

MATERIAL SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Material Name:	Silver nitrate, ACS/ISO grade
Catalogue Number:	C139; C1391; C1395.
Other Names:	Silver nitrate AR; Silver nitrate (V); Lunar caustic; Silver nitrate LR.
Recommended Use:	Photographic film, catalyst for ethylene oxide, indelible inks, silver plating, silvering mirrors, silver salts, germicide (as a wall spray), hair dyeing, analytical chemistry, antiseptic, purification of drinking water, fused form to cauterize wounds and laboratory reagent.
Supplier Name:	ProSciTech
Street Address:	1/11 Carlton Street, Kirwan, Qld. 4817 Australia
Telephone Number:	(07) 4773 9444 - 8:30am – 5:00pm, Monday to Friday (excluding Public Holidays)
Emergency Contact:	(07) 4773 9444 - 8:30am – 5:00pm, Monday to Friday (excluding Public Holidays)

SECTION 2 - HAZARDS IDENTIFICATION

Hazard Classification:	Hazardous according to criteria of Hazardous Substances Information System [HSIS Worksafe Australia].
Hazardous and/or Dangerous Nature:	HAZARDOUS SUBSTANCE. DANGEROUS GOODS.
Risk Phrases:	R8: Contact with combustible material may cause fire. R34: Causes burns. R50: Very toxic to aquatic organisms. R53: May cause long term adverse effects in the aquatic environment.
Safety Phrases:	S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S45: In case of accident or if you feel unwell seek medical advice immediately. S60: This material and its container must be disposed of as hazardous waste. S61: Avoid release to the environment. Refer to special instructions/safety data sheet.

Refer to Section 15 for Poisons Schedule.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Pure Substance (Proportion 100%):

Chemical Identity:	Silver nitrate
Common Name(s):	Silver nitrate, ACS/ISO grade; Silver nitrate AR; Silver nitrate (V); Lunar caustic; Silver nitrate LR.
CAS Number:	7761-88-8

SECTION 4 - FIRST AID MEASURES

Ingestion:	Rinse mouth thoroughly with water; give plenty of water to drink. Never give anything by mouth to an unconscious person. If swallowed, DO NOT induce vomiting. Seek medical attention.
Inhalation:	Remove from exposure, rest and keep warm. In severe cases seek medical attention.
Eye Contact:	Immediately flush eyes with plenty of water for at least 15 minutes – making sure to hold open eyelids. Seek medical attention.
Skin Contact:	Was affected area thoroughly with plenty of running water. Remove contaminated clothing and wash before reuse. If symptoms develop seek medical attention.
First Aid Facilities:	Eye bath/eyewash, Safety shower & general washroom facilities.

Medical Attention & Special Treatment:

Treat symptomatically and supportively.

May cause methemoglobinemia, characterised by chocolate-brown coloured blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heartrate, unconsciousness and possible death.

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

SECTION 5 - FIRE FIGHTING MEASURES

Suitable Extinguishing Media:

Small fire: Use flooding quantities of water. Do not use dry chemicals, CO₂ or foam.

Large fire: Flood area with water from a protected position. Cool containers with water until well after the fire is out. If possible withdraw from the area and let fire burn. Avoid getting water inside containers; a violent reaction may occur. Dam fire control water for later disposal.

Hazards from Combustion Products:

Fire/heat may cause release of toxic fumes such as oxygen, nitrous gasses, and toxic oxides of nitrogen and silver oxides. Shock or friction may cause fire or explosion. Containers may explode when heated. Runoff may create fire or explosion hazard.

Precautions for Fire Fighters:

If safe to do so, remove undamaged containers from that area. Do not move containers that have been exposed to heat or fire. Wear appropriate protective equipment for fire situation, recommended to wear SCBA and chemical splash suit with full breathing apparatus. Structural firefighter's uniform will provide limited protection.

Hazchem Code: 1Y

SECTION 6 - ACCIDENTAL RELEASE MEASURES
--

Emergency Procedures:

Eliminate ignition sources (flame/heat) within at least 15 meters. Do not touch/walk through the product. Stop leaking if safe to do so. Prevent leaking into waterways, drains and confined areas. Prevent entry to spill area by non-essential personnel.

Containment & Clean up:

Wear protective clothing to prevent contact – refer to Section 8.

Try to prevent a dust cloud when collecting material. Use non-sparking tools to collect material and store in a disposable container – all materials used to collect/contain product must be collected and held onto until ready to dispose or recover.

Most organisations using silver compounds collect all silver residues for recovery. Any solids spilt may be swept up for recovery or disposal. Solutions could be washed down a drain with a LARGE quantity of water, or alternatively treated with a salt solution and the resulting silver chloride collected for recovery.

SECTION 7 - HANDLING & STORAGE

Precautions for Safe Handling:

Avoid ingestion and inhalation of vapour dust. Avoid contact with eyes, skin, clothing and other combustible materials. Avoid prolonged or repeated exposure. Application of skin-protective barrier cream recommended. If ingested seek medical advice immediately and when possible show the container or label. Minimise dust generation and accumulation. Use adequate ventilation in workplace. Keep material away from sources of heat and ignition – no smoking. Keep container dry. Wash thoroughly after handling. Remove and wash contaminated clothing before reuse. Discard contaminated shoes. Inform laundry personnel of contaminants hazards.

Precautions for Safe Storage:

Keep container tightly closed when not in use, in a cool, dry, well-ventilated area away from incompatible materials. Keep the container sealed to prevent light and moisture contact. Store at room temperature (15-25°C). Store away from wooden, cardboard and paper surfaces/materials.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

National Exposure Standards: Silver nitrate Cas No. 7761-88-8:
TWA 0.01mg/m³

Engineering Controls:

Use a local exhaust ventilation system.

Personal Protective Equipment:

Respiratory Equipment: Should comply with AS1716 and be selected in accordance with AS1715. In event of emergency a full-face piece SCBA should be used.

Eye Protection: Face shield, chemical goggles or safety glasses with side shields.

Hand Protection: Should comply with AS2161. Excellent gloves made from NR Latex, vinyl or neoprene. Good glove made from Nitrile can also be used.

Body protection: Flame retardant protective clothing is preferred. Long sleeved shirt and pants covered by an apron and in compliance with AS3765 is sufficient.

Hygiene: Always wash hands before smoking, eating, drinking or using the facilities. Was contaminated clothing and other protective equipment before storing or reusing.

SECTION 9 - PHYSICAL & CHEMICAL PROPERTIES

Appearance:	Solid, colourless, transparent, tabular, rhombic crystals or white crystalline powder. Becomes gray or grayish-black when exposed to light in the presence of organic matter.
Odour:	Odourless.
pH:	Aqueous and alcoholic solutions are neutral to litmus: pH5.4-6.4 (100g/l h ₂ o)
Vapour pressure (mm of Hg at °C):	Not volatile.
Vapour density:	5.8 (air = 1)
Boiling point/range (°C):	433°C.
Freezing/melting point (°C):	212°C.
Solubility:	Readily soluble in ammonia water. Soluble in glycerol, diethyl ether and hot alcohol. Very soluble in acetone.
Specific gravity or density:	4.352
Decomposition temperature:	440°C.
Molecular weight:	169.87
Taste:	Bitter, caustic metallic taste.
Flammability:	Not combustible, but assists combustion of other substances.

SECTION 10 - STABILITY AND REACTIVITY

Chemical stability: Stable under normal conditions of use.

Conditions to avoid: Heat, flame, sources of ignition, light, contamination and incompatible materials.

Incompatible Materials:

Reducing agents, combustible materials, organic materials, easily oxidised materials, acetylene + ammonia, acetylidene, alcohols, aldehydes, alkalis, alkali hydroxides, ammonia, ammonium compounds, antimony salts, arenites, benzalkonium chloride, bromides, carbonates, carbides, charcoal, chlorides, chlorosulfonic acid, creosote, ferrous salts, halogenated acids and their salts, hydrazine and derivatives, hydrogen peroxide, hydrogen sulfide, hypophosphites, iodides, magnesium in powdered form (with water), morphine salts, nitriles, non-metals, oils, organic nitro compounds, phosphates, sodium hydroxide, sugars, tannic acid, tannins, tartrates, thimerosal, thiocyanates, vegetable decoctions, and extracts, volatile oils.

Hazardous Decomposition Products:

Oxygen, toxic fumes, nitrous gases, toxic oxides of nitrogen, silver/silver oxides.

Hazardous Reactions:

Reacts with acetylene in presence of ammonia to form silver acetylde, a sensitive powerful detonator when dry. In the absence of ammonia, or when calcium actylide is added to a silver nitrate solution, explosive double salts of silver acetylde and silver nitrate are produced. Mercurous acetylde precipitates silver acetylde from aqueous nitrate. Reaction with chlorosulfonic acid is violent with nitrosulfonic acid being formed. Reduced by hydrogen sulfide in the dark. Easily reduced to metallic silver by ferrous salts, arsenates, hypophosphites, tartrates, sugars, tannins, volatile oils. Dry powdered magnesium and silver nitrate may ignite explosively on contact with a drop of water. Reaction with ammonium hydroxide, sodium hydroxide and stirring may be explosive. Reaction with phosphorus, or sulfur, and shock may be violently explosive. Reaction with charcoal and shock may result in ignition. Highly sensitive explosive is formed when calcium carbide is added to silver nitrate solution. Reaction with alcohols may form and explosive fulminate. When purified phosphine was passed rapidly into a concentrated solution of silver nitrate an explosion occurred.

Hazardous polymerization will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Exposure and Health Effects:

Irritating to eyes, skin and respiratory membranes. People with pre-existing skin conditions, eye problems and/or respiratory function may be more susceptible to irritation.

May cause methemoglobinemia, characterised by chocolate-brown coloured blood, headache, weakness, dizziness, breath shortness, cyanosis (bluish skin due to deficient oxygenation of blood), rapid heartrate, unconsciousness and possible death.

Repeated inhalation may cause lung disease.

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

Ingestion:

Harmful if swallowed. Destructive to tissues of the mucous membranes and upper respiratory tract. Symptoms may include: severe irritation, burning sensation, and coughing, wheezing, laryngitis, shortness of breath, breathing difficulty, headache, nausea, vomiting and possible coma. May be absorbed into the body following inhalation with symptoms paralleling those from ingestion exposure. Dust deposits in the lungs may resemble a form of pneumoconiosis. Inhalation of silver metal dust and fume or of soluble silver compounds may eventually cause argyria, blue-gray discolouration of the skin and mucous membranes, including gum tissue and conjunctiva of the eyes.

Inhalation:

Harmful if inhaled. Corrosive! Swallowing can severe burns of the mouth, throat, stomach and gastrointestinal tract. Can cause sore throat, vomiting, diarrhea. Poison. Symptoms may include: pain and burning in the mouth, blackening of the skin and mucous membranes, throat and abdomen, salivation, vomiting of black material, diarrhea, collapse, shock, coma and death. Ingestion of soluble silver salts may cause agyria. Lethal dose fro humans is 2 grams, or about 28.6mg/kg.

Eye Contact:

Moderate to severe eye irritant. Can cause blurred vision, redness, pain, severe tissue burns and eye damage.

Skin Contact:

May cause desensitisation by skin contact in predisposed people. Symptoms of redness, pain, and severe burn can occur.

Human/Animal data:

Acute Oral Toxicity:

LD50 (Rat): 1173mg/kg.

Lethal dose for humans estimated at 28.6mg/kg.

Eye irritation:

Draize test, rabbit, eye: 1mg Severe;

Draize test, rabbit, eye: 10mg Moderate.

People showing signs of generalized argyria, and who died from an unrelated disease, showed (on autopsy) a deposition of silver in the blood vessel walls, kidneys, testes, pituitary, choroid plexus, and mucous membranes of the nose, macillary antra, trachea and bronchi. Once deposited, there is no known method by which the silver can be eliminated; the pigmentation is permanent and usually noticeable in the conjunctiva of the eye first.

Carcinogenic Category:

Group 2A: Probably carcinogenic to humans.

Other Carcinogenic**Information:**

Nitrate or nitrate (ingested) under conditions that result in endogenous nitrosation are evaluated in the IARC Monographs (Vol. 94; in preparation), is a Group 2A carcinogen.

Laboratory experiments have shown mutagenic effects.

Evidence of reproductive effects.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity:	Highly toxic for aquatic organisms. May cause long term adverse effects in the aquatic environment. Forms corrosive mixtures with water even if diluted.
Persistence and degradability:	Methods for determination of biodegradability are not applicable to inorganic substances.
Bioaccumulative Potential:	BCF: 200; Highly bioaccumulative (Biological Concentration Factor 100-1000).
Environmental Protection:	Do not let the product enter waters, waste water or soil.
Acute Toxicity:	Fish: LC50 (Leuciscus idus): 0.029mg/l /96h. LC50 (Onchorhynchus mykiss): 0.006mg/l /96h. Daphnia: EC50 (Daphnia magna): 0.002mg/l /48h. Algae: IC50 (Scenedesmus sp.): 0.008mg/l /8d. Bacteria: EC10 (Pseudomonas putida): 0.006mg/l /16h.

SECTION 13 - DISPOSAL CONSIDERATIONS**Disposal Methods:**

Dispose of in accordance with local, state and federal government regulations.

Special Precautions/Additional Informational:

All materials that come in contact with the product must either be set aside for recovery or disposed of as a hazardous substance/material. Do not let the product enter waters, waste water or soil.

SECTION 14 - TRANSPORT INFORMATION

UN Number:	UN1493
UN Proper Shipping Name:	Silver nitrate
Class and Subsidiary risk:	5.1
Packing Group:	PG II
Special Precautions for User:	Dangerous goods of Class 5.1 are incompatible for transport with Classes: 1, 2.1, 2.3, 3, 4, 5.2, 7, and 8.
Hazchem Code:	1Y

SECTION 15 - REGULATORY INFORMATION

Poison Schedule Number: S6

SECTION 16 - OTHER INFORMATION

Date of preparation of MSDS: 13 January 2012

Comments:**List of Publications referenced when creating this MSDS;**

- Hazardous Substances Information System Consolidated Lists: Safe Work Australia.
- APPROVED CRITERIA FOR CLASSIFYING HAZARDOUS SUBSTANCES [NOHSC:1008(2004)] 3rd Edition: National Occupational Health and Safety Commission.
- Dangerous Goods - Initial Emergency Response Guide (SAA/SNZ HB76:1997).
- IATA Dangerous Goods Regulations.
- Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)].
- Australia Standard for the Uniform Scheduling of Drugs and Poisons [SUSPD] (Australian Government Department of Health and Ageing).

This Material Safety Data Sheet (MSDS) has been prepared in compliance with the National code of Practice for the Preparation of Material Safety Data Sheets 2nd Edition [NOHSC:2011(2003)]. It is the user's responsibility to determine the suitability of this information for adoption of necessary safety precautions. The information published in this MSDS has been compiled from the publications listed in Section 16: to the best of our ability and knowledge these publications are considered accurate. We reserve the right to revise Material Safety Data Sheets as new information becomes available. Copies may be made for non-profit use.

... End of MSDS ...