

F PHOTOGRAPHERS' FORMULARY

FORMULARY HYPO-ALUM SEPIA TONER (with Potassium Iodide)

Directions for the 1-liter and the 2-liter Kits

Hypo-Alum Sepia Toner produces brown to reddish-brown tones on almost any print. The actual hue that you will obtain depends upon the toning time, upon the paper, and upon the speed of the paper.

Silver nitrate and potassium iodide are both included in this kit although their use is optional: the silver nitrate can be used to decrease the ripening time and the potassium iodide gives a toning solution that yields warmer tones.

There are a number of different formulations in the photographic literature that are called "Hypo-Alum Toners". All of these toners act by the deposition of silver sulfide on the print. They differ from one another principally in the amounts of the ingredients used in their preparation. The formula contained in this kit is equivalent to the Ilford IT-2 toner.

CHEMICALS CONTAINED IN THIS KIT

This kit contains the following chemicals:

Kit Size

Chemical	1 liter	2 liter
Sodium Thiosulfate, pentahydrate	150 g	300 g
Potassium alum (alum)	25 g	50 g
Silver nitrate	.12 g	.24 g
Potassium iodide	1 g	2 g

CHEMICAL SAFETY

All chemicals are dangerous and must be treated with respect. This kit contains one chemical that needs special attention: silver nitrate

Silver Nitrate is both an oxidizer (can supply oxygen to a fire) and a caustic (can cause skin burns). Consult with local sewer and water authorities regarding proper disposal of darkroom chemicals in your area. Clean up any spilled solid silver nitrate with water and dispose of any excess down the drain. Never dispose of solid silver nitrate in a wastepaper basket. If solid silver nitrate comes in contact with the skin, a chemical burn may result. Wash the area with cold water followed by soap and water. Treat any wound in the same manner you would treat a heat burn.

When dilute solutions of silver nitrate are spilled on the skin a brown to brown-black stain results. The color is due to silver metal bound to the protein of the skin and cannot be washed off. While there are chemical methods to remove these brown stains, the best procedure is to just let them wear off.

The user assumes all risks upon accepting these chemicals. IF FOR ANY REASON YOU DO NOT WISH TO ASSUME ALL RISKS, PLEASE RETURN THE CHEMICALS WITHIN 30 DAYS FOR A FULL REFUND.

MIXING THE TONER

You will need a 1 or 2-liter (or larger) mixing bowl and a 1 or 2-liter storage container.

The toning solution is mixed in four separate steps. The first and second steps prepare the toner itself. The third and fourth steps are optional and are explained below.

REPORT NUMBER: 703

VOPAK USA INC.

PAGE: 001

MSDS NO: MZSS230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 11/29/01

VERSION: 002

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 202937

PROD NO : 503233

PHOTOGRAPHERS FORMULARY
C/O MIDWEST TERMINAL
1505 COOLEY

MISSOULA ,MT 59807

VOPAK USA INC.

(425)889-3400

6100 CARILLON POINT

, KIRKLAND

, WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

PRODUCT NAME: SODIUM THIOSULFATE

MSDS NUMBER: MZSS230

EFFECTIVE DATE: 11/21/2001

SUPERSEDES: 1/12/2000

ISSUED BY: 008614

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SODIUM THIOSULFATE

=====

1. PRODUCT IDENTIFICATION

SYNONYMS: SODIUM THIOSULFATE, PENTAHYDRATE; THIOSULFURIC ACID,
DISODIUM SALT, PENTAHYDRATE
CAS NO: 7772-98-7 (ANHYDROUS) 10102-17-7 (PENTAHYDRATE)
MOLECULAR WEIGHT: 248.17
CHEMICAL FORMULA: $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

=====

2. COMPOSITION/INFORMATION ON INGREDIENTS

UCT: SODIUM THIOSULFATE

ORDER NO: 202937
PROD NO : 503233

EDIENT	CAS NO	PERCENT	HAZARDOUS
UM THIOSULFATE	7772-98-7	100%	YES

HAZARDS IDENTIFICATION

GENCY OVERVIEW

ION! MAY BE HARMFUL IF SWALLOWED OR INHALED. MAY CAUSE IRRITATION TO
I, EYES, AND RESPIRATORY TRACT.

NTIAL HEALTH EFFECTS

LATION:
CAUSE IRRITATION TO THE RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE
HING AND SHORTNESS OF BREATH.

STION:
LEVEL OF TOXICITY BY INGESTION. DIARRHEA MAY OCCUR BY INGESTION OF
E QUANTITIES.

I CONTACT:
TATION MAY OCCUR FROM PROLONGED SKIN CONTACT.

CONTACT:
ACT MAY CAUSE MECHANICAL IRRITATION.

INIC EXPOSURE:
INIC EXPOSURE MAY CAUSE SKIN EFFECTS.

AVATION OF PRE-EXISTING CONDITIONS:
NFORMATION FOUND.

IRST AID MEASURES

LATION:
ME TO FRESH AIR. GET MEDICAL ATTENTION FOR ANY BREATHING DIFFICULTY.

STION:
ICE VOMITING IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE
HING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION.

I CONTACT:

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WASH EXPOSED AREA WITH SOAP AND WATER. GET MEDICAL ADVICE IF IRRITATION DEVELOPS.

EYE CONTACT:

WASH THOROUGHLY WITH RUNNING WATER. GET MEDICAL ADVICE IF IRRITATION DEVELOPS.

=====

5. FIRE FIGHTING MEASURES

FIRE:

NOT CONSIDERED TO BE A FIRE HAZARD.

EXPLOSION:

NOT CONSIDERED TO BE AN EXPLOSION HAZARD.

FIRE EXTINGUISHING MEDIA:

USE ANY MEANS SUITABLE FOR EXTINGUISHING SURROUNDING FIRE.

SPECIAL INFORMATION:

USE PROTECTIVE CLOTHING AND BREATHING EQUIPMENT APPROPRIATE FOR THE SURROUNDING FIRE.

=====

6. ACCIDENTAL RELEASE MEASURES

VENTILATE AREA OF LEAK OR SPILL. WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AS SPECIFIED IN SECTION 8, SPILLS: SWEEP UP AND CONTAINERIZE FOR RECLAMATION OR DISPOSAL. VACUUMING OR WET SWEEPING MAY BE USED TO AVOID DUST DISPERSAL.

=====

7. HANDLING AND STORAGE

KEEP IN A TIGHTLY CLOSED CONTAINER, STORED IN A COOL, DRY, VENTILATED AREA. PROTECT AGAINST PHYSICAL DAMAGE. ISOLATE FROM INCOMPATIBLE SUBSTANCES. CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTY SINCE THEY RETAIN PRODUCT RESIDUES (DUST, SOLIDS); OBSERVE ALL WARNINGS AND PRECAUTIONS LISTED FOR THE PRODUCT.

=====

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

AIRBORNE EXPOSURE LIMITS:

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ESTABLISHED.

ILATION SYSTEM:

GENERAL, DILUTION VENTILATION IS A SATISFACTORY HEALTH HAZARD CONTROL THIS SUBSTANCE. HOWEVER, IF CONDITIONS OF USE CREATE DISCOMFORT TO THE ER, A LOCAL EXHAUST SYSTEM SHOULD BE CONSIDERED.

IONAL RESPIRATORS (NIOSH APPROVED):

CONDITIONS OF USE WHERE EXPOSURE TO DUST OR MIST IS APPARENT AND ENGINEERING CONTROLS ARE NOT FEASIBLE, A PARTICULATE RESPIRATOR (NIOSH TYPE OR BETTER FILTERS) MAY BE WORN. IF OIL PARTICLES (E.G. LUBRICANTS, OILING FLUIDS, GLYCERINE, ETC.) ARE PRESENT, USE A NIOSH TYPE R OR P ER. FOR EMERGENCIES OR INSTANCES WHERE THE EXPOSURE LEVELS ARE NOT KNOWN, USE A FULL-FACE POSITIVE-PRESSURE, AIR-SUPPLIED RESPIRATOR.

WARNING: AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN OXYGEN-DEFICIENT ATMOSPHERES.

PROTECTION:

PROTECTIVE GLOVES AND CLEAN BODY-COVERING CLOTHING.

PROTECTION:

SAFETY GLASSES. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN WORK AREA.

PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:

CLINIC, COLORLESS CRYSTALS.

BOILING POINT:

> 100C (> 212F)

SMELL:

LESS.

MELTING POINT:

48C (118F) LOSES WATER @ 100C (212F)

SOLUBILITY:

100 ML WATER @ 4C (39F)

VAPOR DENSITY (AIR=1):

NO INFORMATION FOUND.

SAFETY:

;

VAPOR PRESSURE (MM HG):

NO INFORMATION FOUND.

NO INFORMATION FOUND.

EVAPORATION RATE (BUAC=1):

NO INFORMATION FOUND.

VOLATILES BY VOLUME @ 21C (70F):

PRODUCT: SODIUM THIOSULFATE

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10. STABILITY AND REACTIVITY

STABILITY:
STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE. STABILITY LIMITED IN SOLUTION.

HAZARDOUS DECOMPOSITION PRODUCTS:
OXIDES OF SULFUR AND HYDROGEN SULFIDE.

HAZARDOUS POLYMERIZATION:
WILL NOT OCCUR.

INCOMPATIBILITIES:
SODIUM NITRATE, HALOGENS, AND OXIDIZING AGENTS. REACTS WITH ACIDS TO RELEASE SULFUR DIOXIDE.

CONDITIONS TO AVOID:
INCOMPATIBLES.

11. TOXICOLOGICAL INFORMATION

NO LD50/LC50 INFORMATION FOUND RELATING TO NORMAL ROUTES OF OCCUPATIONAL EXPOSURE.

-----/CANCER LISTS/-----
---NTP CARCINOGEN---

INGREDIENT	KNOWN	ANTICIPATED	IARC CATEGORY
SODIUM THIOSULFATE (7772-98-7)	NO	NO	NONE

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:
NO INFORMATION FOUND.

ENVIRONMENTAL TOXICITY:
NO INFORMATION FOUND.

13. DISPOSAL CONSIDERATIONS

WHATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN

UCT: SODIUM THIOSULFATE

ORDER NO: 202937
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OPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR
AMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS.
E AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL
LATIONS.

USE OF CONTAINER AND UNUSED CONTENTS IN ACCORDANCE WITH FEDERAL, STATE
LOCAL REQUIREMENTS.

TRANSPORT INFORMATION

REGULATED.

REGULATORY INFORMATION

-----/CHEMICAL INVENTORY STATUS - PART 1/-----				
EDIENT	TSCA	EC	JAPAN	AUSTRALIA
UM THIOSULFATE (7772-98-7)	YES	YES	YES	YES

-----/CHEMICAL INVENTORY STATUS - PART 2/-----				
EDIENT	KOREA	DSL	NDSL	PHIL.
UM THIOSULFATE (7772-98-7)	YES	YES	NO	YES

----/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 1/-----				
EDIENT	RQ	TPQ	LIST	CHEMICAL CATG
UM THIOSULFATE (7772-98-7)	NO	NO	NO	NO

----/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 2/-----			
EDIENT	CERCLA	261.33	8(D)
UM THIOSULFATE (7772-98-7)	NO	NO	NO

ICAL WEAPONS CONVENTION: NO TSCA 12(B): NO CDTA: NO
; 311/312: ACUTE: YES CHRONIC: NO FIRE: NO PRESSURE: NO
TIVITY: NO (PURE / SOLID)

RALIAN HAZCHEM CODE: NO INFORMATION FOUND.
ON SCHEDULE: NO INFORMATION FOUND.

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WHMIS: THIS MSDS HAS BEEN PREPARED ACCORDING TO THE HAZARD CRITERIA OF
THE CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS
ALL OF THE INFORMATION REQUIRED BY THE CPR.

=====

16. OTHER INFORMATION

NFPA RATINGS:

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VOPAK USA INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400

05/01/02 14:44 PRODUCT: 503233 CUST NO: 113365 ORDER NO: 202937

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SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM
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RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO
Determine WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY
Borne ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM
PUBLICATION OR USE OF, OR RELIANCE UPON , INFORMATION CONTAINED HEREIN.

INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
Pertain TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
CASES.

*** END OF MSDS ***

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VAN WATERS & ROGERS INC.

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MSDS NO: P16497V

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 11/19/98

VERSION: 004

10-0030

PRODUCT: POTASSIUM ALUM

ORDER NO: 176192

PROD NO : 502257

PHOTOGRAPHERS FORMULARY

CALL IN ADVANCE TO MEET

HC-31

BOX 89

CONDON , MT 59806

VAN WATERS & ROGERS INC. , A ROYAL PAKHOED COMPANY (425)889-3400
6100 CARILLON POINT , KIRKLAND , WA 98033

----- EMERGENCY ASSISTANCE -----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL - CHEMTREC
(800)424-9300

SECTION I PRODUCT IDENTIFICATION

PRODUCT NAME: POTASSIUM ALUM

MSDS #: P16497V

DATE ISSUED: 3/1/97

SUPERSEDES: 10/1/94

ISSUED BY: 000099

SECTION II HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	OSHA ACGIH	OTHER LIMITS	X
	PEL	TLV	RECOMMENDED

Ka1 (SO4)2 12H2O 2Mg(AL)/M3

POTASH ALUM

CRYSTAL SLUM

POTASSIUM ALUMINUM SULFATE

HAZARDOUS SUBSTANCE APPLIES WHEN DISCHARGED INTO

REPORT NUMBER: 703 VAN WATERS & ROGERS INC. PAGE: 002
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PRODUCT: POTASSIUM ALUM

ORDER NO: 176192
PROD NO : 502257

NAVIGABLE WATER, CATEGORY (P) HARMFUL AMOUNT 5000 POUNDS

CAS NO.7784-24-9
HMIS DESIGNATION: 1H, 0F, 0R

SECTION III PHYSICAL CHEMICAL CHARACTERISTICS

BOILING POINT: NA
VAPOR PRESSURE (mm Hg): NA
VAPOR DENSITY (AIR=1): NA
SOLUBILITY IN WATER: Moderate
SPECIFIC GRAVITY (H2O =1): 1.97
MELTING POINT:
EVAPORATION RATE
APPEARANCE AND ODOR colorless, odorless crystal or white powder

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): NA
FLAMMABLE LIMITS: NOT FLAMMABLE
EXTINGUISHING MEDIA: NOT FLAMMABLE

SPECIAL FIRE FIGHTING PROCEDURES: MAY RELEASE SULFUR DIOXIDE OR SULFUR
TRIOXIDE AT HIGH HEAT

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION V REACTIVITY DATA

STABILITY: Stable

INCOMPATIBILITY (Materials to Avoid):

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Sulfur dioxide (SO2) Possibly sulfur
trioxide (SO3)

HAZARDOUS POLYMERIZATION: Will not occur

SECTION VI HEALTH HAZARD DATA

ROUTES OF ENTRY: Inhalation; Irritation
SKIN: Irritation
INGESTION: May be harmful

HEALTH HAZARDS (ACUTE AND CHRONIC): Irritation of skin and mucous membrane

CARCINOGENICITY: N/A NTP: N/A

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PRODUCT: POTASSIUM ALUM

ORDER NO: 176192

PROD NO : 502257

SIGNS AND SYMPTOMS OF EXPOSURE: Irritation possible from inhalation, eye contact or prolonged skin contact.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: N/A

EMERGENCY AND FIRST AID PROCEDURES: Wash skin, flush residue with plenty of water for at least 15 minutes and get medical attention. For ingestion get medical attention.

SECTION VII PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Shovel up and remove, flush residue with water

Neutralize with alkalies

WASTE DISPOSAL: Dissolve in water and flush to waste as permitted by applicable regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store in cool dry place.

OTHER PRECAUTIONS:

SECTION VIII CONTROL MEASURES

INVENTORY PROTECTION (SPECIFY TYPE)

NIOSH APPROVED RESPIRATOR WHERE REQUIRED.

VENTILATION: N/A

LOCAL EXHAUST: As necessary to eliminate dust

PROTECTIVE GLOVES: Rubber or vinyl

EYE PROTECTION: Safety glasses-chemical safety goggles

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Clothing sufficient to protect skin from dust.

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PRODUCT: POTASSIUM ALUM

ORDER NO: 176192

PROD NO : 502257

----- FOR ADDITIONAL INFORMATION -----

CONTACT: MSDS COORDINATOR VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, PACIFIC TIME (425)889-3400

06/14/99 15:01 PRODUCT: 502257 CUST NO: 113365 ORDER NO: 176192

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ARE RESPONSIBLE TO VERIFY THIS DATA UNDER THEIR OWN OPERATING CONDITIONS TO
DETERMINE WHETHER THE PRODUCT IS SUITABLE FOR THEIR PARTICULAR PURPOSES AND THEY
ASSUME ALL RISKS OF THEIR USE, HANDLING, AND DISPOSAL OF THE PRODUCT, OR FROM
THE PUBLICATION OR USE OF, OR RELIANCE UPON, INFORMATION CONTAINED HEREIN.
THIS INFORMATION RELATES ONLY TO THE PRODUCT DESIGNATED HEREIN, AND DOES NOT
RELATE TO ITS USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY OTHER
PROCESS.

*** END OF MSDS ***

10-0030

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

1 Identification of substance:**Product details:**Trade name: Silver nitrate

Stock number: 11414

Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey company
 Johnson Matthey Catalog Company, Inc.
 30 Bond Street
 Ward Hill, MA 01835-8099
 Emergency Phone: (978) 521-6300
 CHEMTREC: (800) 424-9300
 Web Site: www.alfa.com

Information department: Health, Safety and Environmental Department**Emergency information:**

During normal hours the Health, Safety and Environmental Department.
 After normal hours call Chemtrec at (800) 424-9300.

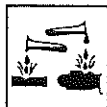
2 Composition/Data on components:**Chemical characterization:****Description:** (CAS#)

Silver nitrate (CAS# 7761-88-8), 100%

Identification number(s):

EINECS Number: 231-853-9

EU Number: 047-001-00-2

3 Hazards identification**Hazard description:**

C Corrosive

O Oxidizing

Information pertaining to particular dangers for man and environment
 R 34 Causes burns.

4 First aid measures**General information**

Immediately remove any clothing soiled by the product.

After inhalation

Supply fresh air. If required, provide artificial respiration. Keep patient warm.

Seek immediate medical advice.

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.

USA

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acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

Trade name: Silver nitrate

(Contd. of page 1)

5 Fire fighting measures

Suitable extinguishing agents Water

Special hazards caused by the material, its products of combustion or resulting gases:

Promotes fire

In case of fire, the following can be released:

Nitrogen oxides (NOx)

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

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

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:

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:

This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

Storage

Requirements to be met by storerooms and receptacles:

No special requirements.

Information about storage in one common storage facility:

Store away from reducing agents.

Do not store together with alkalies (caustic solutions).

Further information about storage conditions:

Keep container tightly sealed.

Store in cool, dry conditions in well sealed containers.

Store under lock and key and with access restricted to technical experts or their assistants only.

USA

(Contd. on page 3)

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

Trade name: Silver nitrate

(Contd. of page 2)

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, soluble compounds, as Ag

	mg/m3
ACGIH TLV	0.01
Belgium TWA	0.1
France TWA	0.1
Germany TWA	0.01 (inhalable fraction of the aerosol)
Netherlands TWA	0.01
Switzerland TWA	0.01
United Kingdom TWA	0.01
Russia TWA	1-STEL
Denmark TWA	0.01
Finland TWA	0.1
Ireland TWA	0.01
USA PEL	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.

Avoid contact with the eyes and skin.

Breathing equipment:

Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves

Eye protection:

Safety glasses

Tightly sealed goggles

Full face protection

Body protection: Protective work clothing.

9 Physical and chemical properties:

Form:	Crystalline
Color:	White
Odor:	Odorless

Change in condition

Melting point/Melting range: Not determined

Boiling point/Boiling range: 444°C (831°F) (dec)

Sublimation temperature /

start: Not determined

(Contd. on page 4)

USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

Trade name: Silver nitrate

(Contd. of page 3)

Flash point:	Not applicable
Flammability (solid, gaseous)	Contact with combustible material may cause fire.
Ignition temperature:	Not determined
Decomposition temperature:	Not determined
Danger of explosion:	Product does not present an explosion hazard.
Explosion limits:	
Lower:	Not determined
Upper:	Not determined
Vapor pressure:	Not determined
Density at 20°C (68°F):	4.352 g/cm ³
Solubility in / Miscibility with Water at 0°C (32°F):	1220 g/l

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:

Reducing agents, easily oxidized materials

Bases

Dangerous reactions Reacts with reducing agents

Dangerous products of decomposition: Nitrogen oxides

11 Toxicological information

Acute toxicity:

LD/LC50 values that are relevant for classification:

Oral	LD50	50 mg/kg (mus)
	LDLo	20 mg/kg (dog)
		800 mg/kg (rbt)

Primary irritant effect:

on the skin:

Corrosive effect on skin and mucous membranes.

Irritant to skin and mucous membranes.

on the eye:

Strong corrosive effect.

Irritating effect.

Sensitization: No sensitizing effects known.

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.

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Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

Trade name: Silver nitrate

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Small doses of nitrates may cause weakness, general depression, headache and mental impairment. Larger doses may cause dizziness, abdominal cramps, vomiting, bloody diarrhea, convulsions and collapse.

Additional toxicological information:

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

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.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

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 for proper disposal.

Uncleaned packagings:**Recommendation:**

Disposal must be made according to official regulations.

14 Transport information**DOT regulations:**

Hazard class:	5.1
Identification number:	UN1493
Packing group:	II
Proper shipping name (technical name):	Silver nitrate

Land transport ADR/RID (cross-border)

ADR/RID class:	5.1 Oxidizing substances
Item:	22b
Danger code (Kemler):	50
UN-Number:	1493

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USA

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 07/10/2001

Reviewed on 01/11/2001

Trade name: Silver nitrate

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Description of goods: Silver nitrate

Maritime transport IMDG:



IMDG Class: 5.1
 UN Number: 1493
 Packaging group: II
 Proper shipping name: Silver nitrate

Air transport ICAO-TI and IATA-DGR:



ICAO/IATA Class: 5.1
 UN/ID Number: 1493
 Packaging group: II
 Proper shipping name: Silver nitrate

15 Regulations

Product related hazard informations:

Hazard symbols:

C Corrosive
 O Oxidizing

Risk phrases:

34 Causes burns.

Safety phrases:

26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

45 In case of accident or if you feel unwell, seek medical advice immediately.

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.

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Reviewed on 01/11/2001

Trade name: Silver nitrate

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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.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Darrell R. Sanders

USA

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HEALTH HAZARD DATA (CONTINUED)

X INGESTION: HARMFUL IF SWALLOWED X POISON _____ SYSTEMIC TOXIC EFFECT _____
MAY CAUSE DISCOMFORT
X OTHER EFFECTS: A HUMAN & EXPERIMENTAL TERATOGEN & AN EXPERIMENTAL REPRODUCTIVE TOXIN:
SEE ABOVE:
TARGET ORGANS: SKIN X EYES X KIDNEYS _____ LIVER _____ BLOOD _____ LUNGS _____ OTHER X
FIRST AID: X EYES: flush with water for 15 minutes. X SKIN: remove contaminated
clothing and wash with soap and water. X INHALATION: remove from exposure
assist breathing. X INGESTION: GIVE WATER. INDUCE VOMITING. GET MEDICAL AID
Seek physician for all overexposures.
PRIMARY ROUTES OF ENTRY: INHALATION _____ SKIN CONTACT X OTHER X
HAZARDOUS INGREDIENTS: N.A.

REACTIVITY DATA

STABILITY: STABLE X UNSTABLE _____
CONDITIONS TO AVOID: HIGH TEMPERATURE
HAZARDOUS DECOMPOSITION PRODUCTS: K_2O , I^-
HAZARDOUS POLYMERIZATION: MAY OCCUR _____ WILL NOT OCCUR X
CONDITIONS TO AVOID:
INCOMPATIBLE MATERIALS: OXIDIZERS, BF_3 , ClF_3 , $FCIO_4$

SPILL OF LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
COLLECT SPILL AND PLACE IN A PROPER CONTAINER FOR DISPOSAL. VENTILATE WELL AND
SCRUB SPILL AREA WITH DETERGENT AND WATER SOLUTION.

WASTE DISPOSAL METHOD: DISPOSE FOLLOWING LOCAL, STATE, AND FEDERAL REGULATIONS.

SPECIAL PROTECTION INFORMATION

NIOSH APPROVED INORGANIC
RESPIRATORY PROTECTION: DUST MASK
VENTILATION: LOCAL EXHAUST
PROTECTIVE GLOVES: CHEMICAL RESISTANT
EYE PROTECTION: SAFETY GOGGLES
OTHER PROTECTIVE EQUIPMENT:
EYE WASH, LAB COAT OR WORK APRON

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
STORE IN CLOSED CONTAINERS IN A COOL, DRY AREA. AVOID CONTACT WITH SKIN AND EYES OR
BREATHING DUST. WASH THOROUGHLY AFTER HANDLING.

NAME: JAMES A. BELL
SIGNATURE: James A. Bell
TITLE: DIRECTOR OF REGULATORY AFFAIRS
DATE: SEPTEMBER 12, 1994

N.D.A. - NO DATA AVAILABLE
N.A. - NOT APPLICABLE