

**PHOTOGRAPHERS'  
FORMULARY**

P.O. Box 950 • Condon MT 59826 • 800-922-5255 • FAX 406-754-2896

**FORMULARY PRINTING-OUT PROCESS**

1/2 liter kit

Printing-out paper (POP), also called salted paper, is a very old technique and was originally developed by Talbot. In the process, paper is first coated with a chloride containing solution. After drying, the paper is then sensitized with silver nitrate, which reacts with the chloride to form light sensitive silver chloride. Upon exposure to ultraviolet light, the silver chloride is converted to silver metal forming the image. Development is not necessary, thus the term "printing-out".

The POP process is self-masking. As the print is exposed to light, silver chloride is converted to silver metal, which shields the unreacted silver chloride remaining on the paper. The effect is the greatest in the shadow areas allowing shadow detail to remain in the final print.

**CHEMICALS CONTAINED IN THIS KIT**

Your kit contains the following chemicals:

Chemical	Amount
Gelatin, soft (75 bloom)	11 g
Sodium citrate	11 g
Ammonium chloride	11 g
Silver nitrate	13 g
Borax	4 g
Gold chloride, 1% solution	8 ml
Potassium dichromate	2 g
Sodium thiosulfate, pentahydrate	50 g

**CHEMICAL SAFETY**

All chemicals are dangerous and must be treated with respect. Please read the warning on each package. Three chemicals in this kit need special attention: silver nitrate, gold chloride, and potassium dichromate.

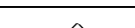



10-0590-10-0600



Gardena, CA

# Material Safety Data Sheet

NFPA	HMIS		Personal Protective Equipment
	Health Hazard	1	 See Section 15.
	Fire Hazard	1	
	Reactivity	0	

## Section 1. Chemical Product and Company Identification

Common Name/ Trade Name	<b>Gelatin</b>	Code	G3050
		CAS#	9000-70-8
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985	RTECS	LX8580000
		TSCA	On the TSCA list.
Commercial Name(s)	Not available	CI#	Not available.
Synonym	Not available.	<b>In case of emergency</b>  <b>CHEMTREC (24hr) 800-424-9300</b>  <b>Emergency phone: (310) 516-8000</b>	
Chemical Name	Not available.		
Chemical Family	Not available.		
Chemical Formula	Not available.		
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985		

## Section 2. Composition and Information on Ingredients

		Exposure Limits			
Name	CAS#	TWA (mg/m3)	STEL (mg/m3)	CEIL (mg/m3)	% by Weight
Gelatin	9000-70-8				100

Toxicological Data on Ingredients      Gelatin:

## Section 3. Hazards Identification

Potential Acute Health Effects      Very slightly to slightly dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic      CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. Toxicity of the product to the reproductive system: Not available. There

**Health  
Effects**

is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition.

**Section 4. First Aid Measures**

**Eye  
Contact**

NO known EFFECT on eye contact, rinse with water for a few minutes.

**Skin  
Contact**

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Hazardous  
Skin  
Contact**

No additional information.

**Inhalation**

Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Hazardous  
Inhalation**

No additional information.

**Ingestion**

Remove dentures if any. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to ingest. Seek medical attention.

**Hazardous  
Ingestion**

No additional information.

**Section 5. Fire and Explosion Data**

**Flammability of the Product**

Combustible.

**Auto-Ignition Temperature**

Not available.

**Flash Points**

Not available.

**Flammable Limits**

Not available.

<b>Products of Combustion</b>	Not available.
<b>Fire Hazards in Presence of Various Substances</b>	No specific information is available in our database regarding the flammability of this product in presence of various materials.
<b>Explosion in Presence of Various Substances</b>	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
<b>Fire Fighting Media and Instructions</b>	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.
<b>Special Remarks on Fire Hazards</b>	No additional remark.
<b>Special Remarks on Explosion Hazards</b>	No additional remark.

#### **Section 6. Accidental Release Measures**

<b>Small Spill</b>	Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
<b>Large Spill</b>	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

#### **Section 7. Handling and Storage**

<b>Precautions</b>	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT breathe dust.
<b>Storage</b>	Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

#### **Section 8. Exposure Controls/Personal Protection**

<b>Engineering Controls</b>	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
<b>Personal Protection</b>	Safety glasses. Lab coat.
<b>Personal</b>	Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient;

Protection in  
Case of a  
Large Spill

Exposure Limits Not available.

#### Section 9. Physical and Chemical Properties

Physical state and appearance	Solid.	Odor	Not available.
Molecular Weight	Not available.	Taste	Not available.
pH (1% soln/water)	Not available.	Color	Not available.
Boiling Point	Not available.		
Melting Point	Decomposes.		
Critical Temperature	Not available.		
Specific Gravity	Not available.		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	Not available.		
Solubility	Not available.		

#### Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

#### Section 11. Toxicological Information

Routes of Entry	Ingestion.
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Toxicity to Animals LD50: Not available. LC50: Not available.

**Chronic Effects  
on Humans**

Toxicity of the product to the reproductive system: Not available.

**Other Toxic  
Effects on Humans**

Very slightly to slightly dangerous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

**Special Remarks on  
Toxicity to Animals**

No additional remark.

**Special Remarks  
on Chronic Effects  
on Humans**

No additional remark.

**Special Remarks  
on other Toxic  
Effects on Humans**

No additional remark.

**Section 12. Ecological Information**

**Ecotoxicity**

Not available.

**BOD5 and COD**

Not available.

**Products of  
Biodegradation**

Not available.

**Toxicity of the  
Products of  
Biodegradation**

The products of degradation are more toxic.

**Special Remarks on  
the Products of  
Biodegradation**

No additional remark.

**Section 13. Disposal Considerations**

**Waste Disposal**

Recycle to process, if possible. Consult your local or regional authorities.

**Section 14. Transport Information**

**DOT Classification**

Not a DOT controlled material (United States).

**Identification**

Not applicable (PIN and PG).

**Special Provisions  
for Transport**

Not applicable.

**DOT (Pictograms)**

**Section 15. Other Regulatory Information and Pictograms**

**Federal and  
State Regulations**

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

NONE

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

**Other Classifications**

WHMIS (Canada)

DSCL (EEC)



Other Classifications

WHMIS (Canada)

DSCL (EEC)

HMIS (U.S.A.)

Health Hazard	<input type="radio"/>
Fire Hazard	<input checked="" type="radio"/>
Reactivity	<input checked="" type="radio"/>
Personal Protection	<input type="radio"/>

National Fire Protection  
Association (U.S.A.)

Health

1	1	0
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Flammability  
Reactivity  
Specific hazard

Personal Protective Equipment



Lab coat.



Safety glasses.

**Section 16. Other Information**

References Not available.

Catalog Number(s) GE105

Other Special  
Considerations No additional remark.

Validated by E. Brull on 12/17/96.

Verified by E. Brull.  
Name

Emergency Phone: (310)516-8000

**Notice to Reader**

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.

MATERIAL SAFETY  
DATA SHEETPHOTOGRAPHERS FORMULARY  
PO BOX 950  
Condon MT 59826

000391

PAGE: 1

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

PRODUCT NAME: SOD CITR DIHYD USP/FCC FG 100#  
CAS NUMBER 994 36 5TRI-ESS SCIENCES, INC.  
1020 W. CHESTNUT STREET  
BURBANK CA 9150605 50 033 9043040-  
DATA SHEET NO: 0030830-002  
LATEST REVISION DATE: 03/86-86063  
PRODUCT: 3921754  
INVOICE: 899659  
INVOICE DATE: 08/10/87  
TO: TRI-ESS SCIENCES, INC.  
1020 W. CHESTNUT STREET  
BURBANK CA 91506

ATTN: PLANT MGR./SAFETY DIR.

## SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: SALTS

DOT HAZARD CLASSIFICATION: NOT APPLICABLE

## SECTION II-COMPONENTS

IF PRESENT, IARC, NTP AND OSHA CARCINOGENS ARE IDENTIFIED IN THIS SECTION  
SEE DEFINITION PAGE FOR CLARIFICATION

INGREDIENT	% (BY WT)	NOTE
SODIUM CITRATE CAS # 994-36-5	>95	(1)

(1); PEL/TLV NOT ESTABLISHED FOR THIS MATERIAL

## SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	NOT APPLICABLE	
VAPOR PRESSURE	NOT APPLICABLE	
SPECIFIC VAPOR DENSITY	NOT APPLICABLE	
SPECIFIC GRAVITY	UNAVAILABLE	
PERCENT VOLATILES	NOT APPLICABLE	
EVAPORATION RATE	NOT APPLICABLE	

## SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT NOT APPLICABLE

EXPLOSIVE LIMIT NOT APPLICABLE

EXTINGUISHING MEDIA: WATER FOG OR CARBON DIOXIDE OR DRY CHEMICAL

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM TOXIC MATERIALS: CARBON DIOXIDE AND CARBON MONOXIDE, VARIOUS HYDROCARBONS, ETC.

FIREFIGHTING PROCEDURES: WEAR SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE WHEN FIGHTING FIRES.

SPECIAL FIRE &amp; EXPLOSION HAZARDS: NOT APPLICABLE

## SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL: NOT ESTABLISHED.

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - MAY CAUSE IRRITATION.  
SKIN - MAY CAUSE IRRITATION.  
BREATHING - OF DUST CAN CAUSE IRRITATION OF NASAL AND RESPIRATORY PASSAGES.  
SWALLOWING - MAY CAUSE GASTROINTESTINAL IRRITATION.

## FIRST AID:

IF ON SKIN: THOROUGHLY WASH EXPOSED AREA WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.

IF IN EYES: FLUSH WITH LARGE AMOUNTS OF WATER, LIFTING UPPER AND LOWER LIDS OCCASIONALLY.

IF SWALLOWED: IMMEDIATELY DRINK TWO GLASSES OF WATER AND INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION IMMEDIATELY.

IF BREATHED: IF AFFECTED, REMOVE INDIVIDUAL TO FRESH AIR. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN. IF BREATHING HAS STOPPED GIVE ARTIFICIAL

MATERIAL SAFETY  
DATA SHEET

TRI-ESS SCIENCES INC.  
1020 W. Chestnut St.  
Burbank, CA 91506  
24-HOUR EMERGENCY TELEPHONE (606) 324-1133



000891

SOD CITR DIHYD USP/FCC FG 100#

PAGE, 2

## SECTION V-HEALTH HAZARD DATA (CONTINUED)

RESPIRATION, KEEP PERSON WARM, QUIET AND GET MEDICAL ATTENTION.

PRIMARY ROUTE(S) OF ENTRY:

INHALATION

## SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION; CANNOT OCCUR

STABILITY; STABLE

INCOMPATIBILITY; NOT APPLICABLE

## SECTION VII-SPILL OR LEAK PROCEDURES

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

SMALL SPILL; SWEEP UP MATERIAL ONTO PAPER.

LARGE SPILL; SHOVEL MATERIAL INTO CONTAINERS. THOROUGHLY SWEEP AREA OF SPILL TO  
CLEAN UP ANY RESIDUAL MATERIAL.

WASTE DISPOSAL METHOD:

SMALL SPILL; DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

LARGE SPILL; DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

## SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION; IF OVEREXPOSURE HAS BEEN DETERMINED OR DOCUMENTED, A  
NIOSH/MSHA JOINTLY APPROVED PARTICULATE RECOVERY RESPIRATOR IS ADVISED IN  
ABSENCE OF PROPER ENVIRONMENTAL CONTROL. (SEE YOUR SAFETY EQUIPMENT SUPPLIER).  
ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE  
EXPOSURE.

VENTILATION; PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST)  
VENTILATION TO MAINTAIN EXPOSURE BELOW LEVEL OF OVEREXPOSURE (FROM KNOWN,  
SUSPECTED OR APPARENT ADVERSE EFFECTS).

PROTECTIVE GLOVES; WEAR RESISTANT GLOVES SUCH AS, NEOPRENE

EYE PROTECTION; CHEMICAL SPLASH GOGGLES IN COMPLIANCE WITH OSHA REGULATIONS ARE  
ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES.  
(CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT; TO PREVENT REPEATED OR PROLONGED SKIN CONTACT, WEAR  
IMPERVIOUS CLOTHING AND BOOTS.

## SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS  
RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS  
GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED  
TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO  
CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND  
SUITABLE TO THEIR CIRCUMSTANCES.

# MATERIAL SAFETY DATA SHEET

TRI-ESS SCIENCES INC.  
1020 W. Chestnut St.  
Burbank, CA 91506  
24-HOUR EMERGENCY TELEPHONE (606) 324-1133



## DEFINITIONS

THIS DEFINITION PAGE IS INTENDED FOR USE WITH MATERIAL SAFETY DATA SHEETS SUPPLIED BY ASHLAND OIL, INC. AND ITS DIVISIONS. RECIPIENTS OF THESE DATA SHEETS SHOULD CONSULT THE OSHA SAFETY AND HEALTH STANDARDS (29 CFR 1910), PARTICULARLY SUBPART G - OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL, AND SUBPART I - PERSONAL PROTECTIVE EQUIPMENT, FOR GENERAL GUIDANCE ON CONTROL OF POTENTIAL OCCUPATIONAL HEALTH AND SAFETY HAZARDS.

### SECTION I PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID; CHEMICAL FAMILY OR PRODUCT DESCRIPTION.

DOT HAZARD CLASSIFICATION; PRODUCT MEETS DOT CRITERIA FOR HAZARDS LISTED.

### SECTION II COMPONENTS

COMPONENTS ARE LISTED IN THIS SECTION IF THEY PRESENT A PHYSICAL OR HEALTH HAZARD AND ARE PRESENT AT OR ABOVE 1% IN THE MIXTURE. IF A COMPONENT IS IDENTIFIED AS A CARCINOGEN BY NTP, IARC OR OSHA AS OF THE DATE ON THE MSDS, IT WILL BE LISTED AND FOOTNOTED IN THIS SECTION WHEN PRESENT AT OR ABOVE 0.1% IN THE PRODUCT. NEGATIVE CONCLUSIONS CONCERNING CARCINOGENICITY ARE NOT REPORTED. ADDITIONAL INFORMATION MAY BE FOUND IN SECTION V. OTHER COMPONENTS MAY BE LISTED IF DEEMED APPROPRIATE.

IDENTITIES OF COMPONENTS LISTED GENERALLY ARE DECLARED TRADE SECRET.

EXPOSURE RECOMMENDATIONS ARE FOR COMPONENTS. OSHA PERMISSIBLE EXPOSURE LIMITS (PELS) AND AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) THRESHOLD LIMIT VALUES (TLVs) APPEAR ON THE LINE WITH THE COMPONENT IDENTIFICATION. OTHER RECOMMENDATIONS APPEAR AS FOOTNOTES.

### SECTION III PHYSICAL DATA

BOILING POINT; OF PRODUCT IF KNOWN. THE LOWEST VALUE OF THE COMPONENTS IS LISTED FOR MIXTURES.

VAPOR PRESSURE; OF PRODUCT IF KNOWN. THE HIGHEST VALUE OF THE COMPONENTS IS LISTED FOR MIXTURES.

SPECIFIC VAPOR DENSITY; COMPARED TO AIR = 1. IF SPECIFIC VAPOR DENSITY OF PRODUCT IS NOT KNOWN, THE VALUE IS EXPRESSED AS LIGHTER OR HEAVIER THAN AIR.

SPECIFIC GRAVITY; COMPARED TO WATER = 1. IF SPECIFIC GRAVITY OF PRODUCT IS NOT KNOWN, THE VALUE IS EXPRESSED AS LESS THAN OR GREATER THAN WATER.

PH; IF APPLICABLE.

PERCENT VOLATILES; PERCENTAGE OF MATERIAL WITH INITIAL BOILING POINT BELOW 425 DEGREES FAHRENHEIT.

EVAPORATION RATE; INDICATED AS FASTER OR SLOWER THAN ETHYL ETHER, UNLESS OTHERWISE STATED.

### SECTION IV FIRE AND EXPLOSION INFORMATION

FLASH POINT; METHOD IDENTIFIED.

EXPLOSION LIMITS; FOR PRODUCT IF KNOWN. THE LOWEST VALUE OF THE COMPONENTS IS LISTED FOR MIXTURES.

HAZARDOUS DECOMPOSITION PRODUCTS; KNOWN OR EXPECTED HAZARDOUS PRODUCTS RESULTING FROM HEATING, BURNING, OR OTHER REACTIONS.

### ADDITIONAL COMMENTS

CONTAINERS SHOULD BE EITHER RECONDITIONED BY CERTIFIED FIRMS OR PROPERLY DISPOSED OF BY APPROVED FIRMS. DISPOSAL OF CONTAINERS SHOULD BE IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS. "EMPTY" DRUMS SHOULD NOT BE GIVEN TO INDIVIDUALS. SERIOUS ACCIDENTS HAVE RESULTED FROM THE MISUSE OF "EMPTIED" CONTAINERS (DRUMS, PAILS, ETC.). REFER TO SECTIONS IV AND IX.

### SECTION IV (CONT.)

EXTINGUISHING MEDIA; FOLLOWING NATIONAL FIRE PROTECTION ASSOCIATION CRITERIA.

FIREFIGHTING PROCEDURES; MINIMUM EQUIPMENT TO PROTECT FIREFIGHTERS FROM TOXIC PRODUCTS OF VAPORIZATION, COMBUSTION OR DECOMPOSITION IN FIRE SITUATIONS. OTHER FIREFIGHTING HAZARDS MAY ALSO BE INDICATED.

SPECIAL FIRE AND EXPLOSION HAZARDS; STATES HAZARDS NOT COVERED BY OTHER SECTIONS.

NFPA CODES; HAZARD RATINGS ASSIGNED BY THE NATIONAL FIRE PROTECTION ASSOCIATION.

### SECTION V HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LIMIT; FOR PRODUCT.

THRESHOLD LIMIT VALUE; FOR PRODUCT.

EFFECTS OF ACUTE OVEREXPOSURE; POTENTIAL LOCAL AND SYSTEMIC EFFECTS DUE TO SINGLE OR SHORT TERM OVEREXPOSURE TO THE EYES AND SKIN OR THROUGH INHALATION OR INGESTION.

EFFECTS OF CHRONIC OVEREXPOSURE; POTENTIAL LOCAL AND SYSTEMIC EFFECTS DUE TO REPEATED OR LONG TERM OVEREXPOSURE TO THE EYES AND SKIN OR THROUGH INHALATION OR INGESTION.

FIRST AID; PROCEDURES TO BE FOLLOWED WHEN DEALING WITH ACCIDENTAL OVEREXPOSURES.

PRIMARY ROUTE OF ENTRY; BASED ON PROPERTIES AND EXPECTED USE.

### SECTION VI REACTIVITY DATA

HAZARDOUS POLYMERIZATION; CONDITIONS TO AVOID TO PREVENT HAZARDOUS POLYMERIZATION RESULTING IN A LARGE RELEASE OF ENERGY.

STABILITY; CONDITIONS TO AVOID TO PREVENT HAZARDOUS OR VIOLENT DECOMPOSITION.

INCOMPATIBILITY; MATERIALS AND CONDITIONS TO AVOID TO PREVENT HAZARDOUS REACTIONS.

### SECTION VII SPILL OR LEAK PROCEDURES

REASONABLE PRECAUTIONS TO BE TAKEN AND METHODS OF CONTAINMENT, CLEAN-UP AND DISPOSAL. CONSULT FEDERAL, STATE AND LOCAL REGULATIONS FOR ACCEPTED PROCEDURES AND ANY REPORTING OR NOTIFICATION REQUIREMENTS.

### SECTION VIII PROTECTIVE EQUIPMENT TO BE USED

PROTECTIVE EQUIPMENT WHICH MAY BE NEEDED WHEN HANDLING THE PRODUCT.

### SECTION IX

#### SPECIAL PRECAUTIONS OR OTHER COMMENTS

COVERS ANY RELEVANT POINTS NOT PREVIOUSLY MENTIONED.



REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 001

MSDS NO: MZA5724

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 08/08/02

VERSION: 003

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

PHOTOGRAPHERS FORMULARY

CALL IN ADVANCE TO MEET

HOLD ON REDDWAY DOCK

CALL BUD TO PICK UP.

CONDON ,MT 59826

UNIVAR 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: AMMONIUM CHLORIDE

MSDS NUMBER: MZA5724

EFFECTIVE DATE: 11/30/01

SUPERSEDES: 4/20/2000

ISSUED BY: 008614

=====

AMMONIUM CHLORIDE

=====

1. PRODUCT IDENTIFICATION

SYNONYMS: SAL AMMONIAC; AMMONIUM MURIATE

CAS NO: 12125-02-9

MOLECULAR WEIGHT: 53.49

CHEMICAL FORMULA: NH4CL

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2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT

CAS NO

PERCENT

HAZARDOUS

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

AMMONIUM CHLORIDE

12125-02-9

99 - 100%

YES

## 3. HAZARDS IDENTIFICATION

## EMERGENCY OVERVIEW

WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. HARMFUL IF SWALLOWED OR INHALED.

## POTENTIAL HEALTH EFFECTS

## INHALATION:

CAUSES IRRITATION TO THE RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE COUGHING, SHORTNESS OF BREATH.

## INGESTION:

CAUSES IRRITATION TO THE GASTROINTESTINAL TRACT. SYMPTOMS MAY INCLUDE NAUSEA, VOMITING AND DIARRHEA.

## SKIN CONTACT:

CAUSES IRRITATION TO SKIN. SYMPTOMS INCLUDE REDNESS, ITCHING, AND PAIN.

## EYE CONTACT:

CAUSES IRRITATION, REDNESS, AND PAIN.

## CHRONIC EXPOSURE:

NO INFORMATION FOUND.

## AGGRAVATION OF PRE-EXISTING CONDITIONS:

NO INFORMATION FOUND.

## 4. FIRST AID MEASURES

## INHALATION:

REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. GET MEDICAL ATTENTION.

## INGESTION:

INDUCE VOMITING IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION.

## SKIN CONTACT:



PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

-----

IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES. GET MEDICAL ATTENTION. WASH CLOTHING BEFORE REUSE. THOROUGHLY CLEAN SHOES BEFORE REUSE.

## EYE CONTACT:

IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER AND LOWER EYELIDS OCCASIONALLY. GET MEDICAL ATTENTION.

=====

## 5. FIRE FIGHTING MEASURES

## FIRE:

NOT CONSIDERED TO BE A FIRE HAZARD.  
AT FIRE TEMPERATURES AMMONIUM CHLORIDE BEGINS TO CORRODE METALS AND MAY DISSOCIATE INTO AMMONIA AND HYDROGEN CHLORIDE. MIXTURES OF ABOUT 16% TO 25% (BY VOLUME) AMMONIA GAS IN AIR ARE FLAMMABLE.

## EXPLOSION:

NOT CONSIDERED TO BE AN EXPLOSION HAZARD.

## FIRE EXTINGUISHING MEDIA:

USE ANY MEANS SUITABLE FOR EXTINGUISHING SURROUNDING FIRE. WATER SPRAY MAY BE USED TO KEEP FIRE EXPOSED CONTAINERS COOL.

## SPECIAL INFORMATION:

IN THE EVENT OF A FIRE, WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN THE PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

=====

## 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. US REGULATIONS (CERCLA) REQUIRE REPORTING SPILLS AND RELEASES TO SOIL, WATER AND AIR IN EXCESS OF REPORTABLE QUANTITIES. THE TOLL FREE NUMBER FOR THE US COAST GUARD NATIONAL RESPONSE CENTER IS (800) 424-8802.

=====

## 7. HANDLING AND STORAGE

KEEP IN A TIGHTLY CLOSED CONTAINER. PROTECT FROM PHYSICAL DAMAGE. STORE IN A COOL, DRY, VENTILATED AREA AWAY FROM SOURCES OF HEAT, MOISTURE AND

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

-----

INCOMPATIBILITIES. 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:

##### AMMONIUM CHLORIDE:

-ACGIH THRESHOLD LIMIT VALUE (TLV):

10 MG/M3 (TWA); 20 MG/M3 (STEL) FUME

##### VENTILATION SYSTEM:

A SYSTEM OF LOCAL AND/OR GENERAL EXHAUST IS RECOMMENDED TO KEEP EMPLOYEE EXPOSURES BELOW THE AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST VENTILATION IS GENERALLY PREFERRED BECAUSE IT CAN CONTROL THE EMISSIONS OF THE CONTAMINANT AT ITS SOURCE, PREVENTING DISPERSION OF IT INTO THE GENERAL WORK AREA. PLEASE REFER TO THE ACGIH DOCUMENT, "INDUSTRIAL VENTILATION, A MANUAL OF RECOMMENDED PRACTICES", MOST RECENT EDITION, FOR DETAILS.

##### PERSONAL RESPIRATORS (NIOSH APPROVED):

IF THE EXPOSURE LIMIT IS EXCEEDED AND ENGINEERING CONTROLS ARE NOT FEASIBLE, A HALF FACEPIECE PARTICULATE RESPIRATOR (NIOSH TYPE N95 OR BETTER FILTERS) MAY BE WORN FOR UP TO TEN TIMES THE EXPOSURE LIMIT OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. A FULL-FACE PIECE PARTICULATE RESPIRATOR (NIOSH TYPE N100 FILTERS) MAY BE WORN UP TO 50 TIMES THE EXPOSURE LIMIT, OR THE MAXIMUM USE CONCENTRATION SPECIFIED BY THE APPROPRIATE REGULATORY AGENCY, OR RESPIRATOR SUPPLIER, WHICHEVER IS LOWEST. IF OIL PARTICLES (E.G. LUBRICANTS, CUTTING FLUIDS, GLYCERINE, ETC.) ARE PRESENT, USE A NIOSH TYPE R OR P FILTER. FOR EMERGENCIES OR INSTANCES WHERE THE EXPOSURE LEVELS ARE NOT KNOWN, USE A FULL-FACEPIECE POSITIVE-PRESSURE, AIR-SUPPLIED RESPIRATOR. WARNING: AIR-PURIFYING RESPIRATORS DO NOT PROTECT WORKERS IN OXYGEN-DEFICIENT ATMOSPHERES.

##### SKIN PROTECTION:

WEAR IMPERVIOUS PROTECTIVE CLOTHING, INCLUDING BOOTS, GLOVES, LAB COAT, APRON OR COVERALLS, AS APPROPRIATE, TO PREVENT SKIN CONTACT.

##### EYE PROTECTION:

USE CHEMICAL SAFETY GOGGLES AND/OR FULL FACE SHIELD WHERE DUSTING OR SPLASHING OF SOLUTIONS IS POSSIBLE. MAINTAIN EYE WASH FOUNTAIN AND QUICK-DRENCH FACILITIES IN WORK AREA.

=====

#### 9. PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

APPEARANCE:  
WHITE POWDER.BOILING POINT:  
520C (968F)ODOR:  
ODORLESS.MELTING POINT:  
338C (640F) SUBLIMES.SOLUBILITY:  
29.7G/100G WATER @ 0C (32F)VAPOR DENSITY (AIR=1):  
1.9SPECIFIC GRAVITY:  
1.53VAPOR PRESSURE (MM HG):  
1.0 @ 160C (320F)PH:  
5.5 (1% AQ.SOL.); 5.1 (3%  
AQ.SOL.); 5.0 (10% AQ.SOL.)EVAPORATION RATE (BUAC=1):  
NO INFORMATION FOUND.% VOLATILES BY VOLUME @ 21C (70F):  
0

## =====

## 10. STABILITY AND REACTIVITY

STABILITY:  
STABLE UNDER ORDINARY CONDITIONS OF USE AND STORAGE.HAZARDOUS DECOMPOSITION PRODUCTS:  
INVOLVEMENT IN A FIRE CAUSES DECOMPOSITION TO FORM HYDROGEN CHLORIDE AND  
AMMONIA.HAZARDOUS POLYMERIZATION:  
WILL NOT OCCUR.INCOMPATIBILITIES:  
CONCENTRATED ACIDS, STRONG BASES, SILVER SALTS, POTASSIUM CHLORATE,  
AMMONIUM NITRATE, BROMINE TRIFLUORIDE AND IODINE HEPTAFLUORIDE. AMMONIUM  
CHLORIDE REACTS EXPLOSIVELY WITH POTASSIUM CHLORATE OR BROMINE TRIFLUORIDE,  
AND VIOLENTLY WITH BROMINE PENTAFLUORIDE, AMMONIUM COMPOUNDS, NITRATES, AND  
IODINE HEPTAFLUORIDE. EXPLOSIVE NITROGEN TRICHLORIDE MAY RESULT FROM  
REACTION OF AMMONIUM CHLORIDE AND HYDROGEN CYANIDE.CONDITIONS TO AVOID:  
HEAT, MOISTURE, INCOMPATIBLES.

## =====

## 11. TOXICOLOGICAL INFORMATION

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

ORAL RAT LD50 : 1650 MG/KG INVESTIGATED AS A MUTAGEN.

## -----/CANCER LISTS/-----

----NTP CARCINOGEN----

INGREDIENT	KNOWN	ANTICIPATED	IARC CATEGORY
AMMONIUM CHLORIDE (12125-02-9)	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 APPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR CONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS. STATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL REGULATIONS.

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

## 14. TRANSPORT INFORMATION

NOT REGULATED.

## 15. REGULATORY INFORMATION

## -----/CHEMICAL INVENTORY STATUS - PART 1/-----

INGREDIENT	TSCA	EC	JAPAN	AUSTRALIA
AMMONIUM CHLORIDE (12125-02-9)	YES	YES	YES	YES

## -----/CHEMICAL INVENTORY STATUS - PART 2/-----

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

-----

INGREDIENT	--CANADA--			
	KOREA	DSL	NSL	PHIL.
AMMONIUM CHLORIDE (12125-02-9)	YES	YES	NO	YES

-----/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 1/-----

INGREDIENT	-SARA 302-		-SARA 313-	
	RQ	TPQ	LIST	CHEMICAL CAT6
AMMONIUM CHLORIDE (12125-02-9)	NO	NO	NO	NO

-----/FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 2/-----

INGREDIENT	CERCLA	-RCRA-	-TSCA-
		261.33	8(D)
AMMONIUM CHLORIDE (12125-02-9)	5000	NO	NO

CHEMICAL WEAPONS CONVENTION: NO    TSCA 12(B): NO    CDTA: NO  
SARA 311/312: ACUTE: YES    CHRONIC: NO    FIRE: NO    PRESSURE: NO  
REACTIVITY: NO    (PURE / SOLID)

AUSTRALIAN HAZCHEM CODE: NO INFORMATION FOUND.  
POISON SCHEDULE: NO INFORMATION FOUND.

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: 2    FLAMMABILITY: 0    REACTIVITY: 0

REVISION INFORMATION:  
MSDS SECTION(S) CHANGED SINCE LAST REVISION OF DOCUMENT INCLUDE: 8.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 008

MSDS NO: MZA5724

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 09/08/02

VERSION: 003

PRODUCT: AMMONIUM CHLORIDE

ORDER NO: 216417

PROD NO : 679831

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

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

09/30/03 14:52

PRODUCT: 679831

CUST NO: 113365

ORDER NO: 216417

----- NOTICE -----

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PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED

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SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM  
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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 \*\*\*



COLUMBUS CHEMICAL INDUSTRIES INC.

P.O. BOX 21  
COLUMBUS, WISCONSIN 53925-0021  
(920) 623-2110  
FAX (920) 623-2577

## Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements

## U.S. Department of Labor

Occupational Safety and Health Administration  
(Non-Mandatory Form)  
Form Approved  
OMB No. 1218-0072

IDENTITY (as Used on Label and List)

Silver Nitrate

**Note:** Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

### Section I

Manufacturers /Distributor Address Number Street City State and Zip Code

Columbus Chemical Industries, Inc.

N4335 Temkin Road

Columbus, WI 53925

Emergency Telephone Number

CHEMTREC 1-800-424-9300

Telephone Number for Information

(920) 623-2140

Date Prepared

01/06/2004

Signature of Preparer (optional)

### Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity, Common Name(s))	CAS #	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Silver Nitrate*	7761-88-8	0.01 mg/m <sup>3</sup> TWA	0.01 mg/m <sup>3</sup> TWA	Not available	>99%

\*Subject to the reporting requirements of SARA Title III Section 313.

### Section III - Physical/Chemical Characteristics

Boiling Point	Decomposes @	440 °C (824 °F)	Specific Gravity (H <sub>2</sub> O = 1)	4.35
Vapor Pressure (mm Hg)		Not available	Melting Point	212 °C (413.6 °F)
Vapor Density (AIR = 1)		5.8	Evaporation Rate (Butyl Acetate = 1)	Not available

Solubility in Water

122 g / 100 cc water @ 0 °C (32 °F)

Appearance and Odor

Colorless to white, odorless crystals.

### Section IV Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Nonflammable		Not applicable	Not applicable

Extinguishing Media

Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

Unusual Fire and Explosion Hazards

Toxic gas of nitrogen oxides and silver oxides may be produced.

**Section V Reactivity Data**

Stability	Unstable		Conditions to Avoid	Light, incompatibles, heat
	Stable	X		and oxygen gas.

**Incompatibility Materials to Avoid**

Combustible materials, bromine trifluoride and trichloride, calcium carbide, magnesium, phosphine, strong reducing agents.

**Hazardous Decomposition or Byproducts**

Oxides of nitrogen, silver oxides.

Hazardous Polymerization	Conditions to Avoid		
	May Occur		Not applicable.
	Will Not Occur	X	

**Section VI Health Hazard Data**

Routes of Entry	Inhalation ?	Skin ?	Ingestion ?
	X	X	X

**Health Hazards (Acute and Chronic)**

SKIN: May cause irritation and may be harmful if absorbed. EYE: Causes eye irritation. INHALATION: May be

Material is irritating to the mucous membranes and upper respiratory tract. May cause severe irritation. INGESTION: harmful if swallowed. Toxic to lungs and mucous membranes. Acute oral toxicity: LD<sub>50</sub> (MOUSE): 50 mg/kg.

Carcinogenicity	NTP	IARC Monographs	OSHA REGULATED?
	Not listed	Not listed	Not listed

**Signs and Symptoms of Exposure.**

EYES: Reddening, tearing, irritation, blindness. SKIN: Skin rash, pain, burns, reddening, dermatitis, ulcerations.

INGESTION: Gastrointestinal pain, diarrhea, nausea, vomiting. INHALATION: Coughing, choking, shortness of breath.

Medical Conditions Generally Aggravated by Exposure Medical conditions that may be aggravated by exposure to this product include: Conjunctivitis of the eye, dermatitis of the skin, asthma, emphysema and other respiratory diseases.

Emergency and First Aid Procedures INGESTION: Wash out mouth with water provided person is conscious. DO NOT INDUCE VOMITING. Call a physician immediately. INHALATION: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. SKIN: Flush with water for at least 15 minutes. Remove contaminated clothing; call a physician. EYES: Flush with large amounts of water for at least 15 minutes, lifting lower and upper eyelids.

**Section VII Precautions for Safe Handling and Use**

Steps to be Taken in Case Material is Released or Spilled Evacuate area. Wear NIOSH/MSHA-approved respirator, chemical-resistant goggles, rubber boots, apron and rubber gloves. Sweep up, place in a plastic container and hold for waste disposal. Avoid raising dust. Ventilate and wash spill area when complete. Prevent release to environment.

Waste Disposal Method Dispose in accordance with all applicable Federal, state and local regulations.

Precautions to be Taken in Handling and Storing Store in a cool, dry, well-ventilated area in tightly-closed, plainly-labelled containers. Store in a corrosion-resistant container. Protect against physical damage, air and light. Maintain adequate ventilation. Wash thoroughly after handling. Do not ingest or breathe dust. Protect exposed tissues.

Other Precautions Containers, even when empty, will retain residue and vapors. Always obey hazard warnings and handle empty containers as if they were full. Do not store near combustible materials.

**Section VII Control Measures**

Respiratory Protection (Specify Type) NIOSH/MSHA-approved respirator with dust/mist cartridge.

Ventilation	Local Exhaust	Necessary.	Special	Eyewash nearby.
	Mechanical (General)	Recommended.	Other	Safety shower nearby.

Protective Gloves Appropriate chemical-resistant gloves.

Other Protective Clothing or Equipment Lab coat or apron, boots.

Work /Hygienic Practices Contact lenses should not be worn when working with this material. Wash exposed areas thoroughly after handling. Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. Do not ingest or breathe dust. Wash contaminated clothing before reuse. Wash hands prior to eating or smoking.

Columbus Chemical Industries, Inc. ("Columbus") believes that the information herein is factual but it is not intended to be all inclusive. The information relates only to the specific Material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because Columbus has no continuing control over the Material, those handling, storing or using the Material should satisfy themselves that they have current information regarding the particular way the Material is handled, stored and used and that the same is done in accordance with federal, state and local law. COLUMBUS MAKES NO WARRANTY, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION) WARRANTIES WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN OR WITH RESPECT TO FITNESS FOR ANY PARTICULAR USE.

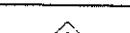



10-0260



Gardena, CA

# Material Safety Data Sheet

NFPA	HMIS	Personal Protective Equipment						
	<table><tr><td>Health Hazard</td><td>(2)</td></tr><tr><td>Fire Hazard</td><td>(0)</td></tr><tr><td>Reactivity</td><td>(0)</td></tr></table>	Health Hazard	(2)	Fire Hazard	(0)	Reactivity	(0)	 See Section 15.
Health Hazard	(2)							
Fire Hazard	(0)							
Reactivity	(0)							

## Section 1. Chemical Product and Company Identification

Common Name/ Trade Name	Sodium borate <i>Borax</i>	Code	S3721
Manufacturer	SPECTRUM CHEMICAL MFG. CORP. 14422 SOUTH SAN PEDRO STREET GARDENA, CALIFORNIA 90248-9985	CAS#	1303-96-4
Commercial Name(s)	Not available	RTECS	SC7310000
Synonym	Sodium pyroborate <i>Borax</i>	TSCA	On the TSCA list.
Chemical Name	Sodium tetraborate decahydrate	CI#	Not available.
Chemical Family	Not available.	<u>In case of emergency</u> CHEMTREC (24hr) 800-424-9300 Emergency phone: (310) 516-8000	
Chemical Formula	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> ·10(H <sub>2</sub> O)		
Supplier	SPECTRUM QUALITY PRODUCTS 14422 S. SAN PEDRO STREET GARDENA, CA 90248-9985		

## Section 2. Composition and Information on Ingredients

		Exposure Limits			
Name	CAS#	TWA (mg/m <sup>3</sup> )	STEL (mg/m <sup>3</sup> )	CEIL (mg/m <sup>3</sup> )	% by Weight
Sodium borate	1303-96-4				100
Toxicological Data on Ingredients	Sodium borate:				

## Section 3. Hazards Identification

Potential Acute Health Effects	Slightly dangerous to dangerous in case of skin contact (irritant), of eye contact (irritant). Very slightly to slightly dangerous in case of skin contact (permeator), of ingestion, of inhalation. This product may irritate eyes and skin upon contact.
Potential Chronic	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. Toxicity of the product to the reproductive system: Not available. There

**Health  
Effects**

is no known effect from chronic exposure to this product. Repeated or prolonged exposure is not known to aggravate medical condition.

**Section 4. First Aid Measures**

**Eye  
Contact**

Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.

**Skin  
Contact**

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical touches the victim's exposed skin, such as the hands: Neutralize exposed skin with a dilute solution of boric acid or acetic acid. Gently and thoroughly wash the contaminated skin with running water and non- abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. COLD water may be used. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

**Hazardous  
Skin  
Contact**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation**

Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Hazardous  
Inhalation**

No additional information.

**Ingestion**

Remove dentures if any. Have conscious person drink several glasses of water or milk. INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. NEVER give an unconscious person anything to ingest. Seek medical attention.

**Hazardous  
Ingestion**

No additional information.

**Section 5. Fire and Explosion Data**

**Flammability of the Product**

Non-flammable.

**Auto-Ignition Temperature**

Not applicable.

**Flash Points**

Not applicable.

**Flammable Limits**

Not applicable.

Products of Combustion	Not applicable.
Fire Hazards in Presence of Various Substances	Not applicable.
Explosion in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. No specific information is available in our database regarding the product's risks of explosion in the presence of various materials.
Fire Fighting Media and Instructions	Non-flammable.
Special Remarks on Fire Hazards	Non combustible.
Special Remarks on Explosion Hazards	No additional remark.

#### Section 6. Accidental Release Measures

Small Spill	Use appropriate tools to put the spilled solid in a convenient waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.
Large Spill	Our database contains no additional information in case of a spill and/or a leak of the product. Use a shovel to put the material into a convenient waste disposal container. Neutralize the residue with a dilute solution of acetic acid. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

#### Section 7. Handling and Storage

Precautions	DO NOT breathe dust. If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes. Keep away from incompatibles as oxidizing agents.
Storage	No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

#### Section 8. Exposure Controls/Personal Protection

Engineering Controls	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Gloves (impervious).
Personal	Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient;

Protection in  
Case of a  
Large Spill

Exposure Limits TWA: 0.31 (ppm) TWA: 5 (mg/m ) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical state and appearance	Solid. (Solid crystalline	Odor	Odorless.
Molecular Weight	381.37	Taste	Not available.
pH (1% soln/water)	10	Color	White.
Boiling Point	Decomposes.		
Melting Point	75.C (167.F)		
Critical Temperature	Not available.		
Specific Gravity	1.73 (Water = 1)		
Vapor Pressure	Not available.		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water.		
Solubility	Soluble in cold water, hot water. Insoluble in methanol.		

Section 10. Stability and Reactivity Data

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	Slightly reactive to reactive with oxidizing agents.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	No additional remark.
Special Remarks on Corrosivity	No additional remark.

Section 11. Toxicological Information

Routes of Entry	Ingestion.
-----------------	------------

Other Classifications

WHMIS (Canada)

DSCL (EEC)

HMIS (U.S.A.)

Health Hazard

0

Fire Hazard

0

Reactivity

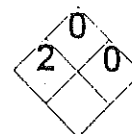
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Personal Protection

0

National Fire Protection  
Association (U.S.A.)

Health



Flammability

Reactivity

Specific hazard

Personal Protective Equipment



Protective Gloves (impervious).



Lab coat.



Splash goggles.

**Section 16. Other Information**

**References** -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.  
-SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.  
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

**Catalog Number(s)** S1180, S1181, S1183, S1185, S1186

**Other Special Considerations** No additional remark.

**Validated by** E. Brull on 12/17/96.

**Verified by** E. Brull.  
**Name**

**Emergency Phone:** (310)516-8000

**Notice to Reader** All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.

Chronic Effects on Humans	Toxicity of the product to the reproductive system: Not available.
Other Toxic Effects on Humans	Slightly dangerous to dangerous in case of skin contact (irritant), of eye contact (irritant). Very slightly to slightly dangerous in case of skin contact (permeator), of ingestion, of inhalation.
Special Remarks on Toxicity to Animals	No additional remark.
Special Remarks on Chronic Effects on Humans	No additional remark.
Special Remarks on other Toxic Effects on Humans	Ingestion of 5-10 grams has produced severe vomiting, diarrhea, shock and death.

## Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Products of Biodegradation	Some metallic oxides.
Toxicity of the Products of Biodegradation	The products of degradation are more toxic.
Special Remarks on the Products of Biodegradation	No additional remark.

## Section 13. Disposal Considerations

Waste Disposal	Recycle to process, if possible. Consult your local or regional authorities.
----------------	--

## Section 14. Transport Information

DOT Classification	Not a DOT controlled material (United States).
Identification	Not applicable (PIN and PG).
Special Provisions for Transport	Not applicable.
DOT (Pictograms)	

**Section 15. Other Regulatory Information and Pictograms**

**Federal and  
State Regulations**

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires emergency planning based on Threshold Planning Quantities (TPQs) and release reporting based on Reportable Quantities (RQs) in 40 CFR 355 (used for SARA 302, 304, 311 and 312). Components present in this product at a level which could require reporting under the statute are:

NONE

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires submission of annual report release of toxic chemicals that appear in 40 CFR 372 (used for SARA 313). This information must be included in all MSDSs that are copied and distributed for this material. Components present in this product at a level which could require reporting under the statute are:

NONE

WARNING: This product contains a chemical known to the State of California to cause cancer. Chemical ingredient(s) requiring this warning:

NONE

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Chemical ingredient(s) requiring this warning: NONE

**Other Classifications**

**WHMIS (Canada)**

**DSCL (EEC)**



**Section 16. Other Information**

**References**

- Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
- SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
- The Sigma-Aldrich Library of Chemical Safety Data, Edition II.

**Catalog Number(s)** S1180, S1181, S1183, S1185, S1186

**Other Special Considerations** No additional remark.

**Validated by** E. Brull on 12/17/96.

**Verified by** E. Brull.  
**Name**

**Emergency Phone:** (310)516-8000

**Notice to Reader**

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum Chemical Mfg. Corp. assumes no responsibility for the completeness or accuracy of the information contained herein.



## SIGMA-ALDRICH

## MATERIAL SAFETY DATA SHEET

Date Printed: 06/17/2004

Date Updated: 03/10/2004

Version 1.2

## Section 1 - Product and Company Information

Product Name	GOLD(I) CHLORIDE, 99.9%
Product Number	481130
Brand	ALDRICH
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS MO 63103 US
Technical Phone:	314 771 5765
Emergency Phone:	414 273 3850 Ext. 5996
Fax:	800 325 5052

## Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
GOLD(I) CHLORIDE, 99.9%	10294-29-8	No
Formula	AuCl	

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Corrosive.

Causes burns. May cause sensitization by skin contact.

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 not breathing give artificial respiration. If breathing is difficult, give oxygen.

## EYE EXPOSURE

Assure adequate flushing of the eyes by separating the eyelids with fingers.

## Section 5 - Fire Fighting Measures

## FLASH POINT

N/A

## AUTOIGNITION TEMP

N/A

## FLAMMABILITY

N/A

## EXTINGUISHING MEDIA

Suitable: Dry chemical powder.

## 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.

---

## 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

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: Avoid inhalation. Do not get in eyes, on skin, on clothing.

### STORAGE

Suitable: Keep tightly closed. Store in a cool dry place.

---

## Section 8 - Exposure Controls / PPE

---

### ENGINEERING CONTROLS

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

### PERSONAL PROTECTIVE EQUIPMENT

Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing. Faceshield (8-inch minimum).

### GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

---

## Section 9 - Physical/Chemical Properties

---

Appearance	N/A	
Property	Value	At Temperature or Pressure
Molecular Weight	232.42 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	289 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	7.57 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
Flash Point	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

Stable: Stable.

Materials to Avoid: Reducing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Decomposes on heating to chlorine gas, hydrogen chloride and metallic gold.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

---

## Section 11 - Toxicological Information

---

### ROUTE OF EXPOSURE

Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption.

### SENSITIZATION

Skin: May cause allergic skin reaction.

### SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause stomatitis, metallic taste, itching, erythema, eczema, erythema multiforme, exfoliative dermatitis, thrombocytopenia, leucopenia, agranulocytosis, and aplastic anemia. Exposure can also cause a gray-to-blue pigmentation (chrysiasis) in the skin and mucous membranes, especially in areas exposed to light. Gold deposits may occur in the eyes causing keratitis and corneal ulceration.

---

## Section 12 - Ecological Information

---



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## Section 13 - Disposal Considerations

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APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Catalysts and expensive metals should be recovered for reuse or recycling. Observe all federal, state, and local environmental regulations.

---

Section 14 - Transport Information

---

DOT

Proper Shipping Name: Corrosive solid, acidic,  
inorganic, n.o.s.  
UN#: 3260  
Class: 8  
Packing Group: Packing Group II  
Hazard Label: Corrosive  
PIH: Not PIH

IATA

Proper Shipping Name: Corrosive solid, acidic,  
inorganic, n.o.s.  
IATA UN Number: 3260  
Hazard Class: 8  
Packing Group: II

---

Section 15 - Regulatory Information

---

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: C  
Indication of Danger: Corrosive.  
R: 34 43  
Risk Statements: Causes burns. May cause sensitization by skin contact.  
S: 26 27 36/37/39 45  
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take off immediately all contaminated clothing. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Corrosive.  
Risk Statements: Causes burns. May cause sensitization by skin contact.  
Safety Statements: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take off immediately all contaminated clothing. Wear suitable protective clothing, gloves, and eye/face protection.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

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. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.







10-1000  
COLUMBUS CHEMICAL INDUSTRIES INC.

P.O. BOX 8  
COLUMBUS, WISCONSIN 53925-0008  
(920) 623-2140  
FAX (920) 623-2577

## Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements

## U.S. Department of Labor

Occupational Safety and Health Administration  
(Non-Mandatory Form)  
Form Approved  
OMB No. 1218-0072

### IDENTITY (as Used on Label and List)

### Potassium Dichromate

**Note:** Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

#### Section I

Manufacturers /Distributor Address Number Street City State and Zip Code

Columbus Chemical Industries, Inc.

N4335 Temkin Road

Columbus, Wisconsin 53925

Emergency Telephone Number

CHEMTREC: 1 (800) 424-9300

Telephone Number for Information

1 (920) 623-2140

Date Prepared

04-26-2005

Signature of Preparer (optional)

#### Section II - Hazardous Ingredients/Identity Information

Hazardous Components

(Specific Chemical Identity, Common Name(s))

CAS #

OSHA PEL

ACGIH TLV

Other Limits

Recommended % (optional)

Potassium Dichromate\* \*\*

7778-50-9

0.1 mg/m<sup>3</sup>

0.05 mg/m<sup>3</sup>

0.001 mg/m<sup>3</sup>

as CrO<sub>3</sub>

as Cr

REL 10hr

\*Subject to SARA Section 313 Reporting Requirements.

\*\* Synonyms: Potassium Bichromate, Bichromate of Potash

#### Section III - Physical/Chemical Characteristics

Boiling Point	500°C(932°F)	Specific Gravity (H <sub>2</sub> O = 1)	Not available
Vapor Pressure (mm Hg)	Not available	Melting Point	398°C(748°F)
Vapor Density (AIR = 1)	Not available	Evaporation Rate (Butyl Acetate = 1)	Not available

Solubility in Water

Soluble, 10.5% w/w @ 20°C

Appearance and Odor

Orange-red, odorless solid

#### Section IV Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Nonflammable		Not applicable	Not applicable

Extinguishing Media

Suitable to extinguish the supporting flame. Water spray, dry chemical, carbon dioxide, alcohol foam.

Special Fire Fighting Procedures

In the event of a fire, wear full protective clothing and NIOSH/MSHA-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Prevent contact with skin and eyes.

Unusual Fire and Explosion Hazards

May emit toxic fumes under fire conditions. Oxidizer. Reacts explosively with Hydrazine and anhydrous Hydroxylamine

**Section V Reactivity Data**

Stability	Unstable		Conditions to Avoid	Incompatibles.
	Stable	X		

**Incompatibility Materials to Avoid**

Reducing agents, combustible materials, organic materials, acids, metals and alkalis.

**Hazardous Decomposition or Byproducts**

Potassium, potassium oxide.

**Hazardous Polymerization****Conditions to Avoid**

	May Occur		None
	Will Not Occur	X	

**Section VI Health Hazard Data**

Routes of Entry	Inhalation ?	Skin ?	Ingestion ?
	Yes	Yes	Yes

**Health Hazards (Acute and Chronic)**

Skin: Corrosive, permeator, sensitizer. Eyes: severe corrosive, may cause permanent corneal damage. Inhalation:

corrosive, prolonged inhalation may cause asthma. May result in impaired kidney and liver function. Ingestion:

Causes severe irritation, This material is a known carcinogen.

Carcinogenicity	NTP	IARC Monographs	OSHA REGULATED?
	Known	Known Group 1	Chromium

**Signs and Symptoms of Exposure.**

Burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting, erythema, blisters, tissue destruction, bloody diarrhea, edema, convulsions, bronchitis, pneumonia, cardiovascular collapse, shock and death.

**Medical Conditions Generally Aggravated by Exposure**

Asthma, emphysema, other respiratory diseases.

**Emergency and First Aid Procedures** EYES/SKIN: Flush immediately with plenty of water for at least 15 minutes. Remove

contaminated clothing. Remove contact lenses if possible. Call physician if irritation develops. Wash clothing

before reuse. **INGESTION: DO NOT** induce vomiting. Give several cups of water to conscious victim. Call a physician.

**INHALATION: Move to fresh air.** Give oxygen if breathing is difficult, artificial respiration if not breathing.

**Section VII Precautions for Safe Handling and Use****Steps to be Taken in Case Material is Released or Spilled**

Evacuate unprotected personnel from area. Ventilate spill area. Wear self-contained breathing apparatus, rubber boots, heavy protective gloves and chemical safety goggles. Dampen spilled material to avoid creating dust. Sweep up and place in non combustible container. Flush spill area with water.

**Waste Disposal Method** Dispose in accordance with all applicable Federal, state and local regulations.

**Precautions to be Taken in Handling and Storing**

Keep container tightly closed. Store in corrosion-proof area. Do not get in eyes or on skin or clothing. Do not taste or swallow. Avoid breathing dust. Use only with adequate ventilation. Wash thoroughly after handling. Separate from combustible materials.

**Other Precautions** Do not get in eyes, on clothing. Do not breathe vapor. Use with adequate ventilation. Containers, even when empty, will retain residue. Always obey hazard warnings and handle empty containers as if they were full.

**Section VII Control Measures**

**Respiratory Protection (Specify Type)** NIOSH/MSHA approved dust/mist respirator.

Ventilation	Local Exhaust	Recommended to control dust.	Special	Eye-wash station nearby.
	Mechanical (General)	Recommended.	Other	Safety shower nearby.

**Protective Gloves** Rubber gloves. **Eye Protection** Safety goggles

**Other Protective Clothing or Equipment** Lab coat or apron and rubber boots. Face-shield recommended.

**Work /Hygienic Practices** Wash exposed areas thoroughly after handling. Wash contaminated clothing before reuse.

Do NOT wear contact lenses. Wear appropriate personal protective equipment. Oxidizer! Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure. **CARCINOGEN!!**

Columbus Chemical Industries, Inc. ("Columbus") believes that the information herein is factual but it is not intended to be all inclusive. The information relates only to the specific Material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because Columbus has no continuing control over the Material, those handling, storing or using the Material should satisfy themselves that they have current information regarding the particular way the Material is handled, stored and used and that the same is done in accordance with federal, state and local law. COLUMBUS MAKES NO WARRANTY, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION) WARRANTIES WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN OR WITH RESPECT TO FITNESS FOR ANY PARTICULAR USE.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 001

MSDS NO: MZS5230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

PHOTOGRAPHERS FORMULARY  
CALL IN ADVANCE TO MEET  
7079 HWY 83 N.  
BOX 89  
CONDON ,MT 59826

UNIVAR USA INC.

6100 CARILLON POINT

, KIRKLAND

(425)889-3400

, WA 98033

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

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

PRODUCT NAME: SODIUM THIOSULFATE

MSDS NUMBER: MZS5230

DATE ISSUED: 3/21/2005

SUPERSEDES: 5/22/2002

ISSUED BY: 008614

=====

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:  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$

Distributed by:

Univar USA Inc.

6100 Carillon Point

Kirkland, WA 98033

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 002

MSDS NO: MZS5230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

425-889-3400

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO	PERCENT	HAZARDOUS
SODIUM THIOSULFATE	7772-98-7	100%	YES

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

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

### POTENTIAL HEALTH EFFECTS

#### INHALATION:

MAY CAUSE IRRITATION TO THE RESPIRATORY TRACT. SYMPTOMS MAY INCLUDE COUGHING AND SHORTNESS OF BREATH.

#### INGESTION:

LOW LEVEL OF TOXICITY BY INGESTION. DIARRHEA MAY OCCUR BY INGESTION OF LARGE QUANTITIES.

#### SKIN CONTACT:

IRRITATION MAY OCCUR FROM PROLONGED SKIN CONTACT.

#### EYE CONTACT:

CONTACT MAY CAUSE MECHANICAL IRRITATION.

#### CHRONIC EXPOSURE:

CHRONIC EXPOSURE MAY CAUSE SKIN EFFECTS.

#### AGGRAVATION OF PRE-EXISTING CONDITIONS:

NO INFORMATION FOUND.

## 4. FIRST AID MEASURES

#### INHALATION:

REMOVE TO FRESH AIR. GET MEDICAL ATTENTION FOR ANY BREATHING DIFFICULTY.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 003

MSDS NO: MZS5230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

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INGESTION:

INDUCE VOMITING IMMEDIATELY AS DIRECTED BY MEDICAL PERSONNEL. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTENTION.

SKIN CONTACT:

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.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 004

MSDS NO: MZS5230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

AIRBORNE EXPOSURE LIMITS:  
NONE ESTABLISHED.

VENTILATION SYSTEM:

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

PERSONAL RESPIRATORS (NIOSH APPROVED):

FOR CONDITIONS OF USE WHERE EXPOSURE TO DUST OR MIST IS APPARENT AND ENGINEERING CONTROLS ARE NOT FEASIBLE, A PARTICULATE RESPIRATOR (NIOSH TYPE N95 OR BETTER FILTERS) MAY BE WORN. IF OIL PARTICLES (E.G. LUBRICANTS, CUTTING FLUIDS, GLYCERINE, ETC.) ARE PRESENT, USE A NIOSH TYPE R OR P FILTER. 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.

SKIN PROTECTION:

WEAR PROTECTIVE GLOVES AND CLEAN BODY-COVERING CLOTHING.

EYE PROTECTION:

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

=====

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:

MONOCLINIC, COLORLESS CRYSTALS.

BOILING POINT:

> 100C (> 212F)

ODOR:

ODORLESS.

MELTING POINT:

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

SOLUBILITY:

79G/100 ML WATER @ 4C (39F)

VAPOR DENSITY (AIR=1):

NO INFORMATION FOUND.

DENSITY:

1.75

VAPOR PRESSURE (MM HG):

NO INFORMATION FOUND.

PH:

NO INFORMATION FOUND.

EVAPORATION RATE (BUAC=1):

NO INFORMATION FOUND.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 005

MSDS NO: MZ55230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

-----  
% VOLATILES BY VOLUME @ 21C (70F):  
0

=====

#### 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\-----

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

=====

#### 12. ECOLOGICAL INFORMATION

##### ENVIRONMENTAL FATE:

NO INFORMATION FOUND.

##### ENVIRONMENTAL TOXICITY:

NO INFORMATION FOUND.

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 006

MSDS NO: MZ55230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

## 13. DISPOSAL CONSIDERATIONS

WHATEVER CANNOT BE SAVED FOR RECOVERY OR RECYCLING SHOULD BE MANAGED IN AN APPROPRIATE AND APPROVED WASTE DISPOSAL FACILITY. PROCESSING, USE OR CONTAMINATION OF THIS PRODUCT MAY CHANGE THE WASTE MANAGEMENT OPTIONS. STATE AND LOCAL DISPOSAL REGULATIONS MAY DIFFER FROM FEDERAL DISPOSAL REGULATIONS.

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

## 14. TRANSPORT INFORMATION

NOT REGULATED.

## 15. REGULATORY INFORMATION

-----\CHEMICAL INVENTORY STATUS - PART 1\-----				
INGREDIENT	TSCA	EC	JAPAN	AUSTRALIA
SODIUM THIOSULFATE (7772-98-7)	YES	YES	YES	YES

-----\CHEMICAL INVENTORY STATUS - PART 2\-----				
INGREDIENT	KOREA	--CANADA--		PHIL.
		DSL	NSL	
SODIUM THIOSULFATE (7772-98-7)	YES	YES	NO	YES

-----\FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 1\-----				
INGREDIENT	-SARA 302-		-SARA 313-	
	RQ	TFQ	LIST	CHEMICAL CATG
SODIUM THIOSULFATE (7772-98-7)	NO	NO	NO	NO

-----\FEDERAL, STATE & INTERNATIONAL REGULATIONS - PART 2\-----			
INGREDIENT	CERCLA	-RCRA-	-TSCA-
		261.33	8(D)
SODIUM THIOSULFATE (7772-98-7)	NO	NO	NO

CHEMICAL WEAPONS CONVENTION: NO      TSCA 12(B): NO      COTA: NO



REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 007

MSDS NO: MZS5230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

-----  
SARA 311/312: ACUTE: YES CHRONIC: NO FIRE: NO PRESSURE: NO  
REACTIVITY: NO (PURE / SOLID)

AUSTRALIAN HAZCHEM CODE: NONE ALLOCATED.  
POISON SCHEDULE: NONE ALLOCATED.

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.

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#### 16. OTHER INFORMATION

NFPA RATINGS:

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

REPORT NUMBER: 703

UNIVAR USA INC.

PAGE: 008

MSDS NO: MZ55230

MATERIAL SAFETY DATA SHEET

MAINFRAME UPLOAD DATE: 03/30/05

VERSION: 004

PRODUCT: SODIUM THIOSULFATE

ORDER NO: 231068

PROD NO : 503233

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

CONTACT: MSDS COORDINATOR

UNIVAR USA INC.

DURING BUSINESS HOURS, PACIFIC TIME

(425)889-3400

04/25/05 15:42

PRODUCT: 503233

CUST NO: 113365

ORDER NO: 231068

----- NOTICE -----

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