

Silver Metal

1. General information

The information contained herein was obtained from sources believed to be reliable; Electrochemical Devices, Inc. (EDI) disclaims all liability for the content. This information applies to material in bulk form and may not be relevant to the small quantities of material used in our products. Silver metal is present in EDI reference electrodes with **AGC**, **AGD** or **AGG** in the second grouping of the model designation. The material is entirely contained within the electrode housing.

Synonyms: Argentum

CAS#: 7440-22-4

2. Hazard Overview

Appearance: white solid.

Caution! May cause respiratory and digestive tract irritation. May cause eye and skin irritation. Danger of cumulative effects.

Target Organs: Kidneys.

Potential Health Effects

Eye: May cause eye irritation.

Skin: May cause skin irritation. May cause skin discoloration.

Ingestion: May cause irritation of the digestive tract. Effects may be cumulative. Ingestion of silver compounds may cause abdominal pain, rigidity, convulsions and shock.

Inhalation: May cause respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

Chronic: Chronic inhalation or ingestion of silver salts may cause argyria characterized by a permanent blue-gray discoloration of the eyes, skin, mucous membranes, and internal organs. This malady results from the accumulation of silver in the body.

3. First Aid

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation develops, get medical aid.

Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

Ingestion: Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Wash mouth out with water. Get medical aid if irritation or symptoms occur.

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

Notes to Physician: Treat symptomatically and supportively.

4. Fire Fighting

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.

Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Flash Point: Not applicable.

Autoignition Temperature: Not applicable.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 1; Flammability: 0; Instability: 0

5. Accidental Release

General Information: Use proper personal protective equipment as indicated in Section 7.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

6. Handling and Storage

Handling: Wash thoroughly after handling. Wash hands before eating. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation. Use with adequate ventilation.

Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. No special precautions indicated.

7. Exposure Control

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.

Exposure Limits:

ACGIH: 0.1 mg/m³ TWA

NIOSH: 0.01 mg/m³ TWA (dust)

10 mg/m³ IDLH (dust)

OSHA - Final PELs: 0.01 mg/m³ TWA

OSHA Vacated PELs: Silver: 0.01 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to minimize contact with skin.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

8. Physical and Chemical Characteristics

Physical State: Solid

Appearance: White

Odor: None reported

pH: Not available.

Vapor Pressure: 100 mm Hg @ 1865 C

Vapor Density: Not available.

Evaporation Rate: Not applicable.

Viscosity: Not available.

Boiling Point: 2212 deg C

Freezing/Melting Point: 961 deg C

Decomposition Temperature: Not available.

Solubility: Insoluble in water.

Specific Gravity/Density: 10.5

Molecular Formula: Ag

Molecular Weight: 107.8

9. Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, exposure to air.

Incompatibilities with Other Materials: Strong acids, strong bases, ethyleneimine.

Hazardous Decomposition Products: Irritating and toxic fumes and gases, silver fumes.

Hazardous Polymerization: Has not been reported.

10. Toxicological Information

LD50/LC50: Not available.

Carcinogenicity: CAS# 7440-22-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: IARC Group 4: Substance nonclassifiable with regard to carcinogenicity. Tumorigenic:
See RTECS

Teratogenicity: No information found.

Reproductive Effects: No information found.

Mutagenicity: No information found.

Neurotoxicity: No information found.

11. Ecological Information

Ecotoxicity: No data available. No information available.

Environmental: Aquatic Fate: Sorption and precipitation processes are effective in reducing the concern of dissolved silver and result in higher concern in the bed sediments than in the overlying waters. Sorption by manganese dioxide and precipitation with halides are probably the dominant controls on the mobility of silver in the aquatic environment.

Physical: Algae, daphnia, fresh water mussels, and fathead minnows were all found capable of accumulating silver; but the food chain was not an important route of silver accumulation for animals at higher trophic levels, suggesting no food chain magnification.