protection, self-contained breathing apparatus, boots, and protective gloves. Wear disposable coveralls and discard after use. Sweep up the spill, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pick-up is complete. Do not let this chemical enter the environment.

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#### 7. Handling and Storage

Store in a tightly closed container in a cool, dry, ventilated area. Protect from physical damage, ignition sources and electrostatic discharges. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

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#### 8. Exposure Controls, Personal Protection

**Airborne Exposure Limits:**

- OSHA Permissible Exposure Limit (PEL) 0.01 mg/m<sup>3</sup> (TWA)
- NIOSH Recommended Exposure Level (REL) 0.01 mg/m<sup>3</sup> (TWA)
- NIOSH Immediately Dangerous to Life or Health Concentration (IDLH) 10 mg/m<sup>3</sup>
- ACGIH Threshold Limit Value (TLV) 0.1 mg/m<sup>3</sup> (TWA)

**Ventilation System:** A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emission of the contaminant at its source, preventing dispersion of it into the general work area.

**Respiratory Protection Equipment:**

Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures. Currently, there are no specific exposure limits for airborne exposures to engineered nanoparticles although occupational exposure limits exist for larger particles of similar chemical composition. The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure. Preliminary evidence shows that for respiration filtration media there is no deviation from the classical single-fiber theory for particulates as small as 2.5 nm in diameter. While this evidence needs confirmation, NIOSH certified respirators will be useful for protecting workers from nanoparticles inhalation when properly selected and fit tested as part of a complete respiratory protection program.

Use NIOSH approved positive flow mask if dust becomes airborne. Try to avoid creating dust conditions.

**Skin Protection:** Wear impervious protective clothing including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Wash thoroughly after handling. Maintain quick-drench facilities in work area.

**Eye Protection:** Use chemical safety goggles and/or full face shield where dusting or splashing of solution is possible. Maintain eye wash fountain in work area.

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## 9. Physical and Chemical Properties

<b>Appearance:</b>	Dark gray to black powder with an average particle size of 20-100 nanometers.
<b>Odor:</b>	Odorless
<b>Solubility:</b>	Insoluble in water
<b>Theoretical Density:</b>	10.49 g/cm <sup>3</sup>
<b>Bulk Density:</b>	0.5 g/cm <sup>3</sup>
<b>Molecular Weight:</b>	107.868 AMU
<b>pH:</b>	Not available
<b>Boiling Point:</b>	2212C (4014F)
<b>Melting Point:</b>	962C (1764F)
<b>Vapor Density (Air=1):</b>	Not available
<b>Vapor Pressure:</b>	Not available
<b>Evaporation Rate:</b>	Not available
<b>Viscosity:</b>	Not applicable
<b>Decomposition Temp:</b>	Not available

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## 10. Stability and Reactivity

**Stability:** Stable under ordinary conditions of use and storage.

**Hazardous Decomposition Products:** Metal oxide fume.

**Hazardous Polymerization:** Will not occur.

**Incompatibilities:** Silver is incompatible with acetylene, ammonia, strong hydrogen peroxide solutions,

strong acids, oxalic acid, tartaric acid, bromoazide, chlorine trifluoride, and ethyleneimine.  
**Conditions to Avoid:** Dust generation and incompatibles.

## 11. Toxicological Information

NTP Known Carcinogen: No  
 NTP Anticipated Carcinogen: No  
 IARC Category: None

## 12. Ecological Information

This substance may be hazardous to the environment; special attention should be given to aquatic organisms.

## 13. Disposal Considerations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory. This material and its container must be disposed of as hazardous waste. Processing, use, or contamination of this product may change the waste management options. All components of this product are listed on the Canadian Domestic Substances List (DSL).

## 14. Transport Information

Not regulated.

## 15. Regulatory Information

### --Chemical Inventory Status – Part 1--

Ingredient	TSCA	EC	Japan	Australia
Silver (7440-22-4)	Yes	not available		

### Chemical Inventory Status – Part 2-

Ingredient	--Canada--			
	Korea	DSL	NDSL	Phil.
Silver (7440-22-4)	No	Yes	No	

### Federal, State & International Regulations – Part 1-

Ingredient	--SARA 302--		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Silver (7440-22-4)			Yes	

### Federal, State & International Regulations – Part 2 -

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8 (d)
Silver (7440-22-4)	5000	No	No

Chemical Weapons Convention: No

TSCA 12(b): No

CDTA: No

SARA 311/312: Acute: Yes, Chronic: Yes, Fire: No, Pressure: No, Reactivity: No (Pure / Solid)

Australian Hazchem Code: None allocated.

Poison Schedule: None allocated.

WHMIS: This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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## 16. Other Information

**Label Precautions:** Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid breathing dust or vapors. Keep container closed. Use only with adequate ventilation.

**Label First Aid:** If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, seek medical attention.

**Product Use:** Laboratory Reagent.

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