

## SAFETY DATA SHEET

### 1. SUBSTANCE AND SOURCE IDENTIFICATION

#### Product Identifier

**SRM Number:** 978a  
**SRM Name:** Assay-Isotopic Standard for Silver  
**Other Means of Identification:** Not applicable.

#### Recommended Use of This Material and Restrictions of Use

This Standard Reference Material (SRM) is intended for use as an assay and isotopic standard. A unit of SRM 978a consists of 0.25 g of silver nitrate, AgNO<sub>3</sub> made from high purity silver metal and high purity nitric acid.

#### Company Information

National Institute of Standards and Technology  
 Standard Reference Materials Program  
 100 Bureau Drive, Stop 2300  
 Gaithersburg, Maryland 20899-2300

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 1-800-424-9300 (North America)  
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### 2. HAZARDS IDENTIFICATION

#### Classification

<b>Physical Hazard:</b>	Oxidizer	Category 2
<b>Health Hazard:</b>	Acute Toxicity, Oral	Category 4
	Skin Corrosion/Irritant	Category 1B
	Eye Damage/Irritant	Category 1

#### Label Elements

##### Symbol



##### Signal Word

DANGER

##### Hazard Statement(s)

H272 May intensify fire; oxidizer.  
 H302 Harmful if swallowed.  
 H314 Causes severe skin burns and eye damage.

##### Precautionary Statement(s)

P210 Keep away from heat.  
 P220 Keep and store away from combustible materials.  
 P221 Take any precaution to avoid mixing with combustibles.  
 P260 Do not breathe dusts.  
 P264 Wash thoroughly after handling.  
 P270 Do not eat, drink, or smoke when using this product.  
 P280 Wear protective gloves, eye protection, and protective clothing.

P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303+P361+P353	If on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water.
P304+P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a doctor.
P363	Wash contaminated clothing before reuse.
P405	Store locked up.
P501	Dispose of contents and container according to local regulations.

**Hazards Not Otherwise Classified:** Not applicable.

**Ingredients(s) with Unknown Acute Toxicity:** Not applicable.

### 3. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

**Substance:** Silver nitrate

**Other Designations:** Lapis infernalis; lunar caustic; nitric acid, silver(1+); silver mononitrate; nitric acid silver (1) salt.

Components are listed in compliance with OSHA's 29 CFR 1910.1200; for the actual values see the Certificate of Analysis.

Hazardous Component(s)	CAS Number	EC Number (EINECS)	Nominal Mass Concentration (%)
Silver nitrate	7761-88-8	231-853-9	100

### 4. FIRST AID MEASURES

**Description of First Aid Measures:**

**Inhalation:** If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration or oxygen by qualified personnel. Seek immediate medical attention.

**Skin Contact:** Wash skin with soap and water for at least 15 minutes. If necessary, seek medical attention.

**Eye Contact:** Flush eyes with water for at least 15 minutes. If necessary, seek medical attention.

**Ingestion:** Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention.

**Most Important Symptoms/Effects, Acute and Delayed:** Irritation and burns to skin, eyes, respiratory tract, and mucous membranes.

**Indication of any immediate medical attention and special treatment needed, if necessary:** If any of the above symptoms are present, seek medical attention if needed.

### 5. FIRE FIGHTING MEASURES

**Fire and Explosion Hazards:** Negligible fire hazard. Oxidizer. May ignite or explode on contact with combustible materials. See Section 9, "Physical and Chemical Properties" for flammability properties.

**Extinguishing Media:**

Suitable: Water.

Unsuitable: Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents.

**Specific Hazards Arising from the Chemical:** None listed.

**Special Protective Equipment and Precautions for Fire-Fighters:** Avoid inhalation of material or combustion byproducts. Wear full protective clothing and NIOSH approved self-contained breathing apparatus (SCBA). Move container from fire area if it can be done without risk. Stay upwind and keep out of low areas.

**NFPA Ratings** (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health = 3                      Fire = 0                      Reactivity = 0

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal Precautions, Protective Equipment and Emergency Procedures:** Keep unnecessary personnel away. Use suitable protective equipment; see Section 8, "Exposure Controls and Personal Protection".

**Methods and Materials for Containment and Clean up:** Notify safety personnel of spills. Collect spilled material in appropriate container for disposal. Isolate hazard area and deny entry.

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## 7. HANDLING AND STORAGE

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**Safe Handling Precautions:** Avoid generating dust. See Section 8, "Exposure Controls and Personal Protection".

**Storage:** Store and handle in accordance with all current regulations and standards. Subject to NFPA 430 code for Storage of Liquid and Solid Oxidizing Agents. Store in a tightly closed container. Avoid contact with air and light. Keep separated from incompatible substances. Protect from physical damage.

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## 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

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**Exposure Limits:** No occupational exposure limits have been established for this material. The exposure limits for Particulates Not Otherwise Regulated are applicable.

OSHA (PEL): 15 mg/m<sup>3</sup> (TWA, total particulates)  
5 mg/m<sup>3</sup> (TWA, respirable particulates)

**Engineering Controls:** Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

**Personal Protection:** In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

**Respiratory Protection:** If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

**Eye/Face Protection:** Wear splash resistant safety goggles with a face shield. An eyewash station should be readily available near areas of use.

**Skin and Body Protection:** Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Chemical-resistant gloves should be worn at all times when handling chemicals.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### Descriptive Properties

<b>Appearance (physical state, color, etc.)</b>	clear, colorless solid
<b>Molecular Formula</b>	AgNO <sub>3</sub>
<b>Molar Mass (g/mol)</b>	169.87
<b>Odor</b>	odorless
<b>Odor threshold</b>	not available
<b>pH</b>	6
<b>Evaporation rate</b>	not available
<b>Melting point/freezing point</b>	212 °C (413.6 °F)
<b>Specific Gravity (water = 1)</b>	4.352 at 19 °C
<b>Density (g/L)</b>	not available
<b>Vapor Pressure (mmHg)</b>	negligible
<b>Vapor Density (air = 1)</b>	not available
<b>Viscosity (cP)</b>	not available
<b>Solubility(ies)</b>	water: 122 % at 0 °C; soluble in ether and glycerol; very slightly soluble in alcohol and acetone
<b>Partition coefficient (n-octanol/water)</b>	not available
<b>Particle Size</b>	not available

### Thermal Stability Properties

<b>Autoignition Temperature</b>	not available
<b>Thermal Decomposition</b>	444 °C (831 °F)
<b>Initial boiling point and boiling range</b>	not available
<b>Explosive Limits, LEL (Volume %)</b>	not available
<b>Explosive Limits, UEL (Volume %)</b>	not available
<b>Flash Point</b>	not available
<b>Flammability (solid, gas)</b>	not available

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## 10. STABILITY AND REACTIVITY

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**Reactivity:** Stable at normal temperatures and pressure.

**Stability:**  X  Stable   Unstable

**Possible Hazardous Reactions:** No data available.

**Conditions to Avoid:** Avoid contact with combustible materials. May ignite or explode on contact with combustible materials. Dangerous gases may accumulate in confined spaces. Keep out of water supplies and sewers.

**Incompatible Materials:** Combustible materials, metal carbide, bases halogens, acids, peroxides, metals, metal salts, and reducing agents.

**Fire/Explosion Information:** See Section 5, "Fire Fighting Measures".

**Hazardous Decomposition:** Oxides of nitrogen.

**Hazardous Polymerization:**   Will Occur  X  Will Not Occur

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## 11. TOXICOLOGICAL INFORMATION

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**Route of Exposure:**  X  Inhalation  X  Skin   Ingestion

**Symptoms Related to the Physical, Chemical and Toxicological Characteristics:** Irritation and burns to skin, eyes, respiratory tract, and mucous membranes.

### Potential Health Effects (Acute, Chronic, and Delayed):

**Inhalation:** Acute exposure may result in severe irritation to the mucosa membranes of the respiratory tract accompanied by sore throat, coughing, shortness of breath, and lung damage. Chronic exposure (2 to 25 years) may result in argyria, a permanent bluish discoloration of the skin and conjunctiva.

**Skin Contact:** Acute exposure to dust or solutions may cause severe irritation, redness, pain, ulceration, and discoloration. Chronic exposure may cause argyria

**Eye Contact:** Acute exposure to dust or solutions may cause severe irritation, redness, pain, burns, and discoloration. Rapid edema of the conjunctiva and lids accompanied by a bloody discharge may occur. Permanent eye damage or blindness is possible. Chronic exposure may result in conjunctivitis or symptoms similar to acute exposure.

**Ingestion:** Acute exposure may result in sever irritation and burns of the mucous membranes of the gastro intestinal tract. Toxic effects include salivation, violent abdominal pain, black vomitus, diarrhea, anuria, collapse, shock, convulsions, coma, and death. The fatal dose in humans has been as low as 2 g.

### Numerical Measures of Toxicity:

**Acute Toxicity:** Category 4  
Rat, Oral LD50: 1173 mg/kg

**Skin Corrosion/Irritation:** Category 1B  
Man, Skin: 1%; may cause severe irritation, pain, redness, ulceration, and discoloration.

**Serious Eye Damage/Eye Irritation:** Category 1  
Rabbit, Eyes: 10 mg – moderate; 1 mg – severe

**Respiratory Sensitization:** Not classified; no data available.

**Skin Sensitization:** Not classified; no data available.

**Germ Cell Mutagenicity:** Not classified.  
Human, 76 µmol/L; Hamster, 60 µmol/L; Mouse, 20 g/kg

**Carcinogenicity:** Not classified.  
**Listed as a Carcinogen/Potential Carcinogen** \_\_\_\_\_ Yes \_\_\_\_\_ X No  
Silver nitrate is not listed by NTP, IARC or OSHA as a carcinogen/potential carcinogen.  
Mouse, Skin TDLo: 15 g/kg (19 week)

**Reproductive Toxicity:** Not classified; no data available.

**Specific Target Organ Toxicity, Single Exposure:** Not classified; no data available.

**Specific Target Organ Toxicity, Repeated Exposure:** Not classified; no data available.

**Aspiration Hazard:** Not classified; no data available.

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## 12. ECOLOGICAL INFORMATION

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### Ecotoxicity Data:

Fish: Rainbow trout, *Oncorhynchus mykiss*, LC50 (96 h): 0.00839 mg/L to 0.1802 mg/L [static].  
Carp, *Cyprinus carpio*, LC50 (96 h): 0.0027 mg/L [semi-static]  
Invertebrate: Water flea, *Daphnia magna*, EC50 (48 h): 0.0008 mg/L to 0.001 mg/L [flow-through]

**Persistence and Degradability:** No data available.

**Bioaccumulative Potential:** No data available.

**Mobility in Soil:** No data available.

**Other Adverse effects:** No data available.

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## 13. DISPOSAL CONSIDERATIONS

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**Waste Disposal:** Dispose of waste in accordance with all applicable federal, state, and local regulations. Subject to disposal regulations US EPA 40 CFR 262 Hazardous Waste Number(s): D001 and D011. Dispose of in accordance with US EPA 40 CFR 262 for concentrations at or above the regulatory level (5.0 mg/L).

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## 14. TRANSPORTATION INFORMATION

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**U.S. DOT and IATA:** UN1493, Silver nitrate, Class 5.1, PG II, Packing Instruction: 558, Excepted Qty E2.

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## 15. REGULATORY INFORMATION

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### U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): 1 lb (0.454 kg) final RQ.  
SARA Title III Section 302 (40 CFR 355.30): Not regulated.  
SARA Title III Section 304 (40 CFR 355.40): Not regulated.  
SARA Title III Section 313 (40 CFR 372.65): 1 % de minimis concentration (related to Silver compounds).  
OSHA Process Safety (29 CFR 1910.119): Not regulated.  
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH:	Yes.
CHRONIC HEALTH:	No.
FIRE:	No.
REACTIVE:	No.
PRESSURE:	No.

### State Regulations:

California Proposition 65: Not listed.

**U.S. TSCA Inventory:** Listed.

**TSCA 12(b), Export Notification:** Not listed.

**Canadian Regulations:** WHMIS Information is not provided for this material.

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## 16. OTHER INFORMATION

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**Issue Date:** 03 April 2015

**Sources:** ChemAdvisor, Inc., SDS, *Silver Nitrate*, 15 December 2014.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Particulates not otherwise regulated*, 04 April 2011; available at <http://www.cdc.gov/niosh/npg/npgd0480.html> (accessed Mar 2015).

### Key of Acronyms:

ACGIH	American Conference of Governmental Industrial Hygienists	NRC	Nuclear Regulatory Commission
ALI	Annual Limit on Intake	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OSHA	Occupational Safety and Health Administration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	PEL	Permissible Exposure Limit
CFR	Code of Federal Regulations	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	REL	Recommended Exposure Limit
EC50	Effective Concentration, 50 %	RM	Reference Material
EINECS	European Inventory of Existing Commercial Chemical Substances	RQ	Reportable Quantity
EPCRA	Emergency Planning and Community Right-to-Know Act	RTECS	Registry of Toxic Effects of Chemical Substances
IARC	International Agency for Research on Cancer	SARA	Superfund Amendments and Reauthorization Act
IATA	International Air Transportation Agency	SCBA	Self-Contained Breathing Apparatus
IDLH	Immediately Dangerous to Life and Health	SRM	Standard Reference Material
LC50	Lethal Concentration, 50 %	STEL	Short Term Exposure Limit
LD50	Lethal Dose, 50 %	TLV	Threshold Limit Value
LEL	Lower Explosive Limit	TPQ	Threshold Planning Quantity
MSDS	Material Safety Data Sheet	TSCA	Toxic Substances Control Act
NFPA	National Fire Protection Association	TWA	Time Weighted Average
NIOSH	National Institute for Occupational Safety and Health	UEL	Upper Explosive Limit
NIST	National Institute of Standards and Technology	WHMIS	Workplace Hazardous Materials Information System

**Disclaimer:** Physical and chemical data contained in this SDS are provided only for use in assessing the hazardous nature of the material. The SDS was prepared carefully, using current references; however, NIST does not certify the data in the SDS. The reference values for this material are given in the NIST Certificate of Analysis.

Users of this SRM should ensure that the SDS in their possession is current. This can be accomplished by contacting the SRM Program: telephone (301) 975-2200; fax (301) 948-3730; e-mail [srmmsds@nist.gov](mailto:srmmsds@nist.gov); or via the Internet at <http://www.nist.gov/srm>.