

SIGMA-ALDRICH
MATERIAL SAFETY DATA SHEET

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Section 1 - Product and Company Information

Product Name SILVER NITRATE STAIN

Company Dorn & Hart Microedge, Inc

135 W Home Ave

Villa Park, IL 60181

Technical Phone: 630-832-3843

Emergency Phone: 630-248-2138

Section 2 - Composition/Information on Ingredient

Substance Name CAS # SARA 313

SILVER NITRATE 7761-88-8 Yes

Formula AgNO₃

Synonyms Lunar caustic * Nitrate d'argent (French) *

Nitric acid, silver(1+) salt * Silver(1+) nitrate

* Silbernitrat

RTECS Number: VW4725000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Oxidizing. Corrosive. Dangerous for the environment.

Contact with combustible material may cause fire. Causes burns.

Harmful if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Target organ(s): Eyes. Nerves.

HMIS RATING

HEALTH: 3*

FLAMMABILITY: 0

REACTIVITY: 3

SPECIAL HAZARD(S): Oxidizer

NFPA RATING

HEALTH: 3

FLAMMABILITY: 0

REACTIVITY: 3

SPECIAL HAZARD(S): Oxidizer

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

EXPLOSION HAZARDS

Container explosion may occur under fire conditions.

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s): Emits toxic fumes under fire conditions.

Contact with other material may cause fire. May accelerate combustion.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Soak up, sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Keep away from combustible

materials, heat, sparks, and open flame.
Light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Remove and wash contaminated clothing promptly. Discard contaminated shoes.

EXPOSURE LIMITS, RTECS

Country Source Type Value

USA ACGIH TWA 0.01 MG(AG)/M3

USA MSHA Standard-air TWA 0.01 MG(AG)/M3

New Zealand OEL

Remarks: check ACGIH TLV

Section 9 - Physical/Chemical Properties

Appearance Physical State: Liquid

Color: Clear

Property Value At Temperature or Pressure

Molecular Weight 169.88 AMU

pH N/A

BP/BP Range 440 °C

MP/MP Range 212 °C

Freezing Point N/A

Vapor Pressure N/A

Vapor Density N/A

Saturated Vapor Conc. N/A

SG/Density 4.35 g/cm³

Bulk Density N/A

Odor Threshold N/A

Volatile% N/A

VOC Content N/A

Water Content N/A

Solvent Content N/A

Evaporation Rate N/A

Viscosity N/A
Surface Tension N/A
Partition Coefficient N/A
Decomposition Temp. N/A
Explosion Limits N/A
Flammability N/A
Autoignition Temp N/A
Refractive Index N/A
Optical Rotation N/A
Miscellaneous Data N/A
Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Conditions of Instability: May decompose on exposure to light.

Conditions to Avoid: Light.

Materials to Avoid: Strong reducing agents, Alcohols, Ammonia, Magnesium, Strong bases.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Silver/silver oxides, Nitrogen oxides, Oxygen.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes burns.

Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

Ingestion: Harmful if swallowed. Ingestion can cause severe gastroenteritis that may be fatal.

TARGET ORGAN(S) OR SYSTEM(S)

Lungs. Blood. Nerves. Eyes.

SIGNS AND SYMPTOMS OF EXPOSURE

Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer. May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver). Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Material is

extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

TOXICITY DATA

Oral

Rat

1173 mg/kg

LD50

Remarks: Lungs, Thorax, or Respiration:Cyanosis.

Behavioral:Tetany. Gastrointestinal:Hypermotility, diarrhea.

Intraperitoneal

Rat

83 MG/KG

LD50

Oral

Mouse

50 mg/kg

LD50

Intraperitoneal

Mouse

17 MG/KG

LD50

Oral

Guinea pig

473 mg/kg

LD50

Remarks: Lungs, Thorax, or Respiration:Cyanosis.

Behavioral:Tetany. Gastrointestinal:Hypermotility, diarrhea.

IRRITATION DATA

Eyes

Rabbit

1 mg

Remarks: Severe irritation effect

Eyes

Rabbit

10 mg

Remarks: Moderate irritation effect

CHRONIC EXPOSURE - CARCINOGEN

Species: Mouse

Route of Application: Skin

Dose: 15 GM/KG

Exposure Time: 19W

Frequency: I

Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application. Skin and

Appendages: Other: Tumors.

CHRONIC EXPOSURE - MUTAGEN

Result: Laboratory experiments have shown mutagenic effects.

Species: Human

Dose: 76 UMOL/L

Cell Type: lymphocyte

Mutation test: DNA inhibition

Species: Mouse

Route: Intraperitoneal

Dose: 20 GM/KG

Mutation test: DNA inhibition

Species: Hamster

Dose: 60 UMOL/L

Cell Type: Embryo

Mutation test: Morphological transformation.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat

Dose: 28560 MG/KG

Route of Application: Oral

Exposure Time: (17W MALE)

Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Rat

Dose: 13590 UG/KG

Route of Application: Subcutaneous

Exposure Time: (1D MALE)

Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat

Dose: 3398 UG/KG

Route of Application: Intratesticular

Exposure Time: (1D MALE)

Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Paternal

Effects: Testes, epididymis, sperm duct.

Species: Rat

Dose: 400 MG/KG

Route of Application: Intratesticular

Exposure Time: (1D MALE)

Result: Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Mouse

Dose: 13590 UG/KG

Route of Application: Subcutaneous

Exposure Time: (30D MALE)

Result: Paternal Effects: Testes, epididymis, sperm duct.

Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Dog
Dose: 50 MG/KG
Route of Application: Subcutaneous
Exposure Time: (1D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Dog
Dose: 20 MG/KG
Route of Application: Intratesticular
Exposure Time: (1D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Section 12 - Ecological Information

ACCUMULATION

Bioaccumulation Potential: Indication of bioaccumulation.

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish

Species: *Leuciscus idus*

Time: 96 h

Value: 0.029 mg/l

Test Type: LC50 Fish

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Species: *Onchorhynchus mykiss* (Rainbow trout)

Time: 96 h

Value: 0.006 mg/l

Test Type: EC50 Daphnia

Species: *Daphnia magna*

Time: 48 h

Value: 0.002 mg/l

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: None

Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information
EU DIRECTIVES CLASSIFICATION

Symbol of Danger: C-N

Indication of Danger: Corrosive. Dangerous for the environment.

R: 34-50/53

Risk Statements: Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S: 26-45-60-61

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Oxidizing. Corrosive. Dangerous for the environment.

Risk Statements: Contact with combustible material may cause fire. Causes burns. Harmful if swallowed. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Statements: Keep away from combustible material. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US Statements: Target organ(s): Eyes. Nerves.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

DEMINIMIS: 1 %

NOTES: This product is subject to SARA section 313 reporting requirements - silver compounds.

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Dorn & Hart Microedge Inc., shall not be held liable for any damage resulting from handling or from contact with the above product.