



- **After skin contact**  
Immediately wash with water and soap and rinse thoroughly.  
Seek immediate medical advice.
- **After eye contact**  
Rinse opened eye for several minutes under running water.  
Then consult a doctor.
- **After swallowing** Seek immediate medical advice.

## **5 Fire fighting measures**

- **Suitable extinguishing agents**  
Fire-extinguishing powder  
Dry sand
- **Protective equipment:**  
Wear self-contained respirator.  
Wear fully protective impervious suit.

## **6 Accidental release measures**

- **Person-related safety precautions:**  
Wear protective equipment. Keep unprotected persons away.  
Ensure adequate ventilation  
Keep away from ignition sources
- **Measures for environmental protection:**  
Do not allow material to be released to the environment  
without proper governmental permits.
- **Measures for cleaning/collecting:**  
Ensure adequate ventilation.  
Keep away from ignition sources.
- **Additional information:**  
See Section 7 for information on safe handling  
See Section 8 for information on personal protection  
equipment.  
See Section 13 for disposal information.

## **7 Handling and storage**

- **Handling**
- **Information for safe handling:**  
Handle under dry argon.  
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:**  
Keep ignition sources away.  
Protect against electrostatic charges.  
Fumes can combine with air to form an explosive mixture.
- **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 acids.  
Do not store together with alkalies (caustic solutions).
- **Further information about storage conditions:**  
Store under dry argon.  
Keep container tightly sealed.  
Store in cool, dry conditions in well sealed containers.

## **8 Exposure controls and personal protection**

- **Additional information about design of technical systems:**  
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

### **Components with limit values that require monitoring at the workplace:**

Silver metal	
	mg/m <sup>3</sup>
ACGIH TLV	0.1
Austria MAK	0.01
Belgium TWA	0.1
Denmark TWA	0.01
Finland TWA	0.1
France VME	0.1
Germany MAK	0.01
Japan OEL	0.01
Korea TWA	0.1
Netherlands MAC-TGG	0.01
Norway TWA	0.01
Russia TWA	1-STEL
Sweden NGV	0.1

Switzerland MAK-W	0.01
United Kingdom TWA	0.1
USA PEL TWA	0.01

- **Additional information:** No data
- **Personal protective equipment**
- **General protective and hygienic measures**  
 The usual precautionary measures for handling chemicals should be followed.  
 Keep away from foodstuffs, beverages and feed.  
 Remove all soiled and contaminated clothing immediately.  
 Wash hands before breaks and at the end of work.
- **Breathing equipment:**  
 Use suitable respirator when high concentrations are present.
- **Protection of hands:** Impervious gloves
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing.

**9 Physical and chemical properties:**

- **General Information**

- **Form:** Powder
- **Color:** Black
- **Odor:** Odorless

- |  | <u>Value/Range</u> | <u>Unit</u> | <u>Method</u> |
|--|--------------------|-------------|---------------|
|--|--------------------|-------------|---------------|

- **Change in condition**

- **Melting point/Melting range:** 960.8 ° C
- **Boiling point/Boiling range:** 2210 ° C
- **Sublimation temperature / start:** Not determined
- **Flash point:** Not applicable

- **Flammability (solid, gaseous)**                      Highly flammable.
- **Ignition temperature:**                                      Not determined
- **Decomposition temperature:**                                      Not determined
- **Explosion limits:**
- **Lower:**    Not determined
- **Upper:**    Not determined
- **Vapor pressure:**    Not determined
- **Density:**                      at      20 ° C                                      10.491 g/cm<sup>3</sup>
- **Solubility in / Miscibility with**
- **Water:**    Insoluble  
Not determined

#### 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:**  
Acids  
Bases
- **Dangerous reactions**  
Silver may react with acetylene or ammonia to form shock sensitive compounds.
- **Dangerous products of decomposition:** Metal oxide fume

#### 11 Toxicological information

- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** Irritant to skin and mucous membranes.
- **on the eye:** Irritating effect.
- **Sensitization:** No sensitizing effects known.

- **Other information (about experimental toxicology):**  
Tumorigenic effects have been observed on tests with laboratory animals.
- **Subacute to chronic toxicity:**  
Absorption of silver compounds by ingestion, inhalation or through broken skin can cause argyria, a permanent bluish-grey discoloration of the skin, conjunctiva and mucous membranes.
- **Additional toxicological information:**  
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.  
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.

#### **12 Ecological information:**

- **General notes:**  
Do not allow material to be released to the environment without proper governmental permits.

#### **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**

- **DOT regulations:**
- **Hazard class:** 4.1
- **Identification number:** UN3089
- **Packing group:** II
- **Proper shipping name (technical name):**  
Metal powders, flammable, n.o.s.,

silver

powder

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 4.1 Flammable solids
- **Item:** 13b
- **Danger code (Kemler):** 40
- **UN-Number:** 3089
- **Description of goods:** Metal powders, flammable, n.o.s.,  
silver  
powder
- **Maritime transport IMDG:**
- **IMDG Class:** 4.1
- **UN Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s.,  
silver  
powder
- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** 4.1
- **UN/ID Number:** 3089
- **Packaging group:** II
- **Proper shipping name:** Metal powders, flammable, n.o.s.,  
silver  
powder

## 15 Regulations

- **Product related hazard informations:**
- **Hazard symbols:** F Highly flammable

- **Risk phrases:** 11 Highly flammable.
- **National regulations**  
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory.
- **Information about limitation of use:**  
For use only by technically qualified individuals. This product contains silver and is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

**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.