Appendix G
(MSDS)

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Alki Clean-S (cooling system cleaning)	Sodium Hydroxide (5%)	004 & 005
Alum (flocculate)	Aluminum Sulfate, N-Hydrate (90% - 100%)	104 & 901
Ammonium Carbonate (chemical cleaning)	Ammonium Carbonate (100%)	901
Ammonium Hydroxide (pH control)	Ammonium Hydroxide (20% - 30%)	104, 401 & 901
Aquatreat DNM-9 (biocide)	Sodium Dimethyldithiocarbamate	004 & 005
Arsenal 240A/LAG (herbicide)	Inerts (70.3%) Isopropylamine Salt of Imazapyr (29.7%)	004 & 005
B-G Tower Chlor Tablets (biocide)	Trichloro-s-triazine trione (99%)	501, 601, 701 & 801
Bio Treat 183 (biocide)	Bromochloro-5, 5-Dimethylhydanton (60%) 1, 3-Dichloro-5, 5-Dimethylhydanton (27.4%) 1, 3-Dichloro-5-Ethyl-5-Methylhydanton (10.6%)	004 & 005

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

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Chemical Product	Chemical Constituents	Applicable Outfalls
Bio Treat 186 (biocide)	Unreacted Sodium Hydroxide (10%)	004 & 005
Bio Treat 189 (biocide)	Water (<85%) Glutaraldehyde (15%) Methanol (<0.15%)	004 & 005
Boric Acid (reactivity control)	Boric Acid (>99%)	101, 104, 201 & 401
Cat Floc T (flocculate)	Cationic Homopolymer (Contains no OSHA Hazardous Constituents)	104, 204, 301 & 901
Caustic Soda (pH control)	Ammonium Hydroxide	104, 401 & 901
CCI0801 (dispersant)	Sulfur-containing polyamide (10% - 30%) Methanol (1% - 5%)	104 & 901
Ceco 350-L (corrosion inhibitor)	Sodium Nitrite (20%) Sodium Borate (2%)	004 & 005

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Ceco 1288 (corrosion inhibitor)	Potassium Hydroxide (10% - 15%) Tolytriazole (1% - 5%) Polymaleic Acid (1% - 10%) 1-Hydroxyethylidene-1,1-diphosphonic Acid (1% - 10%)	004 & 005
Ceco Cide BG-T (biocide)	Alkyl Dimethylbenzylammonium Chloride (13.5%) Tributyltin Neodecanoate (5%) Alkyl Dimethylethylammonium Bromide (1.5%)	004 & 005
Cecotrol 1284 (biocide)	Sodium 2-Mercaptobenzothiazole (1.25%) Potassium Hydroxide (1.55%)	004 & 005
Chlorine (macrofouling)	Chlorine (100%)	001
Chlorine Tablets (disinfection)	Trichloro-s-triazinetrione (99%)	005
Citric Acid (chemical cleaning)	Citric Acid (99% - 100%)	901
CL-50 (corrosion and deposit inhibitor)	Sodium Phosphate, Tribasic	101, 104, 201, 501, 601, 701 & 801

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
CL-103 (deposit penetrant)	Polyoxyethylene-polyoxypropylene copolymer (20%)	101, 104, 201, 501, 601, 701 & 801
CL-363 (deposit penetrant)	Isopropanol (40%)	101, 104, 201, 501, 601, 701 & 801
Clam-Trol CT-2 (macrofouling)	(C12-16) Alkyl Dimethyl Benzyl Ammonium Chloride Ethyl Alcohol (Ethanol)	001
Cleaning Agent M69 (chemical cleaning)	Ethylenediaminetetraacetic Acid	901
Coolite 118 (scale and corrosion inhibitor)	Potassium Hydroxide – Dry Maleic Anhydride, Polymer with Ethyl Acrylate & Vinyl Acetate, Hydrolyzed Hydroxyphosphono - Acetic Acid 2-Propenoic Acid, Polymer with Sodium Phosphinate	004 & 005
Copper Passivating Agent M276 (chemical cleaning)	Proprietary Aqueous Solution of an Amine Salt	901
Copper Solvent Concentrate (chemical cleaning)	Ethylenediamine (14.9%) Ammonium Carbonate (11.2%)	901
Cornite L (corrosion control)	Sodium Nitrite	004 & 005

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Corrosion Inhibitor A251 (chemical cleaning)	Proprietary Mixture of Organic Nitrogen and Organic Sulfur Compounds containing Isopropanol, Thiourea, Inorganic Halogen and Ethylene Glycol Butyl Ether	901
Dimethylamine Hydrochloride (chemical cleaning)	Dimethylamine Hydrochloride (90% - 100%)	901
DTG (Clay) (detoxification)	Respirable Quartz (Crystalline Silica)	001
EC-220 (anti-defoamer)	Polydimethylsiloxane Emulsion Defoamer (Contains no OSHA Hazardous Constituents)	001, 101, 104, 201, 501, 601, 701 & 801
Elimin-Ox Oxygen Scavenger (oxygen control)	Carbohydrazide Water (Contains no OSHA Hazardous Constituents)	104 & 401
Ethylenediamine (chemical cleaning)	Ethylenediamine (>99%)	901
EVAC Biocide (macrofouling)	Mono(N, N-dimethylalkylamine) salt of endothall (53%) Inert Ingredients (47%)	001

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Ferric Ion Corrosion-Control Agent M238 (chemical cleaning)	Proprietary Salt of an Organic Acid	901
H-130 (microbiocide)	Didecyldimethylammonium Chloride (50%) Ethanol (10%)	501, 601, 701 & 801
H-133A (microbiocide)	Ethylene Glycol (40%) n-Dodecylguanidine Hydrochloride (12.25%) Isopropanol (5.25%) Dodecylamine (1.4%)	501, 601, 701 & 801
H-550 (microbiocide)	Glutaraldehyde (50%)	101, 104, 201, 501, 601, 701 & 801
H-940 (microbiocide)	Sodium Bromide (40%)	501, 601, 701 & 801
Hydrazine (oxygen scavenger)	Hydrazine (35%)	104, 401 & 901
Hydrogen Peroxide (oxidizing agent)	Hydrogen Peroxide (30%) Water (70%)	004, 101, 201, 501, 601, 701, 801 & 901

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Iron Solvent Concentrate (chemical cleaning)	Diammonium Ethylene Diamine Tetraacetate (33.6%) Sulfur Containing Polyamide (4.5%) Hydrazine (2.5%)	901
LCS-1200 (corrosion inhibitor)	Sodium Molybdate Dihydrate (5% - 10%) Sodium Tetraborate Pentahydrate (1% - 5%)	101, 104, 201, 501, 601, 701 & 801
Liquid Passivating Agent M240 (chemical cleaning)	Hydrogen Peroxide Water	901
Lithium Hydroxide (pH and corrosion control)	Lithium Hydroxide	101 & 201
MC-140 (chelating agent)	Sodium dimethyldithiocarbamate (40%)	501, 601, 701 & 801
Morpholine (corrosion control)	Morpholine (90% - 100%)	104 & 401
Nalco 7330 (microbiocide)	5-Chloro-2-Methyl-4-Isothiazolin-3-One (1.1%) 2-Methyl-4-Isothiazolin-3-One (0.4%)	101, 104, 201, 501, 601, 701 & 801
Oust (herbicide)	Sulfometuron Methyl (75%) Inert Ingredients (25%)	004

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
PCL-16M (corrosion control)	Sodium Molybdate Dihydrate (30%) Sodium Tetraborate Pentahydrate (0%)	101, 104, 201, 501, 601, 701 & 801
PCL-50 (corrosion inhibitor)	Sodium Tolytriazole (~50%) Sodium Hydroxide (<0.5%)	501, 601, 701 & 801
PCL-361 (penetrant)	Ethoxylated Nonylphenol (5% - 10%) Polyalkylene Glycol	101, 104, 201, 501, 601, 701 & 801
PCL-401 (dispersant)	Anionic Copolymer (Contains no OSHA Hazardous Constituents)	001, 101, 104, 201, 501, 601, 701 & 801
Poly Aluminum Chloride (flocculate)	Aluminum Chlorhydroxide Complex	104 & 901
Pre-Tect 2000 (corrosion inhibitor)	Methoxypropylamine (MPA) (60%)	104 & 401
Pre-Tect 7000 (corrosion inhibitor)	Monoethanolamine (MEA) (40%)	104 & 401
Pre-Tect 9002 (corrosion inhibitor)	Dimethylamine (DMA) (2%)	104 & 401

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Soda Ash (pH control)	Sodium Carbonate (100%)	005
Sodium Bisulfite (dechlorination)	Sodium Bisulfite (90% - 100%)	001, 004, 501, 601, 701 & 801
Sodium Hydroxide (pH control)	Sodium Hydroxide (100%)	004, 101, 104, 201, 501, 601, 701, 801 & 901
Sodium Hypochlorite (biological control)	Sodium Hypochlorite (15%) Sodium Hydroxide (2%)	001, 004, 501, 601, 701 & 801
Sodium Molybdate (corrosion control)	Sodium Molybdate, Dihydrate (90% - 100%)	101, 104, 201, 501, 601, 701 & 801
Sodium Nitrite (corrosion control)	Sodium Nitrite (>97%)	101, 104 & 201
Sodium Phosphate (corrosion control)	Sodium Phosphate, Monobasic, Monohydrate (90% - 100%)	401, 501, 601, 701 & 801

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Sodium Tetraborate Decahydrate (corrosion control)	Sodium Tetraborate Decahydrate (100%)	101, 104, 201, 501, 601, 701 & 801
Sodium Tripolyphosphate (chemical cleaning)	Pentasodium Triphosphate (100%)	901
Sulfuric Acid (pH control & chemical cleaning)	Sulfuric Acid (95% - 98%)	101, 104, 201, 401, 501, 601, 701, 801 & 901
Surfactant F57 (chemical cleaning)	Salt of Sulfonated Aromatic Acid (10% - 30%) Aliphatic Alcohol Glycol Ether (10% - 30%) Water (30% - 60%) Salt of Aromatic Acid (3% - 7%)	901
Thruguard 710 (corrosion control)	Anionic Copolymer (Contains no OSHA Hazardous Constituents)	001
Towerbrom 90M (biocide)	1,3,5-Triazine-2,4,6 (1H, 3H, 5H) –trione, 1,3,5-trichloro	004 & 005
Towerbrom 960 (biocide)	Sodium Dichloroisocyanurate (89%) Sodium Bromide (5% - 10%)	001, 501, 601, 701 & 801

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
Towerchlor (biocide)	Sodium Dichloro-s-triazinetrione (96%)	501, 601, 701 & 801
Towerpro (biocide)	Trichloro-s-triazinetrione (96%)	004 & 005
TRC-256 (corrosion inhibitor)	Sodium Molybdate Dihydrate (30%) Sodium Tetraborate Pentahydrate (1%)	501, 601, 701 & 801
Versene Diammonium EDTA Chelating Agent (chemical cleaning)	Diammonium Salt of Ethylenediaminetetraacetic Acid (45%) Water (55%) (Active ingredients as EDTA Acid - 40%)	901
Vertan 700 Chelant V700 (chemical cleaning)	Proprietary Organic Amine Chelant in Water Trisodium Nitrilotriacetate (<1.5%) Sodium Hydroxide (<1.5%)	901
ZEP Formula 6352 (Car Wash Detergent)	Potassium Dodecylbenzene Sulfonate (<10%)	204
ZEP XT-900 (Car Wash Drying Agent)	Quaternary Ammonium Compounds (10% - 20%) Ethylene Glycol Monobutyl Ether (<10%)	204

WATERFORD 3 MATERIAL SAFETY DATA SHEETS

NPDES PERMIT NO. LA0007374

Chemical Product	Chemical Constituents	Applicable Outfalls
ZEP XT-1398 (Car Wash Presoak)	Sodium Metasilicate (10% - 20%) Ethoxylated Alcohols (5% - 15%) Tetrasodium Ethylenediamine Tetracetate (5% - 15%)	204
Zinc Acetate (corrosion inhibitor)	Zinc Acetate Dihydrate (110%)	101 & 201

SWS SOUTHERN WATER SERVICES, INC.

ALKI CLEAN-S

An Industrial Alkaline Cleaner

PRODUCT DESCRIPTION:

Alki Clean-S is a mixture of detergents, organic dispersives, wetting agents, antifoams and other ingredients effective in removing oily or greasy deposits, and mild scale in new water systems.

APPLICATION AND FEED REQUIREMENTS:

Alki Clean-S is recommended to clean out new installations of cooling towers, steam boilers and closed hot and chill water systems. Alki Clean-S may be fed to the system to be cleaned through any convenient opening. Alki Clean-S dosage requirements are 3 pounds per 500 gallons of contained water. Your S.W.S., Inc. representative should be consulted for proper use of Alki Clean-S.

ALKI CLEAN-S ADVANTAGES:

- Formulated to remove oil, pipe dope and pipe preservatives common in new installations.
- Soluble in hot or cold water
- Odorless

SAFETY PRECAUTIONS:

Should the skin be contacted for a prolonged period, flush with water. If eyes are contacted, flush with water and consult your physician. Contents are alkaline.

Packaged in fiber drums, lever locked, poly bag lining.

263 Hord Street • P.O. Box 23253 • Harahan, LA 70183 • (504) 733-7527

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)
ALKI CLEAN S

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

Manufacturer's Name SOUTHERN WATER SERVICES, INC.	Emergency Telephone Number 1-800-424-9300
Address (Number, Street, City, State, and ZIP Code) 1505 RIVER OAKS ROAD EAST	Telephone Number for Information 504-733-7527
HARAHAN, LA. 70123	Date Prepared 1/91
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Sodium Hydroxide				5.00%

Section III — Physical/Chemical Characteristics

Boiling Point Melting (°F)	236	Specific Gravity (H_2O = 1)	
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (ethel ether =1)	> 1

Solubility in Water: Complete PH of a 1% solution — 12.20

Appearance and Odor: White powder with a distinct detergent odor

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) SETA CC NA	Flammable Limits	LEL	UEL

Extinguishing Media: Water fog, CO_2, Dry chemical

Special Fire Fighting Procedures: Self contained breathing apparatus operated in a positive pressure mode.

Unusual Fire and Explosion Hazards:

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	

Incompatibility (*Materials to Avoid*)
Nitrogen compounds

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion?

Health Hazards (*Acute and Chronic*)

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

Signs and Symptoms of Exposure
Severe eye irritation (redness, blurring, tearing). Moderate Dermatitis

Medical Conditions
Generally Aggravated by Exposure

Emergency and First Aid Procedures
Wash skin with soap and water. flush eyes with water. If ingested dilute with water and contact a physician. Do not induce vomiting.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled
Sweep up solid, flush spill with water.

Waste Disposal Method
Open drain with large amounts of water, or in an approved chemical landfill.

Precautions to Be Taken in Handling and Storing

Other Precautions

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)
NIOSH Dust mask

Ventilation	Local Exhaust	Special
	Mechanical (*General*)	Other

Protective Gloves: Rubber
Eye Protection: Goggles

Other Protective Clothing or Equipment
eye bath and safety shoes

Work/Hygienic Practices

☆U.S. Government Printing Office: 1987—181-804/64362

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: ALUMINUM SULFATE, N-HYDRATE
FORMULA: AL2(SO4)3 NH2O
FORMULA WT: .00
CAS NO.: 17927-65-0
COMMON SYNONYMS: CAKE ALUM
PRODUCT CODES: 0573,0567,0566,0572
EFFECTIVE: 07/30/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
MAY BE HARMFUL IF SWALLOWED

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO
ALUMINUM SULFATE, N-HYDRATE	90-100	17927-65-0

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 86 C (187 F) DECOMPOSES
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 1.60 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE CRYSTALS WITHOUT AN ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE 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.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

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5 - HEALTH HAZARD DATA

ACGIH -(TLV/TWA) AS SOLUBLE SALT.

THRESHOLD LIMIT VALUE (TLV/TWA): 2 MG/M3 (PPM)

TOXICITY: LD50 (IPR-RAT)(MG/KG) - 270
LD50 (ORAL-MOUSE)(MG/KG) - 6207

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST INHALATION MAY CAUSE TIGHTNESS AND PAIN IN CHEST, COUGHING, AND DIFFICULTY IN BREATHING.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
INGESTION MAY CAUSE NAUSEA AND VOMITING.
INGESTION MAY CAUSE GASTROINTESTINAL IRRITATION.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INGESTION, INHALATION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES
INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.

EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR, ALKALI METALS

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

005 03/18/02 AMMONIUM CARBONATE

PRODUCT NAME: AMMONIUM CARBONATE

DS NUMBER: P1616VS

EFFECTIVE DATE: 7/21/2000

SUPERSEDES: 1/1/1998

ISSUED BY: 008558

1. Product Identification
Synonyms:
Carbonic Acid, Diammonium Salt; Diammonium Carbonate; Crystal Ammonia
CAS No.: 506-87-6
Molecular Weight: 96.09
Chemical Formula: $(NH_4)_2CO_3$

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ammonium Carbonate	506-87-6	100%	Yes

3. Hazards Identification
Emergency Overview
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

Potential Health Effects

Inhalation:
Dust may cause irritation of the nose, throat, and lungs. Ammonia vapors leased upon decomposition may cause
:itation of the upper respiratory tract, with coughing, vomiting, and redness to the mucous membranes.
Higher concentrations (1000 ppm) may cause restlessness, tightness in the chest, pulmonary edema, weak pulse,
and cyanosis.
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. Causes burning or serious burns if
decontamination is delayed.
Eye Contact:
Causes irritation, redness, and pain. Causes burning or serious burns if decontamination is delayed.
Chronic Exposure:
No information found.
Aggravation of Pre-existing Conditions:
Persons with pre-existing lung disease may be more susceptible to the effects of this substance.

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:
duce vomiting immediately as directed by medical personnel. Never give thing by mouth to an unconscious
rson.
Skin Contact:
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 lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures
Fire:
Not considered to be a fire hazard.
Explosion:
Generation of ammonia gas may be an explosion hazard.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
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. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment as specified in Section 8.
Spills: Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. 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, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Store below 30C. 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:
For Ammonia:
- OSHA Permissible Exposure Limit (PEL) - 50 ppm
- ACGIH Threshold Limit Value (TLV) - 25 ppm (TWA), 35 ppm (STEL)
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, a full facepiece respirator with an ammonia/methylamine cartridge 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. 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 lashing of solutions is possible.
Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties
Appearance:
Colorless crystal or white powder.
Odor:
Strong ammonia-like odor.
Solubility:
Soluble in water, decomposes in hot water
Specific Gravity:
1.50 @ 20C/4C
pH:
9.0 (100g/L H2O)
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
@ 760 mm Hg (Decomposes)
Melting Point:
58C (136F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
760 @ 60C (140F)
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity
Stability:
Stable under ordinary conditions of use and storage. Becomes unstable upon exposure to air and converts into ammonium bicarbonate. This process liberates ammonia and carbon dioxide.
Hazardous Decomposition Products:
Burning may produce ammonia, carbon monoxide, carbon dioxide, nitrogen oxides. Contact with water or prolonged contact with air may liberate ammonia.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Sodium hypochlorate, acids and acid salts, iron salts, zinc, alkaloids, aluminum and calomel, sodium nitrate and nitrites. Corrosive to nickel, copper and other alloys.
Conditions to Avoid:
Exposure to heat, prolonged exposure to air, contact with water, and incompatibles.

11. Toxicological Information
For Ammonium Carbonate, Oral rat LD50: 2150 mg/kg

--------/Cancer Lists/----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Ammonium Carbonate (506-87-6)	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 facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of hazardous waste and require appropriate analysis to determine specific disposal requirements. 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 Carbonate (506-87-6)	Yes	Yes	Yes	Yes

--------/Chemical Inventory Status - Part 2/--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Ammonium Carbonate (506-87-6)	Yes	Yes	No	Yes

--------/Federal, State & International Regulations - Part 1/--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Ammonium Carbonate (506-87-6)	No	No	No	No

--------/Federal, State & International Regulations - Part 2/--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Ammonium Carbonate (506-87-6)	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: 2

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

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

---------- NOTICE ----------

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* * * E N D O F M S D S * * *

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: AMMONIUM HYDROXIDE
FORMULA: NH4OH
FORMULA WT: 35.05
CAS NO.: 01336-21-6
NIOSH/RTECS NO.: BQ9625000
COMMON SYNONYMS: AMMONIA SOLUTION; AQUA AMMONIA
PRODUCT CODES: 4807,9730,9733,5350,9719,9729,5358,9721,9731,5019,9720,5138
EFFECTIVE: 09/03/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
CAUSES BURNS
MAY BE FATAL IF SWALLOWED
VAPOR EXTREMELY IRRITATING
EXCEPTIONAL HEALTH AND CONTACT HAZARDS - READ MATERIAL SAFETY DATA SHEET
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL, FLUSH SPILL AREA WITH WATER.

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
AMMONIUM HYDROXIDE	20-30	1336-21-6

3 - PHYSICAL DATA

BOILING POINT: N/A VAPOR PRESSURE(MM HG): N/A

MELTING POINT: -78 C (-108 F) VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 0.90 (H2O=1)

EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: CLEAR COLORLESS SOLUTION WITH A STRONG ODOR.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

NFPA 704M RATING: 3-1-0

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE 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. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL; DO NOT GET WATER INSIDE CONTAINERS.

UNUSUAL FIRE & EXPLOSION HAZARDS
GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED
AMMONIA, HYDROGEN GAS

---

5 - HEALTH HAZARD DATA

TOXICITY TEST RESULTS AND SAFETY AND HEALTH EFFECTS ARE BASED ON THE SOLUTE.

THRESHOLD LIMIT VALUE (TLV/TWA): 18 MG/M3 (25 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 27 MG/M3 (35 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 35 MG/M3 (50 PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 350

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OR BURNS OF THE RESPIRATORY SYSTEM, PULMONARY EDEMA, OR LUNG INFLAMMATION.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
PROLONGED EYE CONTACT MAY CAUSE PERMANENT DAMAGE TO THE CORNEA AND

BLINDNESS MAY OCCUR.
INGESTION MAY CAUSE SEVERE BURNING OF MOUTH AND STOMACH.
INGESTION IS HARMFUL AND MAY BE FATAL.

TARGET ORGANS
RESPIRATORY SYSTEM, EYES

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. FOLLOW WITH DILUTED VINEGAR, FRUIT JUICE OR WHITES OF EGGS, BEATEN WITH WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: STRONG ACIDS, ALKALI METALS, STRONG OXIDIZING AGENTS, BROMINE, CHLORINE, ALUMINUM, COPPER, BRASS, BRONZE, MERCURY, DIMETHYL SULFATE

DECOMPOSITION PRODUCTS: AMMONIA

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. CAREFULLY NEUTRALIZE SPILL WITH DILUTE HCL. FLUSH AREA WITH FLOODING AMOUNTS OF WATER. (USE CAUTION.)

J. T. BAKER NEUTRACIT-2(R) CAUSTIC NEUTRALIZER IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002, D003 (CORROSIVE, REACTIVE WASTE)

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 25 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH AMMONIA/AMINE CARTRIDGE AND DUST/MIST FILTER

IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: WHITE STRIPE (STORE SEPARATELY)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA.
STORE BELOW 25 C.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	AMMONIUM HYDROXIDE (12-44% AMMONIA)
HAZARD CLASS	CORROSIVE MATERIAL (LIQUID)
UN/NA	NA2672
LABELS	CORROSIVE
REPORTABLE QUANTITY	1000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	AMMONIA SOLUTIONS (10-35% AMMONIA)
HAZARD CLASS	8
UN/NA	UN2672
LABELS	CORROSIVE

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: ALCO CHEMICAL CORPORATION	EMERGENCY TELEPHONE NO.: 615-629-1405
ADDRESS (Number, Street, City, State, and ZIP Code): 909 Mueller Dr., Chattanooga, TN 37406	
CHEMICAL NAME AND SYNONYMS: Disodium ethylenebis dithiocarbamate/sodium dimethyldithiocarbamate	TRADE NAME AND SYNONYMS: AQUATREAT DNM-9
CHEMICAL FAMILY: blend of carbamates	FORMULA:

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	212°F	SPECIFIC GRAVITY (H_2O=1)	1.03
VAPOR PRESSURE (mm Hg.)	not known	PERCENT, VOLATILE BY VOLUME (%)	9%
VAPOR DENSITY (AIR=1)	not known	EVAPORATION RATE (_____=1)	not known
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Yellow green sulfur		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LFL	UFL

EXTINGUISHING MEDIA
This section not applicable

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: TOXICITY - approx. 2gm/kg Rats

EFFECTS OF OVEREXPOSURE: irritation of skin and eyes possible

EMERGENCY AND FIRST AID PROCEDURES: wash well with water.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		decomposes when acidified
	STABLE		

INCOMPATABILITY *(Materials to avoid)*: strong acids

HAZARDOUS DECOMPOSITION PRODUCTS:

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	XX	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

wash with water; toxic to fish

WASTE DISPOSAL METHOD: as prescribed by local regulations regarding organic chemical wastes.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: wear NIOSH organics mask

VENTILATION				
	LOCAL EXHAUST	yes	SPECIAL	none
	MECHANICAL *(General)*	not normally required	OTHER	none

PROTECTIVE GLOVES	EYE PROTECTION
yes	yes

OTHER PROTECTIVE EQUIPMENT:

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

avoid skin and eye contact

OTHER PRECAUTIONS:

GPO 934-150

Form OSHA-20
Rev. May 72

AMERICAN CYANAMID CO.
PARSIPPANY, NJ 07054

MATERIAL SAFETY DATA SHEET (VENEZUELA)

MSDS NO. IN03465-6
CAS NO. 081510-83-0

DATE: MAR 27, 1997

EMERGENCY TELEPHONE: 58-36-22-02-93
(201)-835-3100 (U.S.A.)

PRODUCT IDENTIFICATION	TRADE NAME: ARSENAL® 240A/LAG
	SYNONYMS: 2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2-yl)nicotinic acid, salt with isopropylamine (1:1)· 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid, salt with 2-propanamine (1:1); AC252,925; Imazapyr; Isopropylamine Salt; CL252,925
	CHEMICAL FAMILY: Imidazolinone
	MOLECULAR FORMULA: $C_{13}H_{15}N_3O_3 . C_3H_9N$
	MOLECULAR WEIGHT: 320.400
	USAGE: Herbicide

WARNING STATEMENTS	**CAUTION!** **KEEP OUT OF REACH OF CHILDREN.** **AVOID CONTACT WITH SKIN, EYES, AND CLOTHING.** **AVOID BREATHING SPRAY MIST.**

INGREDIENTS

COMPONENT	CAS. NO.	%	PEL/TLV
Inerts		70.30	
Isopropylamine Salt of Imazapyr	081510-83-0	29.70	None Established

REFERENCE: Inerts
Isopropylamine Salt of Imazapyr None

PHYSICAL PROPERTIES	APPEARANCE AND ODOR: Clear, slightly viscous, pale yellow to dark green aqueous liquid; slight ammoniacal odor.
	BOILING POINT: Not Available
	MELTING POINT: Not Applicable
	VAPOR PRESSURE: Not Available
	SPECIFIC GRAVITY: 1.06 - 1.09
	VAPOR DENSITY: Not Available
	% VOLATILITY (BY VOL.): ~ 70
	OCTANOL / H_2O at 22°C PARTITION COEF.: 1.3 for the active ingredient

(cont from pg. 1)

PH:	6.0 - 7.5
SATURATION IN AIR (BY VOL.):	Not Available
EVAPORATION RATE:	Not Available
SOLUBILITY IN WATER:	Miscible

FIRE AND EXPLOSION HAZARD INFORMATION

FLASH POINT:	> 98.9°C > 210°F (SETA Closed Cup)
FLAMMABLE LIMITS (% BY VOL.):	Not Applicable
AUTOIGNITION TEMP:	> 93°C (200°F)
DECOMPOSITION TEMP:	Not Available

FIRE EXTINGUISHING MEDIA:
Use water, foam; dry chemical or carbon dioxide to extinguish fires.

FIRE CONTROL TACTICS:
Wear self-contained, positive pressure breathing apparatus and full fire fighting protective clothing.

Keep unnecessary people away. Use as little water as possible. Dike area of fire to prevent pesticide run-off. Use spray or fog - solid stream may cause spreading.

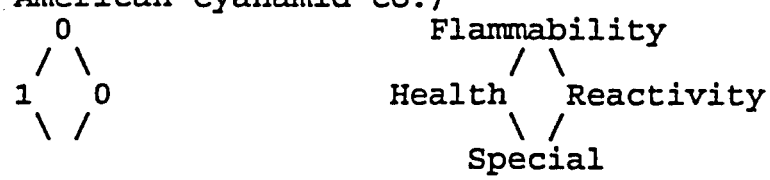
Do not decontaminate personnel or equipment, or handle broken packages or containers without protective equipment as specified in the Exposure Control Section. Decontaminate emergency personnel with soap and water before leaving the fire area.

Avoid breathing dusts, vapors and fumes from burning materials. Control run-off water - if water enters a drainage system, advise the authorities downstream.

NFPA HAZARD RATING

(As Recommended by American Cyanamid Co.)

0 Least
1 Slight
2 Moderate
3 High
4 Severe



REACTIVITY DATA

STABILITY:	Stable
POLYMERIZATION:	Will not occur
INCOMPATIBLE MATERIALS:	Strong oxidizing and reducing agents. Corrosive to mild steel and brass.
HAZARDOUS DECOMPOSITION PRODUCTS:	Combustion may produce oxides of carbon and nitrogen.

HEALTH HAZARD INFORMATION

TOXICITY DATA AND EFFECTS OF OVEREXPOSURE:

ACUTE TOXICITY DATA:
The acute oral LD_{50} for both male and female albino rats is greater than 5000 mg/kg indicating that this material is no more than slightly toxic if ingested.

The acute dermal LD_{50} for both male and female albino rabbits is greater than 2148 mg/kg indicating that this material is no more than slightly toxic by single skin applications.

This formulation is irritating to the rabbit eye and is mildly irritating to the rabbit skin.

CHRONIC TOXICITY DATA:
Mutagenicity: No mutagenic activity was observed in Imazapyr Technical by all test methods used. These included unscheduled DNA Synthesis Rat Hepatocyte Assay, in vitro Chinese Hamster Ovary (CHO)/ Hypoxanthine Guanine Phosphoriboxyl Transferase (HGPRT) Mutation Assay, Bacterial/Microsome Reverse Mutation (Ames) Test and in vitro Chromosomal Aberrations in Chinese Hamster Ovary Cells.

Teratogenicity: No teratogenic or fetotoxic effects were found at all dose levels tested in both rats and rabbits.

Carcinogenicity: No oncogenic effects were observed at all dose levels tested in mice and rats.

Imazapyr is not listed as a human carcinogen by the IARC, OSHA or NTP.

Isopropylamine salt present in this formulation is not listed as a human carcinogen by the IARC, OSHA or NTP.

EMERGENCY AND FIRST AID PROCEDURES:

IF ON SKIN: Wash with plenty of soap and water. Get medical attention if irritation persists.

IF IN EYES: Flush with plenty of water. Get medical attention if irritation persists.

IF SWALLOWED: Drink two glasses of water, induce vomiting if the person is conscious. Obtain medical attention promptly.

IF INHALED: Remove to fresh air.

NOTES TO PHYSICIAN:
There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the

(cont from pg. 3) clinical condition.

MEDICAL CONDITION AGGRAVATED BY OVEREXPOSURE:
A knowledge of the available toxicology information and of the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

EXPOSURE CONTROL METHODS

During formulation of this product, use the following recommended industrial hygiene practices:

Wear chemical splash goggles to prevent contact with the eyes. If face-shield is used for protection, chemical splash goggles are still needed to protect the eyes.

Wear rubber gloves and apron to prevent contact with the skin. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

For end-users, refer to product label for personal protective clothing/equipment.

SPILL OR LEAK PROCEDURES

Wearing protective clothing/equipment as per "Exposure Control" section, absorb with an inert material such as clay or sawdust.

WASTE DISPOSAL: Dispose in accord with local, state, and federal regulations.

SPECIAL PRECAUTIONS

HANDLING AND STORAGE:
Do not contaminate water, food, or feed by storage or disposal. Store in a pesticide storage area that is a secure, dry, well-ventilated separate room, building or covered area.

Not for use or storage in or around the home.

Keep away from sources of ignition and protect from exposure to fire and heat.

Segregate from oxidizers and incompatible materials listed in the Reactivity Data Section.

APPENDIX

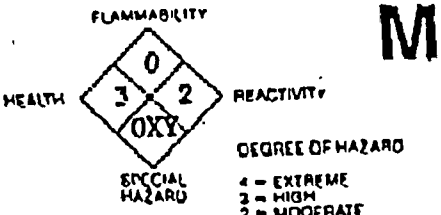
ARSENAL® IS A REGISTERED TRADEMARK OF THE AMERICAN CYANAMID COMPANY

The information and statements herein are believed to be reliable but are not to be construed as a warranty or representation for which we assume legal responsibility. Users should undertake sufficient verification and testing to determine the suitability for their own particular purpose of any information or products referred to herein. NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE IS MADE.

Last Revision Date: 10/18/90

SOURCE AND	SHEET NO.:	IN03465-6
DATE INFORMATION	DATE:	MAR 27, 1997

BioLab
Safety & Governmental Affairs
P.O. Box 1489, Decatur, GA 30031
(404) 378-1753 TWX 810-751-3318



Material Safety Data Sheet

CUSTOMER 360428001

F-0667

1. Identification

PRODUCT NAME: B-G TOWER CHLOR TABLETS

CHEMICAL NAME: 1,3,5,Trichloro-s-triazine-2,4,6(1H,3H,5H) trione

FORMULA: C3N3O3Cl3

2. Hazardous Ingredients

	%	TLV	CAS NO.
Trichloro-s-triazine trione	99	Not Est.	87-90-1

3. Health Hazards

FIRST AID AND ACUTE HEALTH HAZARDS:
EYE CONTACT: Flush with large volumes of water for 15 minutes. Contact a physician.
SKIN CONTACT: Brush excess material off of skin and flush with water for 15 minutes. If irritation persists, contact a physician.
FOR INGESTION: Drink large quantities of water. DO NOT INDUCE VOMITING. Contact a physician.
INHALATION: AVOID BREATHING DUST OR CHLORINE FUMES. IF INHALED, REMOVE TO FRESH AIR. CALL A PHYSICIAN IF IRRITATION DEVELOPS OR PERSISTS.

CHRONIC/LONG TERM HAZARDS: None expected at use concentrations.

CARCINOGENICITY: None

4. Description And Physical Data

PHYSICAL FORM: Solid (X)
Liquid ( )
Gas ( )

SOLUBILITY IN WATER: Insoluble ( )
Moderate (X)
Complete ( )

APPEARANCE: White tablets; chlorine odor

5. Fire And Explosion Hazard Data

FLASH POINT: N/A

EXTINGUISHING MEDIA: Water (X) Carbon dioxide ( )
Dry chemical ( ) Not Applicable ( )

SPECIAL FIRE FIGHTING PROCEDURES: Isolate container in open air, if possible. Deluge with water. Use NIOSH/MSHA approved self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Contact with most organic materials may result in fire. May be explosive, with the evolution of toxic gases.
HAZARDOUS THERMAL DECOMPOSITION PRODUCTS: Nitrogen trichloride, carbon monoxide, phosgene(400 F), and other chlorine gases.

HAZARDOUS POLYMERIZATION:	CONDITIONS TO AVOID:	INCOMPATIBILITY (MATERIALS TO AVOID):
May Occur ( )	High Temperature (X)	Strong Oxidants ( )
Will Not Occur (X)	Poor Ventilation (X)	Alkali ( )
	Contamination (X)	Moisture (X)
	Moisture/High Humidity(X)	Acids ( )
		Solvents (X)
		Other (X)*

*Organic matter, inorganic reducing agents, ammonia, nitrogen-bearing compounds

7. Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Pick up and place in CLEAN, DRY, plastic or plastic-lined containers. Isolate containers in open, well-ventilated area. Flush small residues into sewer with large quantities of water.

WASTE DISPOSAL METHOD: Flush small amounts into sewer with large quantities of water. Large amounts should be transported to a permitted hazardous waste facility for proper disposal. Follow all federal, state, and local hazardous waste regulations.

8. Special Protection Information

RESPIRATORY PROTECTION: If excessive dusting occurs, use a NIOSH/MSHA approved self-contained breathing apparatus. Engineering or administrative controls should be implemented to reduce exposure.

VENTILATION: Provide adequate mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

EYE PROTECTION: Safety glasses with side shields are required when using this material.
SKIN PROTECTION: Rubber or vinyl gloves should be worn when handling this material. The use of a rubber or vinyl apron is recommended.

9. Special Precautions

Store in a cool, dry, well-ventilated area away from any other chemicals. Keep out of reach of children. Avoid breathing dust. Always open containers in a well-ventilated area. Keep containers tightly closed when not in use.

This information is given without a warranty or representation. We do not assume any legal responsibility for same, nor do we give permission, inducement or recommendation to practice any patented invention without a license. It is offered solely for your consideration, investigation and verification. Before using any product, read the label.

Signature: _____ Regulatory Affairs Specialist
Jane R. Brown

Date: 10-1-90 Supercedes: 1-15-89

MATERIAL SAFETY DATA SHEET
BIO TREAT 183

SOUTHERN WATER SERVICES, INC.
1505 River Oaks Road East
Harahan, LA 70123

Company Phone No.: (504) 733-7527

Emergency Phone No.
(800) 255-3924

IDENTIFICATION:

Product Name:	Bio Treat 183
Chemical Name and/or Family:	Biocide
C.A.S. Number:	Blend
Formula:	Proprietary
M.S.D.S. Effective Date:	June 17, 2002

COMPOSITION and INFORMATION on INGREDIENTS:

Component	C.A.S. #	%	Exposure Limits
BROMOCHLORO-5,5-DIMETHYLHYDANTOIN	126-06-7	60.0	TWA/TLV 0.2 mg/m³
1,3-DICHLORO-5,5-DIMETHYLHYDANTOIN	118-52-5	27.4	OSHA PEL: 0.2 mg/m^A3 OSHA TWA: 0.2 mg/m^A3 ACGIH TLV: 0.2 mg/m^A3
1,3-DICHLORO-5-ETHYL-5-METHYLHYDANTOIN	89415-87-2	10.6	TWA/TLV 0.2 mg/m³

HAZARD IDENTIFICATION:

Health Hazard: Oxidizer. May cause severe skin irritation. Can cause severe eye irritation or burns. Prolonged contact may cause irreversible damage May cause severe nose, throat, and lung irritation. Material is toxic to fish.

Primary Routes of Entry:

- **Inhalation** ..... Avoid breathing vapors or mists. Prolonged or excessive inhalation at high concentrations can be severely irritating to the lung with potential systemic absorption and tissue damage.
- **Skin** ..... A single, prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. Causes irritation, possible burns on prolonged contact.
- **Ingestion** ..... Ingestion is not considered a potential route of exposure. Ingestion can cause irritation of the mouth, throat, and esophagus. Harmful or fatal if swallowed.
- **Eye** ..... Risk of serious damage to eyes, possible irreversible. Causes severe irritation and burns.

Over Exposure Effects: May cause irreversible damage.

Carcinogenicity:
Bromoform at 12 ppm considered carcinogenic.

Hazardous Materials Identification System Rating:

- **Health** 3
- **Flammability** 1
- **Reactivity** 1
- **Personal Protection** C

MATERIAL SAFETY DATA SHEET
BIO TREAT 183

FIRST AID MEASURES:

EYE CONTACT FIRST AID: In case of contract, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.
SKIN CONTACT FIRST AID: Remove contaminated clothing and shoes. Wash affected area immediately with large amounts of soap and water. Get medical attention if irritation develops or persists.
INHALATION FIRST AID: Although this product is not known to cause respiratory problems, if breathing is difficult, remove to fresh air and provide oxygen. If not breathing, give artificial respiration. Get medical attention if cough or other symptoms develop.
INGESTION FIRST AID: If swallowed, do not induce vomiting. Give water or milk to dilute. Never give anything by mouth to an unconscious person. Contact a physician.

FIRE FIGHTING MEASURES:

Flash Point: > 201°F (PMCC)

Flammable Properties: Material is a strong oxidizer and corrosive. May ignite combustible materials and may produce noxious gases. Airborne dusts of this product in an enclosed space and in the presence of an ignition source may constitute an explosion hazard.

Flammable Limits:
Lower ..... ND
Upper ..... ND

Extinguishing Media: Water, carbon dioxide, foam or dry powder.

Unusual Fire Hazard: No known unusual hazards in a fire/explosion situation.

Special Firefighting Procedures: As in any fire, wear self-contained breathing apparatus pressure-demand MSHA/NIOSH (Approved or equivalent) and full protective gear. Containers can build up pressure if exposed to heat (fire). Dike and collect water used to fight fire. Contaminated extinguishing water must be disposed of in accordance with applicable regulations.

ACCIDENTAL RELEASE MEASURES:

Spill or Leak: Wear appropriate personal protective equipment. Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Exposure Controls/Personal Protection. Contain liquid to prevent further contamination of soil, surface water or groundwater.

Danger! Oxidizing and corrosive material. Contain spilled material. When spilled material comes in contact with water, self-contained breathing apparatus is preferred.

Carefully sweep up spilled material (avoid generating dust) and place in an appropriate contained for disposal. Do not contaminate with oxidizable materials. Neutralize any residue with dilute, alkaline sodium bisulfite or thiosulfate solution; absorb with sand or vermiculite and place in a compatible contained for disposal. If spilled material is wet, neutralize and proceed as stated above.

HANDLING and STORAGE PROCEDURES:

Precautionary Handling: Follow all MSDS/label precautions even after container is emptied because they may retain product residues. Avoid contact with skin and eyes. Avoid breathing mists. Wash hands thoroughly after handling. Store in a secure area. Provide appropriate ventilation. Avoid generating dust.

Storage: Keep this product in original closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Isolate from all organic material. Keep contained tightly closed.

MATERIAL SAFETY DATA SHEET
BIO TREAT 183

EXPOSURE CONTROLS and PERSONAL PROTECTION:

Ventilation:

Mechanical ..... Desired in closed places
Local ..... Recommended
Respirator Protection: ..... When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection
Eye Protection: ..... Wear goggles or safety glasses with side shields when handling this product.
Skin Protective: ..... Wear impervious gloves
Other Protective Equipment: ..... Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower.
Hygienic Practices: ..... Remove and wash contaminated clothing before reuse.

Additional Information: ..... This MSDS has been reduced in content from the original prepared by Kemira Chemicals, Inc. For additional non-emergency health, safety, or environmental information, phone 1-800-347-1542. For emergencies, phone 1-770-422-1250 or 1-800-424-9300. The Kemira product name is INDUBROM.

PHYSICAL and CHEMICAL PROPERTIES:

Appearance and Odor: ..... Solid white briquettes. Pungent odor.
Melt/Freezing Point: ..... 248-298°F
Solubility in Water: ..... 0.54 gms/100 gms
Bulk Density: ..... 60 lbs/ ft 3

STABILITY and REACTIVITY:

Stability: ..... This compound is stable at ambient temperatures.
Conditions to Avoid: ..... Elevated temperatures. Decomposes at 329°F (165°C).
Incompatible Materials: ..... Avoid contact with acids and alkalis, high storage temperatures, moisture and readily oxidizable material.
Hazardous Decomposition Products: ..... Toxic decomposition products may be formed. Decomposition may produce toxic vapors/fumes of chlorine, bromine, and oxides of carbon and nitrogen.

DISPOSAL CONSIDERATIONS:

Waste Disposal Method: Avoid disposal into waste water treatment facilities. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

EPA Hazardous Waste: NO.

Contaminated Materials: Relative small quantities of product may be neutralized as described in Accidental Release section, page 2.

Container Disposal: Uncleaned empty containers should be disposed of in the same manner as the contents.

TRANSPORTATION INFORMATION:

Hazard Class: 5.1
DOT Shipping Name: Oxidizing solid, N.O.S., (Bromocholoro dimethylhydantoin), 5.1, UN1479, PGII BioTreat 183
Reportable Quantity: ND

REGULATORY INFORMATION:

Notice The following information is presented in good faith and be believed to be accurate, as of the revised date shown below. No warranty is therefore, expressed or implied. Regulatory information requirements are subject to change as governmental regulations change.

SARA 311 Categories:
Immediate (Acute) Health Effects: ..... Yes
Delayed (Chronic) Health Effects: ..... No
Fire Hazards: ..... No
Sudden Release of Pressure Hazzard: ..... No
Reactivity Hazards: ..... Yes

Miscellaneous Information:

This material or all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substance Control Act (TSCA).

This product is subject to regulation under the US Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and is therefore exempt from U.S. Toxic Substance Control Act (TSCA) Inventory listing requirements.

This product is subject to regulation under the Canadian pest Control Products Act (P.C.P. Act). Therefore, this product is excluded from the supplier labeling and material safety data sheet requirements as specified in Section 12 of the Hazardous Products Act.

MISCELLANEOUS OTHER INFORMATION:

Product Packaging: Various

Footnotes:
ND - No Data Available
NA - Not Applicable
NE - Not Established
< = Less Than
> = Greater Than

This product's safety information is provided to assist our customers in assessing compliance with health, safety and environmental regulations. The information contained herein, is based on data available to us and is believed to be accurate, although no guarantee or warranty is provided by this company in this respect. Since the use of this product is within the exclusive control of the user, it is the user's obligation to determine the conditions of safe use of this product. Such conditions should comply with all Federal regulations concerning the product. *All materials in this product are produced in compliance with Public Law 94-469 (also known as the "Toxic Substances Control Act" of 1976).*

Prepared By: Southern Water Services, Inc.
1505 River Oaks Road East
Harahan, LA 70123
(504) 733-7527

Date Revised: June 17, 2002

MATERIAL SAFETY DATA SHEET
BIO TREAT 186

SOUTHERN WATER SERVICES, INC.
1505 River Oaks Road East
Harahan, LA 70123

Company Phone No: (504) 733-7527

Emergency Phone No:
(800) 255-3924

IDENTIFICATION:

Product Name:	Bio Treat 186 Biocide
Chemical Name and/or Family:	Proprietary; Stabilized bromine biocide, Aqueous solution
C.A.S. Number:	Mixture
Formula:	Proprietary
M.S.D.S. Effective Date:	June 17, 2002

COMPOSITION and INFORMATION on INGREDIENTS:

Component	C.A.S. #	%	Exposure Limits
Unreacted Sodium Hydroxide	1310-73-2	10%	OSHA: 2mg/m3 ACGIH: 2 mg/m3

HAZARD IDENTIFICATION:

Health Hazard: 3

Primary Routes of Entry:

Inhalation ..... Not expected to be toxic. Do not breathe fumes from fires or decomposition.
Skin ..... Causes burns to the skin.
Ingestion ..... Not expected to be acutely toxic.
Eye ..... Expected to cause burns.
Chronic Effects of Overexposure ..... None known.

Toxicity Data:

Acute Oral Tox LD50 = 2,491 mg/kg of body weight;
Acute Dermal Tox LD50 = >2,000 mg/kg of body weight;
Acute Inhalation LD50 - 20.37 mg/l. Not a contact Dermal Sensitizer; Corrosive to skin.

Aquatic Toxicity Data:

Organism: Bluegill Sunfish Lepomis Macrochirus
- TOXICITY RESULTS: 96-hour LC50 value was 3.8 mg whole material/L. Organism: Waterflea Daphnia magna
- TOXICITY RESULTS: 48-hour EC50 value was 4.8 mg whole material/L. Organism: Unicellular Green Alga, Selenastrum capricornutum
- TOXICITY RESULTS: 96-hour IC50 value was 2.6 mg whole material/L.

Hazardous Materials Identification System Rating:

Health 3
Flammability 0
Reactivity 0
Personal Protection .. C

MATERIAL SAFETY DATA SHEET
BIO TREAT 186

FIRST AID MEASURES:

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention.
EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.
SKIN CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention.
INGESTION: If swallowed, give two glasses of water. Do not induce vomiting. Get medical attention.

FIRE FIGHTING MEASURES:

Flash Point (Method): ..... N/A

Flammable Limits: ..... N/A

Extinguishing Media: ..... None required.

Special Fire Fighting Procedures: ..... Avoid breathing fumes.

Hazardous Thermal Decomposition Products: ..... Include bromine and chlorine.

Unusual Fire and Explosion Hazards: ..... None known.

ACCIDENTAL RELEASE MEASURES:

Spill or Leak: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or absorbents to prevent migration and entry into sewers or streams. Take up small spills by first diluting with water and then using a dehalogenating agent such as sodium thiosulfate solution. Large spills may be taken up with pump or vacuum and finished off with dry chemical absorbent. May require excavation of contaminated soil.

HANDLING and STORAGE PROCEDURES:

Precautionary Handling: Store below 40°C/104°F in a dry, well-ventilated area. Avoid freezing (Freezing Point is -6°C/21 °F), extreme heat, and direct sunlight. Keep containers closed when not in use. Due to build-up of pressure overtime, this product is supplied in vented containers. Product should be stored in opaque containers to prevent exposure to light.

EXPOSURE CONTROLS and PERSONAL PROTECTION:

Ventilation:

Mechanical ..... Unnecessary under normal conditions
Local ..... Unnecessary under normal conditions
Respirator Protection: ..... None under normal conditions. In irritating atmospheres use NIOSH approved acid gas respirator.
Eye Protection: ..... Use goggles and/or face shield
Protective Gloves: ..... Wear impervious gloves
HMIS Personal Protective Code: ..... C. Safety glasses, gloves, apron
Threshold Limit Value: ..... None Established by OSHA/ACGIH

Additional Information: This MSDS has been reduced in content from the original prepared by Albemarle Corporation. For additional non-emergency health, safety or environmental information phone 1-800-535-3030. For emergencies: 24 hour emergency phone: 1-225-344-7147. The Albemarle product name is STABROM 909 Biocide.

MATERIAL SAFETY DATA SHEET
BIO TREAT 186

PHYSICAL and CHEMICAL PROPERTIES:

Appearance and Odor: ..... Yellow liquid. Mild odor.
Melting Point: ..... N/A
Solubility in Water: ..... Miscible
Boiling Point: ..... 214-216°F
Specific Gravity: 1.34

STABILITY and REACTIVITY:

Stability: ..... Stable
Conditions to Avoid: ..... High temperature/extreme heat/light.
Incompatible Materials: ..... This product is strongly basic and an oxidizing agent. Avoid contact with alcohols, aldehydes, strong reducing agents, acids, and ammonia containing products. Avoid contact with metals such as steel, aluminum, iron and copper.
Hazardous Polymerization: ..... Will not occur
Hazardous Thermal Decomposition Products: ..... Include bromine and chlorine.

DISPOSAL CONSIDERATIONS:

Disposal Method: Under the CERCLA/RCRA regulations currently in effect, this material is regulated as a hazardous waste or material. Therefore, it must be disposed of in a "permitted" hazardous waste facility in compliance with EPA and/or other applicable local, state, and federal regulations. It should be handled in a manner acceptable to good waste management practice. Following neutralization to render the material nonhazardous, the material may be disposed of in a manner acceptable to good waste management practice and in compliance with applicable local, state, and federal regulations. The Reportable Quantity (RQ) of this product is 10,000 pounds minimum based on the RQ of sodium hydroxide.

TRANSPORTATION INFORMATION:

Hazard Class: 8
Packing Group: III
DOT Proper Shipping Name: ..... Corrosive Liquids, Basic, Inorganic, N.O.S. (Halogenated complex, Sodium Hydroxide) Bio Treat 186, UN1266

REGULATORY INFORMATION:

Notice: The following information is presented in good faith and be believed to be accurate, as of the revised date shown above. No warranty is therefore, expressed or implied. Regulatory information requirements are subject to change as governmental regulations change.

TSCA: This material is in compliance with the Toxic Substances Control Act (15 USC 2601-2629).

HAZARD CATEGORIES FOR SARA 3111312 REPORTING ARE INDICATED BELOW:

HEALTH	Immediate (Acute)	Yes
HEALTH	Delayed (Chronic)	No
PHYSICAL	Fire	No
PHYSICAL	Sudden Release of Pressure	No
PHYSICAL	Reactive	No
	Nuisance Mist/Dust Only	No

NOTE 1: See CERCLA for Reportable Quantity.

COMPONENT NAME	CAS NO.	PERCENTAGE	REGULATION
Unreacted Sodium hydroxide CERCLA - RQ=1000	1310-73-2	10.0	CERCLA NJ RTK - SHH PA RTK

(Typical value of sodium hydroxide is <10%.)

MISCELLANEOUS OTHER INFORMATION:

Product Packaging: Various
Footnotes:
ND - No Data Available
NA - Not Applicable
NE - Not Established
< = Less Than
> = Greater Than

This product's safety information is provided to assist our customers in assessing compliance with health, safety and environmental regulations. The information contained herein, is based on data available to us and is believes to be accurate, although no guarantee or warranty is provided by this company in this respect. Since the use of this product is within the exclusive control of the user, it is the user's obligation to determine the conditions of safe use of this product. Such conditions should comply with all Federal regulations concerning the product. All materials in *this product* are *produced* in compliance *with* Public Law 94-469 (also *known* as the "Toxic Substances Control *Act" of* 1976).

Prepared by: Southern Water Services, Inc.
P.O. Box 23253
Harahan, LA 70183
(504)733-7527

Date Revised: June 17, 2002

MATERIAL SAFETY DATA SHEET
BIO TREAT 189

SOUTHERN WATER SERVICES, INC.
1505 River Oaks Road East
Harahan, LA 70123

Company Phone No.: (504) 733-7527

Emergency Phone No.
(800) 255-3924

IDENTIFICATION:

Product Name:	Bio Treat 189
Chemical Name and/or Family:	Aqueous Glutaraldehyde Solution
C.A.S. Number:	111-30-8
Formula:	15% OHCC3H6CHO
M.S.D.S. Effective Date:	June 17, 2002

COMPOSITION and INFORMATION on INGREDIENTS:

Component	C.A.S. #	%	Exposure Limits
Water	7732-18-5	<= 85%	None
Glutaraldehyde	111-30-8	15%	ACGIH: 0.05 ppm skin OSHA: 0.2 ppm skin VCC: 0.1 ppm skin
Methanol	67-56-1	<= 0.15%	ACGIH TWA8: 200 ppm skin OSHA TWA8: 200 ppm skin

HAZARD IDENTIFICATION:

Health Hazard: Corrosive. Causes irreversible eye damage. Causes skin irritation. Harmful if inhaled. Harmful if swallowed. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Causes asthmatic signs and symptoms in hyper-reactive individuals. Aspiration may cause lung damage.

Primary Routes of Entry:

Inhalation ..... Irritant
Skin ..... Irritant
Eyes ..... Contact with liquid will cause severe conjunctivitis.

Over Exposure Effects: Repeated skin contact may cause a cumulative dermatitis. May cause skin sensitization in a small portion of individuals and present as an allergic contact dermatitis. This usually results from contact with the liquid, but occasionally there may be a reaction to glutaraldehyde vapor. May cause asthma, particularly in those with an increased tendency to develop allergic reactions to common environmental allergens (*i.e.*, atopic individuals).

Hazardous Materials Identification System Rating:

Health 3
Flammability 1
Reactivity 1
Personal Protection ... C

FIRST AID MEASURES:

Inhalation: Remove to fresh air. Give artificial respiration if not breathing. In breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

Eye Contact: Immediately flush eyes with water and continue washing for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferable from an ophthalmologist.

Skin Contact: Immediately remove contaminated clothing and shoes. Wash skin with soap and water. Obtain medical attention. Wash clothing before reuse. Discard contaminated leather articles such as shoes and belt.

Swallowing: DO NOT INDUCE VOMITING. Do not give anything to drink. Obtain medical attention without delay.

Notes to Physician: Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or pertonitis and the resultant complications. Any material aspirated during vomiting may cause lung injury. Therefore, emesis should not be induced mechanically or pharmacologically. If it is considered necessary to evacuate the stomach contents, this should be done by means least likely to cause aspiration (e.g., gastric lavage after endotracheal intubation).

FIRE FIGHTING MEASURES:

Flash Point: None

Flammable Limits:

Lower ..... NA
Upper ..... NA

Extinguishing Media: Non-flammable (aqueous solution): After water evaporates, remaining material will burn. Use alcohol-type or all-purpose-type foam, applied by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

Unusual Fire Hazard: None.

ACCIDENTAL RELEASE MEASURES:

Spill or Leak: Very low concentrations (5 ppm or less of glutaraldehyde) can be degraded in a biological wastewater treatment system. Thus, small spills can be flushed with large quantities of water. Large quantities or "slugs" can be harmful to the treatment system. Thus, large spills should be collected for disposal. It may also be possible to decontaminate spilled material by careful application of aqueous sodium hydroxide bisulfite. Depending on conditions, considerable heat and fumes can be liberated by the decontamination reaction.

HANDLING and STORAGE PROCEDURES:

Precautionary Handling: Do not get in eyes, on skin, on clothing. Avoid breathing vapor. Do not swallow. Wear goggles, protective clothing and gloves. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

Storage: Please refer to Union Carbide Corporation publication: GLUTARALDEHYDE. Safe Handling and Storage Guide; UC-1255.

EXPOSURE CONTROLS and PERSONAL PROTECTION:

Ventilation:

Mechanical	Desired in closed places
Local	Recommended
Respirator Protection:	NIOSH approved self-contained breathing apparatus for extended exposure to concentrated fumes
Eye Protection:	Use goggles and/or face shield if splashing is likely
Protective Gloves:	Wear nitrile (NBR) Butyl gloves
HMIS Personal Protective Code:	C. Safety glasses, gloves, apron
Threshold Limit Value:	See exposure limits on page one

Additional Information: This MSDS has been reduced in content from the original prepared by Bio-Source, Inc. For additional non-emergency health, safety, or environmental information, phone 1-770-978-1443. For emergencies, phone 1-800-255-3924 (Chem-Tel). The Bio-Source product name is GL-15.

PHYSICAL and CHEMICAL PROPERTIES:

Appearance and Odor:	Transparent liquid. Sharp, fruity, medicinal odor
Boiling Point: Melting Point:	>213°F
Freezing Point:	20°F
Vapor Pressure (mmHg):	0.2
Vapor Density (Air = 1):	0.7
pH Value:	3.1-4.5
Solubility in Water:	Complete
Specific Gravity (Water = 1):	1.042

STABILITY and REACTIVITY:

Conditions to Avoid:	Temperatures above 100°C
Incompatible Materials:	Strong alkalies and acids catalyze an aldol-type condensation (exothermic, but not violent)
Decomposition Products:	Burning can product carbon monoxide and/or carbon dioxide. Carbon monoxide is highly toxic.
Hazardous Polymerization:	Will not occur

DISPOSAL CONSIDERATIONS:

Waste Disposal Method: Atomize into a very hot incinerator fire or mix with a suitable flammable solvent, and incinerate where permitted under appropriate Federal, State, and local regulations. High water content may dampen flame. Dispose in accordance with all applicable Federal, state, and local environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

EPA Hazard Waste Codes: NA

TRANSPORTATION INFORMATION:

Hazard Class:	
DOT Proper Shipping Name:	D.O.T. Non-Regulated-Bio Treat 189
Reportable Quantity:	NA

REGULATORY INFORMATION:

Notice The following information is presented in good faith and be believed to be accurate, as of the revised date shown below. No warranty is therefore, expressed or implied. Regulatory information requirements are subject to change as governmental regulations change.

EPA: Environmental Protection Agency:

SARA: Superfund Amendments and Reauthorization Act
Title III, Section 313 (Toxic Chemicals): ..... None
Reportable Quantity (RQ): ..... None
Threshold Planning Quantity (TPQ): ..... None

CERCLA: The Comprehensive Environmental Response, Compensation, and Liability Act of 1980:

Reportable Quantity (RQ): ..... None

MISCELLANEOUS OTHER INFORMATION:

Product Packaging: Various
Footnotes:
ND - No Data Available
NA - Not Applicable
NE - Not Established
< = Less Than
> = Greater Than

This product's safety information is provided to assist our customers in assessing compliance with health, safety and environmental regulations. The information contained herein, is based on data available to us and is believed to be accurate, although no guarantee or warranty is provided by this company in this respect. Since the use of this product is within the exclusive control of the user, it is the user's obligation to determine the conditions of safe use of this product. Such conditions should comply with all Federal regulations concerning the product. *All materials in this product are produced in compliance with Public Law 94-469 (also known as the "Toxic Substances Control Act" of 1976).*

Prepared By:
Southern Water Services, Inc.
1505 River Oaks Road East
Harahan, LA 70123
(504) 733-7527

Date Revised: June 17, 2002

20 MULE TEAM®

Boric Acid

Material Safety Data Sheet

DATE OF ISSUE May 2000

Supersedes January 2000 Version

1 Chemical product and company identification

Product name: Boric Acid
Grade: Technical, NF, S.Q
Product use: Industrial manufacturing
Chemical formula: H_3BO_3
Chemical name/synonyms: Boric acid, orthoboric acid, boracic acid
Chemical family: Inorganic borates
CAS registry number: 10043-35-3 (11113-50-1)

(Refer to Section 15 for TSCA/DSL chemical inventory listing)

MANUFACTURER:

U.S. Borax Inc.
26877 Tourney Road
Valencia, CA 91355-1847

EMERGENCY PHONE NUMBERS

24 Hr. Medical Info. Service: (661) 284-5200
Chemtrec (Spills): (800) 424-9300

2 Composition/information on ingredients

This product contains greater than 99 percent (%) boric acid (H_3BO_3), which is hazardous under the OSHA Hazard Communication Standard and under the Canadian Controlled Products Regulations of the Hazardous Products Act (WHMIS), based on animal chronic toxicity studies. Refer to Sections 3 and 11 for details on hazards.

3 Hazard identification

Emergency overview

Boric Acid is a white, odorless, powdered substance that is not flammable, combustible, or explosive and has low acute oral and dermal toxicity

Potential ecological effects

Large amounts of Boric Acid can be harmful to plants and other species. Therefore, releases to the environment should be minimized.

Potential health effects

Routes of exposure: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because Boric Acid is poorly absorbed through intact skin

Inhalation: Occasional mild irritation effects to nose and throat may occur from inhalation of Boric Acid dust at levels greater than 10 mg/m^3.

Eye contact: Boric Acid is non-irritating to eyes in normal industrial use.

Skin contact: Boric Acid does not cause irritation to intact skin.

Ingestion: Products containing Boric Acid are not intended for ingestion. Boric Acid has a low acute toxicity. Small amounts (e.g., a teaspoonful) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.

Cancer: Boric Acid is not a known carcinogen.

Reproductive/developmental: Animal ingestion studies in several species, at high doses, indicate that borates cause reproductive and developmental effects. A human study of occupational exposure to borate dust showed no adverse effect on reproduction.

Target organs: No target organ has been identified in humans High dose animal ingestion studies indicate the testes are the target organs in male animals.

Signs and symptoms of exposure: Symptoms of accidental over-exposure to Boric Acid have been associated with ingestion or absorption through large areas of damaged skin. These may include nausea, vomiting and diarrhea, with delayed effects of skin redness and peeling.

Refer to Section 11 for details on Toxicological data.

4 First aid measures

Inhalation: If symptoms such as nose or throat irritation are observed, remove person to fresh air

Eye contact: Use eye wash fountain or fresh water to cleanse eye If irritation persists for more than 30 minutes, seek medical attention.

Skin contact: No treatment necessary because non-irritating.

Ingestion: Swallowing small quantities (one teaspoon) will cause no harm to healthy adults. If larger amounts are swallowed, give two glasses of water to drink and seek medical attention.

Note to physicians: Observation only is required for adult ingestion in the range of 4-8 grams of Boric Acid. For ingestion of larger amounts, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only Hemodialysis should be reserved for massive acute ingestion or patients with renal failure. Boron analyses of urine or blood are only useful for documenting exposure and should not be used to evaluate severity of poisoning or to guide treatment[1]. Refer to Section 11 for details.

BORAX™

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5 Fire fighting measures

General hazard: None, because Boric Acid is not flammable, combustible or explosive. The product is itself a flame retardant.

Extinguishing media: Any fire extinguishing media may be used on nearby fires.

Flammability classification (29 CFR 1910.1200): Non-flammable solid.

6 Accidental release measures

General: Boric Acid is a water-soluble white powder that may, at high concentrations, cause damage to trees or vegetation by root absorption (Refer to Ecological information, Section 12, for specific information.)

Land spill: Vacuum, shovel or sweep up Boric Acid and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during cleanup and disposal. No personal protective equipment is needed to cleanup land spills.

Spillage into water: Where possible, remove any intact containers from the water. Advise local water authority that none of the affected water should be used for irrigation or for the abstraction of potable water until natural dilution returns the boron value to its normal environmental background level. (Refer to Sections 12, 13 and 15 for additional information.) Boric Acid is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261). (Refer to Regulatory information, Section 15, for additional references.)

7 Handling and storage

General: No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity and to minimize caking of the product, bags should be handled on a first-in, first-out basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

Storage temperature: Ambient

Storage pressure: Atmospheric

Special sensitivity: Moisture (caking)

8 Exposure controls/personal protection

Engineering controls: Use local exhaust ventilation to keep airborne concentrations of Boric Acid dust below permissible exposure levels.

Personal protection: Where airborne concentrations are expected to exceed exposure limits, NIOSH/MSHA certified respirators should be used. Eye goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

Occupational exposure limits: Boric acid is treated by OSHA, Cal OSHA and ACGIH as "Particulate Not Otherwise Classified" or "Nuisance Dust". The OSHA/PEL (Permissible Exposure Level) is 15 mg/m^3 total dust and 5 mg/m^3 respirable dust. The Cal OSHA/PEL is 10 mg/m^3. The ACGIH/TLV (Threshold Limit Value) is 10 mg/m^3.

9 Physical and chemical properties

Appearance:	White, odorless, crystalline solid
Specific gravity:	1.51
Vapor pressure:	Negligible @ 20°C
Solubility in water:	4.7% @ 20°C, 27.5% @ 100°C
Melting point:	170.9°C (340°F) (heated in closed space)
pH @ 20°C:	6.1 (0.1% solution), 5.1 (1.0% solution); 3.7 (4.7% solution)
Molecular weight:	61.84

10 Stability and reactivity

General: Boric Acid is a stable product, but when heated it loses water, first forming metaboric acid (HBO_2), and on further heating it is converted into boric oxide (B_2O_3).

Incompatible materials and conditions to avoid: Boric Acid reacts as a weak acid which may cause corrosion of base metals. Reaction with strong reducing agents, such as metal hydrides or alkali metals, will generate hydrogen gas, which could create an explosive hazard.

Hazardous decomposition: None.

11 Toxicological information

Acute toxicity

Ingestion: Low acute oral toxicity, LD_{50} in rats is 3,500 to 4,100 mg/kg of body weight.
Skin/dermal: Low acute dermal toxicity; LD_{50} in rabbits is greater than 2,000 mg/kg of body weight. Boric acid is poorly absorbed through intact skin.
Inhalation: Low acute inhalation toxicity; LC_{50} in rats is greater than 2.0 mg/L (or g/m^3).
Skin irritation: Non-irritant.
Eye irritation: Draize test in rabbits produced mild eye irritation effects. Fifty years of occupational exposure to Boric Acid indicates no adverse effects on human eye. Therefore, Boric Acid is not considered to be a human eye irritant in normal industrial use.
Sensitization: Boric acid is not a skin sensitizer.

Other

Reproductive/developmental toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes[2]. Boric acid studies in rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations[3, 4]. The doses administered were many times in excess of those to which humans would normally be exposed[5].
Carcinogenicity/mutagenicity: No evidence of carcinogenicity in mice[6]. No mutagenic activity was observed for boric acid in a battery of short-term mutagenicity assays.
Human data: Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility[7].

12 Ecological information

Ecotoxicity data

General: Boron (B) is the element in boric acid which is used by convention to report borate product ecological effects. It occurs naturally in sea-water at an average concentration of 5 mg B/L and generally occurs in fresh water at concentrations up to 1 mg B/L. In dilute aqueous solutions the predominant boron species present is undissociated boric acid. To convert boric acid into equivalent boron (B) content, multiply by 0.1748.
Phytotoxicity: Boron is an essential micronutrient for healthy growth of plants; however, it can be harmful to boron sensitive plants in high quantities. Care should be taken to minimize the amount of Boric Acid released to the environment.
Algal toxicity:
Green algae, *Scenedesmus subspicatus*
96-hr EC_{10} = 24 mg B/L†
Invertebrate toxicity[8]:
Daphnids, *Daphnia magna strous*
48-hr LC_{50} = 133 mg B/L‡
21-day NOEC-LOEC = 6-13 mg B/L‡

Test substance: † sodium tetraborate
‡ boric acid

Fish toxicity:
Sea-water[9]:
Dab, *Limanda limanda*
96-hr LC_{50} = 74 mg B/L†
Fresh water[10]:
Rainbow trout, *S gairdneri* (embryo-larval stage)
24-day LC_{50} = 150 mg B/L‡
32-day LC_{50} = 100 mg B/L‡
Goldfish, *Carassius auratus* (embryo-larval stage)
7-day LC_{50} = 46 mg B/L‡
3-day LC_{50} = 178 mg B/L‡

Environmental fate data

Persistance/degradation: Boron is naturally occuring and ubiquitous in the environment. Boric Acid decomposes in the environment to natural borate.
Octanol/water partition coefficient: Log P_{ow}: -0.7570 at 25°C.
Soil mobility: Boric Acid is soluble in water and is leachable through normal soil.

13 Disposal considerations

Disposal guidance: Small quantities of Boric Acid can usually be disposed of at landfill sites. No special disposal treatment is required, but local authorities should be consulted about any specific local requirements. Tonnage quantities of product are not recommended to be sent to landfills. Such product should, if possible, be used for an appropriate application.

RCRA (40 CFR 261): Boric acid is not listed under any sections of the Federal Resource Conservation and Recovery Act (RCRA).
NPRI (Canada). Boric acid is not listed on the Canadian National Pollutant Release Inventory.

Refer to Section 15 for additional regulatory information.

14 Transport information

DOT hazardous classification: Boric acid is not regulated by the U.S. Department of Transportation (DOT) and is therefore not considered a hazardous material/substance.
TDG Canadian transportation: Boric acid is not regulated under Transportation of Dangerous Goods (TDG)

International transportation: Boric acid has no UN Number, and is not regulated under international rail, road, water or air transport regulations.

15 Regulatory information

OSHA/Cal OSHA: This MSDS document meets the requirements of both OSHA (29 CFR 1910.1200) and Cal OSHA (Title 8 CCR 5194 (g)) hazard communication standards. *Refer to Section 8 for regulatory exposure limits.*

WHMIS classification: Boric Acid is classified as Class D-Division 2A under Canadian WHMIS guidelines.

Chemical Inventory listing: Boric acid (10043-35-3) appears on several chemical inventory lists (including the EPA TSCA Inventory, Canadian DSL, European EINECS, Japanese MITI, Australian and Korean lists) under the CAS No. representing the anhydrous form of this inorganic salt.

U.S. EPA TSCA Inventory	10043-35-3
Canadian DSL	10043-35-3
EINECS	233-139-2
South Korea	1-439
Japanese MITI	(1)-63

RCRA: Boric acid is not listed as a hazardous waste under any sections of the Resource Conservation and Recovery Act (RCRA) or regulations (40 CFR 261 *et seq*).

Superfund: CERCLA/SARA. Boric acid is not listed under CERCLA (Comprehensive Environmental Response Compensation and Liability Act) or its 1986 amendments, SARA (Superfund Amendments and Reauthorization Act), including substances listed under Section 313 of SARA, Toxic Chemicals, 42 USC 11023, 40 CPR 372 65, Section 302 of SARA, Extremely Hazardous Substances, 42 USC 11002, 40 CFR 355, or the CERCLA Hazardous Substances list, 42 USC 9604, 40 CFR 302.

Safe Drinking Water Act (SDWA): Boric acid is not regulated under the SDWA, 42 USC 300g-1, 40 CFR 141 *et seq*. Consult state and local regulations for possible water quality advisories regarding boron compounds.

Clean Water Act (CWA) (Federal Water Pollution Control Act): 33 USC 1251 *et seq*.

a) Boric acid is not itself a discharge covered by any water quality criteria of Section 304 of the CWA, 33 USC 1314.
b) It is not on the Section 307 List of Priority Pollutants, 33 USC 1317, 40 CFR 129.
c) It is not on the Section 311 List of Hazardous Substances, 33 USC 1321, 40 CFR 116.

Canadian drinking water guideline: An "Interim Maximum Acceptable Concentration" (IMAC) for boron is currently set at 5 mg B/L.

IARC: The International Agency for Research on Cancer (IARC) (a unit of the World Health Organization) does not list or categorize boric acid as a carcinogen.

NTP Biennial Report on Carcinogens: Boric acid is not listed.

OSHA carcinogen: Boric acid is not listed.

California Proposition 65: Boric acid is not listed on the Proposition 65 list of carcinogens or reproductive toxicants.

Federal Food, Drug and Cosmetic Act: Pursuant to 21 CFR 175.105, 176.180 and 181.30, boric acid is approved by the FDA for use in adhesive components of packaging materials, as a component of paper coatings on such materials, or for use in the manufacture thereof, which materials are expected to come in contact with dry food products.

Clean Air Act (Montreal Protocol): Boric acid was not manufactured with and does not contain any Class I or Class II ozone depleting substances.

16 Other information

References

1) Litovitz T L, Norman S A, Veltri J C, Annual Report of the American Association of Poison Control Centers Data Collection System. Am J Emerg. Med. 4 427-458 (1986).
2) Weir R J, Fisher R S, Toxicol. Appl. Pharmacol. 23: 351-364 (1972).
3) Fail *et al.*, Food. Appl Toxicol 17: 225-239 (1991).
4) Price *et al.*, J. Am. Coll. Toxicol 14 (2), 173 (Abst. P-17) (1995).
5) Murray F J, Regul. Toxicol Pharmacol. (Dec. 1995)
6) National Toxicology Program (NTP) - Toxicology and carcinogenesis studies of boric acid in B6C3F1 mice, Tech. Report Ser. No 324, U S. Dept. of Health and Human Services. NIH Publ. No 88-2580 (1987).
7) Whorton *et al.*, Occup Environ. Med. 51. 761-767 (1994).
8) Schobert *et al.*, Textile Surfactants Detergents 25: 99-107 (1988).
9) Hagman S J, Manor G, Water Research Centre Report 616-M (1993)
10) Butterwick L, de Oude N, Raymond K, Ecotoxicol. Environ. Safety 17: 339-371 (1989).

For general information on the toxicology of inorganic borates, see Patty's Industrial Hygiene and Toxicology, 4th Ed. Vol. II, (1994), Chap. 42, Boron; ECETOC Tech. Report No. 63 (1995).

Product label text hazard information*:

- Do not ingest.
- Ingestion may cause reproductive harm or birth defects based on animal data.
- Avoid contamination of food or feed.
- Not for use in food, drug or pesticides+.
- Refer to MSDS.
- KEEP OUT OF REACH OF CHILDREN.

*The WHMIS panel format is used for Canadian product.
+Except for NF (pharmaceutical grade) products.

National Fire Protection Assoc. (NFPA) Classification:

Health	0
Flammability	0
Reactivity	0

Hazardous Materials Information Systems (HMIS):

Red: (Flammability)	0
Yellow: (Reactivity)	0
Blue: (Acute Health)	1*

*Chronic Effects

For further information contact:

U.S. Borax Inc.
Occupational Health & Product Safety Department
(661) 287-8050

1179 1/85

MATERIAL SAFETY DATA SHEET

DATE August 17, 1987

6293-05-02-86-102

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.

PRODUCT NAME CAT FLOC T

SECTION I

MANUFACTURER'S NAME	Calgon Corporation	EMERGENCY TELEPHONE NO.	(412) 777-8000
ADDRESS	P.O. Box 1346, Pittsburgh, PA 15230		
CHEMICAL NAME AND SYNONYMS	Cationic homopolymer	FORMULA	Multi-component Liquid

SECTION II HAZARDOUS INGREDIENTS

PRINCIPAL HAZARDOUS COMPONENT (S)	CAS #	% BY WEIGHT	ORAL LD_{50}	DERMAL LD_{50}	TLV (Units) ACGIH	OSHA	OT
Chemical Name / Common Name: This product would not be regarded to contain any hazardous ingredients according to OSHA Hazard Communication Standard (29 CFR 1910.1200).			*	*			
Chemical Name / Common Name							
Chemical Name / Common Name							
Chemical Name / Common Name							
Chemical Name / Common Name							
Chemical Name / Common Name							

* See Section V - Effects of Overexposure - for toxicity data on the product

SECTION III PHYSICAL DATA

BOILING POINT (° F)	>212	SPECIFIC GRAVITY (H_2O=1)	1.033
VAPOR PRESSURE (mmHg.)	Similar to Water	PERCENT VOLATILE BY VOLUME (%)	80
VAPOR DENSITY (AIR=1)	Similar to Water	pH	3.0 - 4.0
SOLUBILITY IN WATER	Complete	OTHER	
APPEARANCE AND ODOR	Viscous clear, colorless to pale- yellow liquid with mild chemical odor		

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	Not Flammable; Aqueous Solution
EXTINGUISHING MEDIA	Product is not flammable.
SPECIAL FIRE FIGHTING PROCEDURES	None
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

SECTION V HEALTH HAZARD DATA

EFFECT OF OVEREXPOSURE

A. ACUTE

1. INGESTION — The product is practically non toxic through ingestion. The acute oral LD_{50} (rats) is 14.6 g/kg.

2. INHALATION — The product is a polymer solution with water used as the solvent system. It would not be considered hazardous by inhalation.

3. DERMAL EXPOSURE

a. TOXIC — The product is practically non toxic through dermal absorption. The acute dermal LD_{50} (rabbits) is $>$ 20 g/kg (testing on a 40% solution of the polymer

b. IRRITATION — The product would not be considered a primary skin irritant. The primary skin irritation index (rabbits) for a 40% solution of the polymer was found to be 1.0/8.

c. SENSITIZATION — Human Patch Testing on a higher molecular weight version of the polymer has shown that it is not a skin sensitizer.

4. EYE IRRITATION

A 40% solution of the polymer when instilled in rabbit eyes did not produce any occular irritation during the 7-day observation period with the exception of one test eye in the no wash group at 24 hours which showed slight conjunctival effects.

B. SUBCHRONIC, CHRONIC, OTHER

A 13-week rat oral toxicity study was performed using dose levels of 5, 50 and 500 mg/kg (active ingredient). Animals in the 50 and 500 mg/kg groups showed slight weight gain and decreased food consumption. In the 500 mg/kg group, a deviation in the erythrocytes, total protein and globulin levels was observed. A twelve month study feeding 2 and 200 ppm of a higher molecular weight version of the polymer to rats and beagles in their drinking water showed no significant adverse effects. The polymer, when tested according to Ames assay, did not demonstrate genetic activity. The dose range employed for this test was 0.01 microliters per plate to 10 microliters per plate (with and without activation). A teratology study conducted on the product using rabbits showed no increase in malformations. The rabbits were dosed orally with the product during Day 6 through 18 of gestation. The dose levels used were 0.075, 2.5, and 25 mg/kg/day. A multi-genetic reproductive study conducted on the product showed that no increase in reproductive failure (throughout 2 generations) was observed at the dose levels tested (0.75, 2.5, and 25 mg/kg/day).

FIRST AID

A. EYE

Good First Aid should be followed in all cases of exposure.
In case of eye contact, flush with plenty of water for at least 15 minutes.
If irritation develops, call a physician.

B. SKIN

Not Applicable

C. INGESTION

Not Applicable

D. INHALATION

Not Applicable

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID	
	STABLE	X		Unknown
	UNSTABLE			

INCOMPATABILITY (Materials to Avoid)

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of nitrogen

SECTION VII SPILL OR LEAK PROCEDURES

REPORTABLE QUANTITIES (RQ) IN LBS OF EPA HAZARDOUS SUBSTANCES IN PRODUCT

1. N/A
2.
3.

NOTIFY EPA OF PRODUCT SPILLS EQUAL TO OR EXCEEDING

N/A LBS.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Dispose of in accordance with local, state and federal regulations. Dike area to contain as much spilled material as possible. Remove any remaining material by absorbing on vermiculite or other suitable absorbing material and place in a sealed metal container for disposal. Hose spill area well since product can make floors slippery.

WASTE DISPOSAL METHOD

Dispose of in a landfill or incinerate in accordance with local, state, and federal regulations.

SECTION VIII HANDLING/STORAGE

PROTECTIVE GLOVES	EYE PROTECTION
Not Required	Not Required

OTHER PROTECTIVE CLOTHING

Not Required

RESPIRATORY PROTECTION

Not Required

VENTILATION	LOCAL EXHAUST	OTHER
Normal	Not Required	None
	MECHANICAL (General) Not Required	

STORAGE & HANDLING

Wash thoroughly after handling.

Keep container closed.

Exercise caution in the storage and handling of all chemical substances.

OTHER PRECAUTIONS

None

N/A = Not Applicable

PREPARED BY Janet Mostowy 7/16/87

HydroChem Industrial Services, Inc.
6210 Rothway, Suite 150
Houston, Texas 77040

CHEMTREC Emer. No: 1-800-424-9300
HydroChem Phone: 1-800-934-9376
Revision Date: November 1, 1994

CHEMICAL CODE: M002
PRODUCT NAME: Caustic Soda

EFFECTIVE DATE: 01 November 94

PREPARED BY: G. A. Leach

HMIS RATING:
Health 3 Flammability 0 Reactivity 1

HAZARDOUS INGREDIENTS:	CAS NUMBER
Ammonium Hydroxide	001310-73-2

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Alkaline
Color: White
Vap.Density: >1
pH: 13 (1 percent)
Pour Point: 604 deg F (318 deg C)
Vap. Pressure: 1 mmHg at 739 deg
Viscosity: Not determined

Form: Flakes / Beads
Odor: None
%Sol. In Water: 100
Sp. Gravity: 2.13
Boiling Pt.: 2534 deg F (1390 deg C)
% Volatile: > Not Applicable
Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C)
Method Used: Not Applicable
Ignition Temperature: > Not determined
Explosion Limits in Air - Lower: Not applicable
Upper: Not applicable
Extinguishing Media:
None needed - use appropriate media for surrounding fire
Special Fire Fighting Equipment and Hazards:
Wear protective fire fighting clothing and avoid breathing vapors. Use SCBA in closed areas. Material is strongly caustic

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility: Aluminum, magnesium, water, organic materials, organic acids, copper, mineral acids, organic halogens, zinc, tin, bronze, brass, ally alcohols, hydrochloric acid, HF, nitric acid, oleum, sulfuric acid.
Hazardous Decomposition: None
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact: Immediately flush eyes with water for 30 minutes while holding eyelids open. See a doctor at once.
Skin Contact: Immediately wash with soap and water for 30 minutes. See a doctor at once. Destroy contaminated shoes and clothing.
Swallowing: DO NOT induce vomiting. Give 2 glasses of milk (preferred) or water and take to hospital at once.
Inhalation: Remove to fresh air. See a doctor at once. If breathing has stopped begin artificial respiration
Notes: None

SECTION 5 - HANDLING PRECAUTIONS:

Ventilation:
General and local ventilation if mist or dusts are generated.

Respiratory Protection:
Use NIOSH approved respirator with dust & mist protection required if airborne concentrations exceed TLV. At concentrations up to 100 ppm, a high-efficiency particulate respirator is recommended. Above this level, a self-contained breathing apparatus is advised

Protective Clothing:
Face Shield, rubber boots, chemical slicker suit, impervious neoprene gloves, goggles.

Eye Protection:
Chemical goggles required and an eye wash in work area.

Exposure Guidelines:
TLV (ceiling) 2 mg/m³ (ACGIH 86-87). PEL is 2 mg/m³ OSHA (86)

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills: Wearing full protective clothing, scoop up with a clean shovel and place in a clean dry container and cover. Flush residual with plenty of water.

Disposal Method
Product: Ship via permitted waste hauler to permitted hazardous waste disposal facility.
Container: Send empty bags to sanitary land fill. Render other containers unusable by puncturing or crushing.

Degradability: Not biodegradable
Fish Toxicity: Low toxicity to fish
CERCLA Reportable Quantity: 1000 lbs.
RCRA Hazardous Waste Number: D002, D003 (Corrosive, Reactive)

SECTION 7 - TOXICOLOGY:

Eye Contact: Corrosive. Rapidly causes pain, burns, corneal injury. May cause permanent damage and blindness.

Skin Contact: Corrosive. Rapidly causes burns, redness, swelling and damage to tissue. Not likely to be absorbed in toxic amounts. Pain may be delayed.

Swallowing: Corrosive. Causes pain and severe burns to mouth, throat and stomach. Can cause vomiting, airway obstruction. Can affect heart and blood vessels.

Inhalation: Corrosive. Short exposure can injure lungs, throat, mucous membranes and reduce lung capacity. Causes pain, burns, choking, and coughing.

Carcinogens: Not listed by IARC, USA NTP, or USA OSHA.

Other: None

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.
Physical Hazard: Corrosive.
Handling and Storage Precautions:
Store in dry place. Keep away from moisture, acid, and liquid organics, including alcohols.
Packaging Requirements:
Paper bag (minimum 3 ply), or other industrial container designed for powders and granulated materi
Additional Information:
70 pounds/cubic foot bulk density

SECTION 9 - REGULATORY INFORMATION:

This product contains toxic chemicals subject to the reporting requirements of Section 313 of Title III of t Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372: Sodium Hydroxide

Acute: Yes Chronic: Yes Flammability: No Pressure: No Reactivity: No

Extremely Hazardous Substance : No
CERCLA Hazardous Substance: Yes Contains Sodium Hydroxide (RQ = 1,000 pounds)
NFPA Rating:
Health 3 ; Flammability 0 ; Reactivity 1; Other: None
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

Section 6 Spill & Disposal
Section 9 Regulatory Information

SHIPPING INFORMATION:

ICC Tariff Classification: Compound, Boiler Cleaning, Scale Removal, Solid
ICC Item Number: 138640 ICC Class: 50 LTL TL
Department of Transportation - (DOT):
Description: Hazardous Material/Hazardous Substance ***
Hazard Class: 8 (corrosive)
Shipping Name: Sodium Hydroxide, Solid, 8, UN 1823, PG II
DOT Label: Corrosive 8
Comment: IF RQ IS EXCEEDED IN SINGLE CONTAINER, MATERIAL IS A HAZARDOUS MATERIAL AND HAZARDOUS SUBSTANCE; ADD THE LETTERS RQ TO END OF SHIPPING DESCRIPTION.
Tank Exempt.#: N/A
CERCLA RQ: 1,000 lbs.
US Foreign Trade Schedule B# (Export): 2815.11.0000
Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services, Incorporated. The information here believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem Industrial Services regarding the accuracy or completeness of the information.

PETROLITE

MATERIAL SAFETY DATA SHEET
Petrolite Corporation

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION	
PRODUCT NAME: CCI0801	
MANUFACTURER/SUPPLIER Petrolite Corporation 369 Marshall Ave St. Louis, Mo 63119-1897 CUSTOMER CARE: 1-800-872-1916 8:00am-5:00pm Monday-Friday (CST)	EMERGENCY TELEPHONE NUMBERS (24 HOUR): Chemtrec: 800-424-9300
Preparer: Gary Bowman	Date of Last Revision: 05/04/97
Title: Product Manager	Supercedes MSDS Dated: 01/02/97

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	HAZARDOUS INGREDIENTS	CAS #	WT/WT %
01	Methanol	67-56-1	1-5
02	Sulfur containing polyamide	Trade Secret	10-30

ITEM	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-STEL	COMPANY TLV-TWA	SKIN
01	200 ppm	250 ppm	200 ppm	N.E.	N.E.	Y
02	N.E.	N.E.	N.E.	N.E.	N.E.	N

LEGEND:
N.A.: Not Applicable
N.E.: Not Established
N.D.: Not Determined
(C): Ceiling Limit
Y: Skin absorption is significant to overall exposure
N: Skin absorption is not significant

SECTION 3 - HAZARDS IDENTIFICATION

****
********** EMERGENCY OVERVIEW **********
****

APPEARANCE: Amber liquid

ODOR: Amine odor

SIGNIFICANT HAZARDS:

Severely irritating to the eyes and skin. Irritating to the respiratory tract. Contains a material which can be absorbed through the skin. Contains a material which can cause visual disturbances. Contains a material which can cause nervous system effects. Contains a material which may cause embryo/fetotoxicity based on animal data.

POTENTIAL HEALTH EFFECTS

EYE CONTACT:
Direct eye contact may cause severe irritation or burns. If not immediately removed, may cause permanent eye damage. Mists and vapors may cause moderate to severe eye irritation.

SKIN CONTACT:
Prolonged and repeated skin contact may cause dermatitis, drying and defatting due to the solvent properties. Prolonged and repeated skin contact may cause moderate to severe skin irritation and possibly burns. A component(s) of this product can be absorbed through the skin upon direct contact, possibly resulting in toxic effects similar to those of inhalation.

THIS MSDS PRODUCED BY PETROLITE CORPORATION, ST. LOUIS, MO.
PRODUCT WARRANTY, DISCLAIMER AND LIMITATION OF LIABILITY ARE FOUND ON THE LAST PAGE
CONTINUED ON NEXT PAGE

SECTION 3 - HAZARDS IDENTIFICATION - continued

INHALATION:
Inhalation may cause intense irritation to the respiratory tract (nose, mouth, mucous membranes). Inhalation of high concentrations may cause headache, nausea, giddiness and shortness of breath. Prolonged, repeated, or high exposures to the vapor of a component(s) of this product may cause visual disturbances and eye damage.

INGESTION:
Harmful if swallowed. May be readily absorbed through the gastrointestinal tract. May result in irritation or burns to the mouth and digestive system. Effects of ingestion are similar to those of inhalation.

CHRONIC EFFECTS:
Ingestion or inhalation of high concentrations of a component(s) of this product may result in visual disturbances. In extreme cases, may cause temporary or permanent blindness, metabollic acidosis, and central nervous system depression which can possibly lead to death. Studies have shown that inhalation of a component in this product has produced teratogenic effects in laboratory animals. Animal studies have shown that a component(s) of this product is associated with adverse effects of embryo/fetotoxicity at non-maternally toxic dosage levels.

CARCINOGENICITY:
No known information.

SECTION 4 - FIRST AID MEASURES

FIRST AID PROCEDURES

EYES:
If material gets into eyes, flush with water immediately for 15 minutes. Consult a physician.

SKIN:
Wash skin thoroughly with soap and water. If rash or irritation develops, consult a physician. Launder clothing before reuse.

INHALATION:
If inhaled, remove to fresh air. Administer oxygen if necessary. Consult a physician if symptoms persist or exposure was severe.

INGESTION:
Due to possible aspiration into the lungs, DO NOT induce vomiting if ingested. Have the victim drink 8 to 10 ounces (240 - 300 ml) of water to dilute the material in the stomach. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have the victim lean forward to reduce the risk of aspiration. Consult a physician immediately.

NOTE TO PHYSICIAN

NOTE TO PHYSICIAN:
Administer activated carbon if indicated.

SECTION 5 - FIRE-FIGHTING MEASURES

Flashpoint and Method:	>93 C (>200 F) SFCC ASTM D-3828	Autoignition Temperature:	N.D.
Flammable Limits:	LEL: N.D.	UEL: N.D.	

HAZARDOUS COMBUSTION PRODUCTS:
Oxides of nitrogen and sulfur. Carbon monoxide. Carbon dioxide.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
None known.

EXTINGUISHING MEDIA: Alcohol Foam, CO_2, Dry Chemical, Foam, Water Fog

FIRE-FIGHTING INTRUCTIONS:
Use a self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode. Non-flammable. Cool fire-exposed containers using water spray.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

LEAKS OR SPILLS:
Use personal protective equipment as necessary. Absorb with suitable chemical absorbent. Dispose of material in accordance with all federal, state and local regulations. Dike to prevent entering any sewer or waterway. Transfer liquid to a holding container.

OTHER:
No known information.

Refer to Section 15 for regulatory reporting requirements in the event of an accidental release.

SECTION 7 - HANDLING AND STORAGE

HANDLING AND STORAGE:
Avoid breathing vapor and contact with eyes, skin and clothing. Keep container closed when not in use. Chemical residue may remain in emptied container. Do not reuse empty containers without commercial cleaning or reconditioning. Use in well ventilated area.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:
General ventilation should be provided to maintain ambient concentrations below nuisance levels. Local ventilation of emission sources may be necessary.

PERSONAL PROTECTIVE EQUIPMENT (PPE):
Chemical-resistant gloves and chemical goggles, face-shield and synthetic apron or coveralls should be used to prevent contact with eyes, skin or clothing.

RESPIRATORY PROTECTION:
If concentrations exceed the exposure limits specified, use of a NIOSH-approved supplied air respirator is recommended. Where the protection factor is exceeded, use of a Self Contained Breathing Apparatus (SCBA) may be necessary.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Solubility in Water:	Soluble	pH @ 5.0% 75/25 Isopropanol/Water:	N.D
Density @ 60 F (16 C):	9.00 lb/USgal	Evaporation Rate:	Is slower than Ether
Boiling Point ASTM D-86:	N.D.	Vapor Density:	Is heavier than air
Vapor Pressure:	N.D.	Physical State:	Liquid

SECTION 10 - STABILITY AND REACTIVITY

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

INCOMPATIBLE MATERIALS AND CONDITIONS TO AVOID:
Keep away from strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:
No known information.

SECTION 11 - TOXICOLOGICAL INFORMATION

PRODUCT TOXICOLOGICAL INFORMATION

LD 50 Dermal	LD 50 Oral	LC 50 Inhalation	Eye Irritation Score	Skin Irritation Score
N.D.	<5g/kg-R	N.D.	4	1

OTHER:
No known information.

COMPONENT TOXICOLOGICAL INFORMATION:

Component	LD 50 Dermal	LD 50 Oral	LC 50 Inhalation
Methanol	15800 mg/kg-RB	5628 mg/kg-R	64000 ppm/4H-R
Sulfur containing polyamide	N.D.	N.D.	N.D.

LEGEND:
R = Rat
RB = Rabbit
M = Mouse
GP = Guinea Pig

SKIN AND EYE SCORE:
1 = No Effect / Slight Irritant
2 = Moderate Irritant
3 = Strong Irritant
4 = Skin: Extreme Irritant ; Eye: Extreme Irritant/Corrosive

SECTION 12 - ECOLOGICAL INFORMATION

An ECOTOX *Report is available for this product. Please contact Petrolite Corporation for a copy of this report.

OTHER:
No known information.

SECTION 13 - DISPOSAL INFORMATION

DISPOSAL INFORMATION:
Responsibility for proper waste disposal rests with the generator of the waste. Dispose of any waste material in accordance with applicable regulations. Note that these regulations may also apply to empty containers, liners, and rinsate. Processing, use, dilution, or contamination or this product may cause its physical and chemical properties to change.

SECTION 14 - TRANSPORTATION INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (D.O.T.) INFORMATION

Proper Shipping Name: Non-Hazardous per D.O.T.

D.O.T. Emergency Response Guide: N.A.	Marine Pollutant: N.A.

INTERNATIONAL MARITIME ORGANIZATION (I.M.O.) INFORMATION

Proper Shipping Name: NOT REGULATED BY I.M.O.

IMDG Code Page: N.A.	EMS Number: N.A.
MFAG Table Number 1: N.A.	MFAG Table Number 2: N.A.

Marine Pollutant: N.A.

SECTION 15 - REGULATORY INFORMATION

RCLA HAZARDOUS SUBSTANCES AND REPORTABLE QUANTITIES:
.e Petrolite product contains the following components that are subject to the release reporting requirements of the Comprehensive Environmental Response, Compensation, and Liability Act. Also listed is the Reportable Quantity (RQ) in pounds for each such component, and the amount of product, in gallons, that must be released or spilled in order to exceed the RQ.

Chemical Name	CAS Number	RQ #	RQ. GAL.
Methanol	67-56-1	5,000	17,015

SARA TITLE III:
This Petrolite product contains the following components that are identified as extremely hazardous substances by the Superfund Amendments and Reauthorization Act. Also listed is the Reportable Quantity (RQ) in pounds for each such component, and the amount of product, in gallons, that must be released or spilled in order to exceed the RQ; and the Threshold Planning Quantity (TPQ) in pounds for each such component, and the amount of product in gallons that contains the TPQ.

Chemical Name	CAS Number	RQ (lbs.)	RQ (gal.)	TPQ (lbs.)	TPQ (gal.)
No SARA Extremely Hazardous Substances are present in this material.					

Petrolite has determined that under Sections 311/312 of SARA Title III, the following hazard categories apply to this product:

Hazard: Immediate Health

SARA SECTION 313:
This Petrolite product contains the following components that are subject to the annual toxic release inventory reporting requirements of Section 313 of SARA Title III. Also listed is the concentration of the component, in weight percent, in the product, A component is not listed if its concentration is less than the de minimis level.

Chemical Name	CAS Number	Weight Percent
Methanol	67-56-1	3.2 %

TOXIC SUBSTANCES CONTROL ACT (TSCA):
.his product or its components, if a mixture, are listed on the TSCA inventory.

This Petrolite product contains the following components that are subject to the reporting requirements of TSCA Section 12(b) if exported from the United States:

Chemical Name	CAS Number
No TSCA 12(b) chemicals are present in the product.	

SIGNIFICANT NEW USE RULES (SNUR):
This product does not contain any components that are subject to a Significant New Use Rule (SNUR).

PENNSYLVANIA RIGHT-TO-KNOW:
The following non-hazardous ingredients are present in the product at greater than 3%:

Chemical Name	CAS Number
Water	7732-18-5
Acylated polyamine	Trade Secret

CONTINUED ON NEXT PAGE

SECTION 16 - OTHER INFORMATION

EPA HAZARD CLASSIFICATIONS:
Health: 3 Flammability: 1 Reactivity: 0 Special: COR

REVISION HISTORY:
6/21/96 updated sect. 3 chronic effects
12/10/95 updated sect. 3 chronic effects
10/22/96 new format
12/96 updated RQ's, sect. 15
05/97 Canadian Review
File 109

The information and recommendations contained hereon are believed to be accurate and reliable as of the date issued. However, we do not warrant their accuracy or reliability.

We only warrant to you, but no other persons, that the product referenced herein shall conform to our quality assurance specifications for the product on the date of shipment to you. WE EXPRESSLY DISCLAIM ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Any technical advice, information or recommendation given to you is given gratis without any warranty whatsoever as to the advice, information or recommendation given or results obtained.

shall assume all risks and shall be solely responsible for the results obtained from the storage, handling or use of the product and any information commendation regarding the product, whether alone or in combination with other substances.

UNDER NO CIRCUMSTANCES SHALL WE BE LIABLE FOR ANY ECONOMIC, CONSEQUENTIAL (INCLUDING LOST PROFITS OR SAVINGS) OR INCIDENTAL DAMAGES, EVEN IF WE ARE INFORMED OF THEIR POSSIBLITY, EXEMPLARY OR PUNITIVE DAMAGES, REGARDLESS OF THE FORM OR ACTION, WHETHER IN CONTRACT OR TORT, INCLUDING OUR SOLE OR JOINT NEGLIGENCE AND STRICT LIABILITY.

THIS MSDS PRODUCED BY PETROLITE CORPORATION, ST. LOUIS, MO.

SAFETY DATA

--- --- St. — P.O. BOX 23526
NEW ORLEANS, LA. 70183
(504) 733-8511

SECTION I - IDENTIFICATION

Chemical Names & Synonyms
Proprietary aqueous blend of organic and inorganic salts

Chemical Family	Formula	Trade Name
Not Applicable	Not Applicable	CEO 350-L

Description	Cas No.
Water white liquid - no odor	Not Applicable

SECTION II - NORMAL HANDLING PROCEDURES

Precautions To Be Taken In Handling And Storage

Store closed container away from excessive heat. Wear protective equipment when handling. Wash with soap and water after handling. Remove and contaminated clothes and launder before reuse.

Protective Equipment:	Ventilation Requirements:
Eyes - Goggles, Chemical Shield Gloves - Impervious Other - Chemical Apron	General ventilation is required

SECTION III - HAZARDOUS INGREDIENTS

Basic Material	CAS No.	%	OSHA PEL/TLV DATA
Sodium Nitrite	7632-00-0	20%	None Established
Sodium Borate	1303-96-4	2%	5 Mg/M3 TWA

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point Method	OSHA Classification	Flammable Explosion Limit	Lower	Upper
NA	Non-Flammable		N/A	N/A

Extinguishing Media Water Flood

Special Fire Hazard & Fire Fighting Procedures - Wear self contained breathing apparatus with full face piece and full body protective clothing when this product is involved in a fire.

SECTION V - HEALTH HAZARD DATA

Threshold Limit Value
Not established

Symptoms of Over Exposure
Severe eye irritation

Emergency First-Aid Procedures:
Skin - Wash with plenty of soap and water

Eyes - Immediately flush with plenty of water, continuing for at least 15 minutes and get medical attention.

Ingestion- Immediately give 2 to 4 glasses of water and induce vomiting by touching finger to back of throat. Continue until vomited fluid is clear. Get medical attention promptly. If cyanosis (blue skin) develops, give oxygen provided a qualified operator is available.

Inhalation

SECTION VI - TOXICOLOGY (PRODUCT)

Toxicology tests have not been performed on MECO Treat NBL. Base material toxicology testing classes this product as a skin and eye irritant.

Principal Routes of Absorption - Ingestion - Large quantities can result in cyanosis and marked fall in blood pressure leading to coma.

Effects of Acute Exposure
Eye and skin irritation.

Effects of Chronic Exposure
None known to exist.

SECTION VII - SPILL AND LEAKAGE PROCEDURES (CONTROL PROCEDURES)

Action For Material Release Or Spill

Wear protective clothing. Sponge or mop spilled material or use absorbent material. Flush spill area with water and recover rinsate for proper disposal.

Waste Disposal Method

Disposal of Sodium Nitrate waste may be subject to federal, state and local regulations. Users of this product should review their operation in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulating agencies before discharging or dispersing of waste material.

SECTION VIII - SHIPPING DATA

D.O.T. Oxidizing Material, N.O.S., Oxidizer, UN1749

SECTION IX - REACTIVITY DATA

Stable X Unstable At ___ C ___ F	Hazardous Polymerization	May Occur
		Will Not Occur

Conditions to Avoid - Temperatures of 320° C

Incompatibility (Material to Avoid) - Acids, ammonium compounds, reducing agents
Hazardous Decomposition Products - Gaseous nitrogen oxides

SECTION X - PHYSICAL DATA

Melting Point N.D.	Vapor Pressure N.D.	Volatiles N.D.
Boiling Point N.D.	Solubility in Water	Evaporation Rate N.D.
Specific Gravity (H_2O=1) 1.1-1.2	pH 9.0-10.0 (neat)	Vapor Density (AIR=1) N.D.

This Material Safety Data Sheet has been prepared in accordance with 29 CFR Part 1910.1200. It contains information that we believe to be true and complete at the date of preparation. However, no warranty is expressed or implied. Advise given under "Waste Disposal" assumes compliance with Federal, State and Local Regulations regarding the disposal of hazardous waste. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user.

Coastal Engineering Corporation
820 SAMS ST. — P. O. BOX 23526
NEW ORLEANS, LA. 70183
(504) 733-8511

FEB 14 1986
Date

MATERIAL SAFETY DATA SHEET

Latest Revision Date: -3/18/93
Print Date: -3/18/93
EMERGENCY PHONE NUMBER: 800-255-3924
24 Hour Emergency Phone Number for Transportation

SECTION 1 PRODUCT IDENTIFICATION

Product Name or Number:	CECO 1288
Sold By:	COASTAL ENGINEERING CORPORATION
Company Address:	P.O. BOX 23526 HARAHAN, LA. 70183
Company Phone Number:	(504) 733-8511
Trade Name:	CECO 1288
Chemical Name:	-Not Applicable
Synonyms:	-Not Applicable
Formula:	-Not Applicable
Chemical Family:	-Not Applicable
Description:	-Clear to hazy amber liquid
Cas Number:	-Not Applicable
Hazard Rating (NFPA):	-Health - 1 -Flammability -0 -Reactivity -0 -Personal Protection -See section 5
NFPA DESIGNATION KEY:	- 0 - Minimal 1 - Slight Hazard - 2 - Moderate Hazard 3 - Serious Hazard - 4 - Severe Hazard

SECTION 2 HAZARDOUS INGREDIENTS / HAZARD DATA

Chemical Name(s)	-Cas #	-%Wt.	-Osha Pel	-Acgih Tlv
Potassium Hyroxide	1310-58-3	10-15	2 mg/m³	2mg/m³ (15 min)
Tolytriazole	64665-57-2	1-5	Not	Established
Polymaleic Acid	26099-09-2	1-10	Not	Established
1-Hydroxyethylidene-1,1-diphosphonic Acid	2809-21-4	1-10	Not	Established

SECTION 3 PHYSICAL DATA

Boiling/Melting Point @ 760 mm Hg:	-Not Determined
pH:	-12-12.3 (neat)
Vapor Pressure mm Hg @ 20° C:	-Not Determined
Vapor Density (Air = 1):	-Not Determined

Percent Volatile by Weight (%):	•85
Specific Gravity or Bulk Density:	-1.0-1.1
Solubility in Water:	-Complete
Evaporation Rate (BuAC = 1):	•Not Determined
Appearance:	•Clear to hazy light amber liquid
Odor:	•Aromatic

SECTION 4 HANDLING AND STORAGE

Storage: Store CLOSED container away from excessive heat. Do not allow product to freeze or get above 140°F.

Handling: Wear protective equipment and clothing when handling. Wash with soap and water after handling. Remove any contaminated clothing and launder before reuse.

SECTION 5 PERSONAL PROTECTION

Respiratory Protection: Not necessary if using a local exhaust system.

Ventilation: Local exhaust ventilation

Protective Clothing: Wear long sleeve, heavy cloth, work shirts and work pants. Wear rubber gloves and chemical aprons when working with products.

Eye Protection: Wear dust proof/splash proof chemical goggles when handling this product.

Other Precautions: Have an eyewash/safety shower located in work area where products is used.

SECTION 6 SPILL AND LEAKAGE (CONTROL PROCEDURES)

Material Release or Spill: Wear protective clothing. Dike area to prevent spreading of the spill. Sponge or mop the spilled material or use absorbent material. Place recovered material in a recovery barrel for reuse or disposal. Flush spill area with water and recover the rinsate for proper disposal. Do not flush products to open sewers or to streams.

Waste Disposal Method: Dispose of waste liquid in a chemical landfill or a hazardous waste disposal site. Disposal must be in accordance with federal, state and local regulations.

SECTION 7 REACTIVITY DATA

Product Stability: •Stable__X___ • Unstable_____

Conditions to Avoid: Do not store in areas extreme heat. Do not allow the product temperature to exceed 140° F. Do not allow product to freeze.

Chemical Incompatibility: Do not contact with strong acids.

Hazardous Decomposition Products: Carbon dioxide and oxides of nitrogen may be generated by thermal degradation.

Hazardous Polymerization: May Occur:
Will Not Occur: X

SECTION 8 HEALTH HAZARD DATA * EFFECTS OF OVEREXPOSURE

Primary Route of Exposure: Eye and skin contact.
Acute Effects: Toxicological studies have not been performed on CECO 1288.
Base material testing information indicates the following.
.Skin Contact: Contact of product with skin may cause skin irritation and possible burns.
.Eye Contact: Direct contact of product with eyes can cause irritation and possible burns of the eye.
.Ingestion: Ingestion of this product may cause severe irritation and burns of the mouth, esophagus and stomach. Ingestion may cause nausea, vomiting and collapse.
.Inhalation: Inhalation of mists of product may cause severe irritation and burns of the nasal system and throat.
Chronic Effects of Overexposure: Dermatitis of the skin with possible conjunctivitis of the eyes.
Carcinogenicity:
NTP: This product does not contain base materials found as a suspected carcinogen.
IARC: This product does not contain base materials found as a suspected carcinogen.
OSHA Regulated: This product does not contain base materials regulated by OSHA.
Mutagen, Teratogen Information: •No data found.
Allergic Sensitization: •No data found.

SECTION 9 TOXICOLOGY INFORMATION

Routes Of Entry: Ingestion and inhalation of mists.
Toxicology tests: Toxicology tests have not been performed on CECO 1288.
Base material toxicology classifies this product as toxic, corrosive and a skin and eye irritant.
Toxicological data found on base materials is reported.

Potassium Hydroxide	Oral(Rat)LD 50	365mg/kg
Polymaleic Acid	Oral(Rat) LD 50	15,000 mg/kg (neut.to pH7)
1-Hydroxyethylidene-1,1-diphosphonic Acid	Oral(Rat)LD 50	2400 mg/kg
	Dermal(Rabbit)LD 50	7940 mg/kg

Target Organs: Not Determined

SECTION 10 EMERGENCY AND FIRST AID PROCEDURES

Skin: Wash skin with plenty of soap and water. Remove and launder clothing items before reuse. Seek medical attention for irritation.

Eyes: Flush eyes immediately for 15 minutes holding eyelids apart to obtain best results. Seek medical attention for discomfort.

Ingestion: Do not induce vomiting. Drink several glasses of water or milk. Seek immediate medical attention.

Inhalation: Remove immediately from exposed area to fresh air. If breathing has stopped, start resuscitation, administer oxygen and seek medical attention.

SECTION 11 FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Test Method): Not Applicable

Autoignition Temperature: Not Applicable

Flammability Limits In Air (% V): LOWER: Not Applicable

UPPER: Not Applicable

Extinguishing Media: Carbon dioxide, chemical foam, water, whichever is suitable for surrounding fire.

Special Fire Fighting Procedures: Wear self contained breathing apparatus with full face piece and full body protective clothing when this product is involved in a fire.

Unusual Fire & Explosion Hazards: None.

SECTION 12 ENVIRONMENTAL DATA

Environmental Toxicity Data: This product has not been evaluated as a whole. Base material data found is reported.

1-Hydroxyethylidene-1,1-diphosphonic Acid	Rainbow Trout 96 Hr. LC 50	368 mg/l
	Daphnia Magna 48 Hr. EC 50	527 mg/l
Polymaleic Acid:	Rainbow Trout 96 Hr. LC 50	>2500 ppm
	Daphnia Magna 48 Hr. IC 50	>1000 ppm

CERCLA Reportable: This product if spilled is a CERCLA reportable material.

Waste Disposal Method: This product is a RCRA waste. Dispose of product in a chemical landfill or a hazardous waste disposal site. Disposal must be in accordance with federal, state, and local regulations.

Container Disposal: This product is a RCRA waste. Triple rinse the container disposing of the rinsate in an approved manner. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities.

Hazardous Waste 40CFR261: D002

Threshold Planning Quantity: None

Name: CECO 1288

EPA 40 CFR 355 (SARA 301-304) Toxic Chemical Release: This product is a reportable Toxic Release Chemical.

Reporting EPA 40CFR372 (SARA 311-313): This product does not contain a chemical which is listed in Section 313 above the de minimus concentration Sodium Hydroxide Case No. 1310-73-2

SECTION 13 SHIPPING DATA

D.O.T. Proper Shipping Name:	-Corrosive Liquid, N.O.S.(contains sodium hydroxide),R.Q., UN 1760
Hazardous Substance 49CFR CERCLA:	-R.Q.
D.O.T. Hazard Class:	-Corrosive
D.O.T. Labels Required:	-Corrosive
D.O.T. Placards Required:	-Corrosive
UN/NA Code:	-UN 1760
Bill of Lading Description:	-Rust preventing compound, Liquid O/T petroleum
CC Number:	-65

24 Hour Emergency Telephone Number for Transportation: (504) 733-8511

SECTION 14 REGULATORY INFORMATION SECTION

Workplace Classifications: This product is considered hazardous under the OSHA Hazard Communications Standard (29CFR 1910.1200).

Transportation Classifications:

US DOT Hazard Class: Corrosive.

Emergency Planning and Community Right to Know (SARA Title 3)

Section 311/312 Categorizations (40CFR370): This product is a hazardous chemical under 29 CFR 1910.1200. This product is categorized as an immediate health hazard.

Section 313 Information (40CFR372): This product does contain a chemical which is listed in Section 313 above de minimus concentration.

CERCLA Information (40CFR302.4): This material has a reportable quantity under the Comprehensive Environmental, Response, Compensations, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304. The materials hazardous waste number and reportable quantity is listed below. Releases of this material in excess of its reportable quantity must be reported to the National Response Center (1-800-424-8802) and to the appropriate state and local emergency response organizations Waste Number: D002 • R.Q.: 20,000 lbs.

RCRA Information: When a decision is made to discard this material as supplied, it is classified as a RCRA waste.

Chemical Control Laws:

FIFRA: Not Regulated

Name: CECO 1288

TSCA: This product is not listed on the TSCA. However, the basic components are listed.

USDA: This product is not authorized for use in food producing facilities under USDA guidelines.

FDA: This product is not authorized by the FDA to come in contact with food.

SECTION 15 SUPPLIER INFORMATION

This Material Safety Data Sheet has been prepared in accordance with 29 CFR 1910.1200. It contains information that we believe to be true and complete at the date of preparation. However, no warranty is expressed or implied. Advice given under "Waste Disposal" assumes compliance with Federal, State, and Local Regulations regarding the disposal of Hazardous Waste. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user.

Name CECO 1288

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: COASTAL ENIGNEERING CORPORATION	EMERGENCY TELEPHONE NO.: 504/733-8511
ADDRESS (Number, Street, City, State, and ZIP Code): 820 Sams Street, Harahan, Louisiana 70123	
CHEMICAL NAME AND SYNONYMS:	TRADE NAME AND SYNONYMS: Ceco Cide BG-1
CHEMICAL FAMILY:	FORMULA:

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Alkyl Dimethylbenzylammonium Chloride	13.5	
Tributyltin Neodecanoate	5.0	
Alkyl Dimethylethylammonium Bromide	1.5	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	.998
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Clear to light straw color liquid		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	N/A			
SPECIAL FIRE FIGHTING PROCEDURES	N/A			
	N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS	N/A			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE
Severe skin and eye irritant. Fatal if swallowed.

EMERGENCY AND FIRST AID PROCEDURES
Skin contact, flush with plenty of water. Eye contact, contact physician. If ingested, drink large quantities of milk, raw egg whites, gelatin solution or water. To Physician: Probable muscosal damage may contraindicate gastric lavage. Measures against circulatory shock, respiratory depression, and convulsions may be needed.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	XX	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Absorb spills onto inert absorbent material such as sawdust or clay and place in trash receptacle.

WASTE DISPOSAL METHOD
Incinerate. Follow local, state and federal regulations and codes regarding disposal.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Not required

VENTILATION	LOCAL EXHAUST	Recommended	SPECIAL
	MECHANICAL *(General)*	Acceptable	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Neoprene or rubber	Safety goggles

OTHER PROTECTIVE EQUIPMENT
Face shield recommended

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Read and follow all label directions

OTHER PRECAUTIONS
Keep out of reach of children. Avoid contamination of food or feedstuffs. Toxic to fish. Keep out of lakes streams, or ponds.

GPO 930-560

MATERIAL SAFETY DATA SHEET

Coastal Engineering Corporation
820 SAMS ST. — P. O. BOX 23526
NEW ORLEANS, LA. 70183
(504) 733-8511

Product Name: OECOTROL 1284 Date: 8/02/85
Hazard(s) as defined by OSHA Hazard Communication Standard:
Corrosive to eyes. Irritating to skin.
Sensitizer.

COMPONENTS

Chemical Name	% by wt	TLV
Sodium 2-mercaptobenzothiazole CAS Registry Number: 2492-26-4	1.25	N/A
Potassium hydroxide CAS Registry Number: 1310-58-3	1.55	2 mg/m3

The balance of the components comprises proprietary information.

PHYSICAL DATA

Appearance: Pale yellow liquid
Odor: Slight
Boiling point: Above 212 °F
Solubility: Complete in water
Specific gravity: 1.190
pH (neat): Greater than 12
pH (100 ppm in water): 9 - 10

FIRE AND EXPLOSION DATA

Flash point: None below 212 °F Flammable limits: N/A
Extinguishing Media: Water fog, carbon dioxide, foam, dry chemical
Special Firefighting Procedures: None

REACTIVITY DATA

Stability: Stable Incompatibility: Strong acids
Hazardous Decomposition Products: None

HEALTH HAZARD DATA

Acute Effects: Not tested.
Irritant Effects: Corrosive to eyes. Irritating to skin.
Sensitization Effects: Sodium 2-mercaptobenzothiazole is a sensitizer.
Carcinogenic Potential: Not listed in any of OSHA Standard, Section 1910.1200 sources as carcinogenic; not tested by Buckman Laboratories, Inc.
Other Health Effects: None known.

HANDLING PRECAUTIONS

Rubber gloves and safety glasses or goggles are required. Body-protective clothing and shoes are recommended. Eye-wash fountains in the work place are recommended.

EMERGENCY AND FIRST AID INSTRUCTIONS

Eye exposure: Flush with clean, cool water for 15 minutes. See a physician.
Skin exposure: Wash with soap and water. See a physician if irritation occurs. Remove and wash contaminated clothing.
Inhalation: Remove to fresh air.

SPILL, LEAK, AND DISPOSAL PROCEDURES

Large spills: Dam area to prevent spill from spreading. Dispose of as below.
Small spills: Flush liquid to sewer with copious amounts of water.
Product disposal: Product is hazardous waste, EPA Hazard Code (C), EPA Hazardous Waste Number D002, due to pH.
Container disposal: Offer for recycling or triple rinse and dispose of in an approved landfill.

REGULATORY CLASSIFICATIONS

DOT Shipping:	Nonhazardous.
EPA Registration:	N/A
TSCA Inventory:	All components are included in the Inventory.
FDA Regulation(s):	21 CFR 176.210 and 176.170

The information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described in the Product Data Sheet is the responsibility of the user.

This Material Safety Data Sheet was prepared to comply with the OSHA Hazard Communication regulations.

MSDS

Stockcode (Product ID) : LP150-A07693 Page number 1 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 2/14/86 Trade Secret? N Product CAS: 7782-50-5

Product Name: CHLORINE CYLINDER SIZE VCL 150 LB.

Special Handling Instructions:

STORE OUTSIDE OR IN A WELL-VENTILATED AREA. WEAR GOGGLES, SELF-CONTAINED BREATHING APPARATUS, AND RUBBER OVERCLOTHING, (INCLUDING GLOVES).

General Short Name: CHLORINE

Synonym 1 :

2 :

3 :

4 :

5 :

HEADER INFORMATION

MCKESSON CHEMICAL COMPANY ONE POST STREET SAN FRANCISCO, CA 94104 EMERGENCY ASSISTANCE: CALL CHEMTREC (800) 424-9300.

Manufacturer: MCKESSON CHEMICAL COMPANY

Catalog # FORMULA: CL2

PRODUCT ID TEXT

EPA REG. NO.: 1662-32 MCKESSON CODE: T1011

SECTION II – HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	PCT	FORMULA	PEL	TLV
CHLORINE	7782-50-5	100	CL2	1	1

HAZARDOUS INGREDIENTS TEXT

SECTION III - PHYSICAL DATA

Appearance: GREENISH-YELLOW GAS OR LIQUID

Odor: SUFFOCATING, PUNGENT ODOR

Boiling Point: -29 F Specific Gravity (H2O=1) :

Melting Point: -150 F Vapor Pressure (mm Hg) : 20

Solubility in Water: .7 Vapor Density (air=1) : 2.5

Evaporation Rate (butyl acetate=1) : N/A

PHYSICAL DATA TEXT

SECTION IV – FIRE/EXPLOSION HAZARD

Flash Point : NONE

Flash Point Method Used: N/A

Lower Explosion Limit: N/A Upper Explosion Limit: N/A

Extinguishing Media:

USE WATER SPRAY, DRY CHEMICAL OR CO2.

Special Fire Fighting Procedures:

FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

Unusual Fire & Explosion Hazard:

CHLORINE WILL SUPPORT THE BURNING OF COMBUSTIBLE MATERIAL JUST AS OXYGEN DOES. FLAMMABLE GASES AND VAPORS CAN FORM EXPLOSIVE MIXTURES WITH CHLORINE.

NFPA Labeling : 3 Health Hazard – Blue Label (0-4)

MSDS

Stockcode (Product ID) : LP150-A07693 Page number 2 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 2/14/86 Trade Secret? N Product CAS: 7782-50-5

Product Name: CHLORINE CYLINDER SIZE VCL 150 LB.

0 Flammability -- Red Label (0-4)

0 Reactivity -- Yellow Label (0-4)

OXY Special Note -- White Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

SPECIAL FIRE FIGHTING PROC.: TANKS AND CYLINDERS WILL RELEASE CHLORINE WHENFUSIBLE METAL SAFETY PLUGS MELT AT 158-165 F. UNUSUAL FIRE AND EXPLOSION HAZARDS: LIQUID CHLORINE CAN IGNITE SOLID METALSSUCH AS ALUMINUM, CARBON STEEL, AND FINELY DIVIDED IRON.

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N) : IARC Monographs N OSHA Regulated N NTP N

Route of Entry (Y or N) : Inhalation Y Ingestion Skin

Signs & Symptoms of Exposure:

INHALATION: VAPORS AND MISTS IRRITATE THE NOSE AND THROAT. INHALATION OFHIGHER CONCENTRATIONS MAY CAUSE HEADACHES, NAUSEA, VOMITING, AND COMA. INHALA-TION OF VERY HIGH CONCENTRATIONS OR PROLONGED EXPOSURE MAY CAUSE UNCONSCIOUS-NESS OR DEATH. SEE TEXT.

Medical Conditions Aggravated by Exposure:

NONE KNOWN

Emergency & First Aid Procedures:

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING GET IMMEDIATE MEDICAL ATTENTION. IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OR RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION. IN CASE OF SKIN CONTACT: VENT FOR INHALATION EXPOSURE FIRST. IMMEDIATELY FLUSH SKIN WITH LOTS OF RUNNING WATER FOR 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. IF SWALLOWED: DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE LOTS OF WATER OR MILK. GET IMMEDIATE MEDICAL ATTENTION. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON.

HEALTH HAZARDS TEXT

EYE CONTACT: VAPORS, LIQUID, AND MISTS ARE EXTREMELY CORROSIVE TO THE EYES. BRIEF CONTACT OF THE VAPORS WILL BE SEVERELY DAMAGE THE EYES AND PROLONGED CONTACT MAY CAUSE PERMANENT EYE INJURY WHICH MAY BE FOLLOWED BY BLINDNESS. SKIN CONTACT: LIQUID CHLORINE WILL BURN THE SKIN. HIGH CONCENTRATIONS OF GAS WILL IRRITATE THE SKIN AND MAY FORM BLISTERS. SWALLOWED: SWALLOWING IS UNLIKELY BECAUSE CHLORINE IS A GAS AT ROOM TEMPERA- TURE AND PRESSURE. INGESTION OF LIQUID WOULD CAUSE SEVERE INTERNAL INJURIES. CHRONIC EFFECTS OF EXPOSURE: MAY CAUSE CORROSION OF THE TEETH, SKIN IRRITATION AND REDUCED RESPIRATORY CAPACITY. TOXICITY ORAL: NO DATA FOUND BECAUSE CHLORINE IS A GAS AT ROOM TEMPERATURE. DERMAL: NO DATA FOUND BEACUSE CHLORINE IS A GAS AT ROOM TEMPERATURE. INHALATION: HUMAN LCLO=873 PPM/30 MIN; RAT LC50=293 PPM/1 HR; MOUSE LC50=137 PPM/1 HR.

SECTION VI -- REACTIVITY DATA

Stable (Y or N) : Y Hazardous Polymerization (Y or N): N

Stability Conditions to Avoid:

INTENSE LOCAL HEAT

Hazardous Polymerization Conditions to Avoid:

N/A

Incompatibility (Materials to Avoid):

Hazardous Decomposition or By Products:

REACTIVITY DATA TEXT

INCOMPATIBILITY: REDUCING AGENTS, COMBUSTIBLE MATERIALS, ORGANIC CHEMICALS, FINELY DIVIDED METALS AND WATER. HAZARDOUS DECOMPOSITION PRODUCTS: CHLORINE DOES NOT DECOMPOSE BUT REACTS WITH WATER TO FORM HYDROCHLORIC ACID AND WITH CARBON MONOXIDE TO FORM

MSDS

Stockcode (Product ID) :	LP150-A07693				Page number	3	of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y	Product from MMIS?	Y
MSDS's Date:	2/14/86			Trade Secret?	N	Product CAS:	7782-50-5
Product Name:	CHLORINE CYLINDER SIZE VCL 150 LB.						

PHOSGENE.

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

ONLY SPECIALLY TRAINED PERSONNEL SHOULD ATTEMPT REPAIRS. WEAR ACID-RESISTANT SLICKER SUIT AND COMPLETE PROTECTIVE EQUIPMENT INCLUDING RUBBER GLOVES, RUBBER BOOTS, AND CHEMICAL GOGGLES AND FACESHIELD. WEAR SELF-CONTAINED BREATHING APPARATUS. STOP THE FLOW OF GAS. IF THE LEAK CANNOT BE STOPPED IN PLACE AND IS IN AN ENCLOSED PLACE, MOVE THE CONTAINER TO THE OPEN AIR IF IT SAFE TO DO SO.

Waste Disposal Method:

SAFE HANDLING PROCEDURES TEXT

SPILL OR RELEASE MEASURES CON'T: SHIFT THE CONTAINER SO GAS, RATHER THAN LIQUID, LEAKS. REPAIR THE LEAK OR APPLY AN EMERGENCY KIT. NEVER APPLY WATER TO A CHLORINE LEAK. DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEAN ING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPRO- PRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES. NOTE: EMPTY CONTAINERS CAN HAVE RESIDUE, GASES AND MIST AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

SECTION VIII -- SPECIAL PROTECTION

Protective Gloves: RUBBER GLOVES

Eye Protection: CHEMICAL GOGGLES

Respiratory Protection (specific type):

Ventilation Instructions:

LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW THE PEL.

Other Protective Clothing or Equipment:

LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, RUBBER GLOVES AND RUBBER APRON. AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

Work/Hygenic Practices:

SPECIAL PROTECTION TEXT

RESPIRATORY PROTECTION: NIOSH-APPROVED ACID-GAS CANISTER FOR LOW CONCENTRATION ONLY. NIOSH-APPROVED FULL FACEPIECE CARTRIDGE RESPIRATOR FOR NON-ROUTINE USE. SELF-CONTAINED BREATHING APPARATUS FOR EMERGENCY USE.

SECTION IX -- SPECIAL PRECAUTIONS

Handling/Storage Precautions:

STORE IN A COOL, DRY AREA OUT OR DIRECT SUNLIGHT AND PROTECTED FROM MOISTURE. STORE AWAY FROM OTHER COMPRESSED GASES AND COMBUSTIBLE MATERIALS. USE ONLY AN APPROVED CHLORINE WRENCH.

SPECIAL PRECAUTIONS TEXT

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL ON OR NEAR THIS CONTAINER. OTHER PRECAUTIONS: DO NOT ATTEMPT TO HANDLE, STORE, OR USE CHLORINE WITHOUT A COMPLETE REVIEW BY ALL PERSONNEL OF THE CHLORINE INSTITUTE'S CHLORINE MANUAL. ALSO, ATTENDANCE AT A MCKESSON CHEMICAL COMPANY SEMINAR ON CHLORINE HANDLING IS SUGGESTED. CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

TRAILER TEXT

1st SECTION EXTRA TEXT

MSDS

Stockcode (Product ID) :	LP150-A07693			Page number	4	of	4
MSDS Part	1	of	1	Kit?	N	Hazardous?	Y
Product from MMIS?	Y						
MSDS's Date:	2/14/86			Trade Secret?	N	Product CAS:	7782-50-5
Product Name:	CHLORINE CYLINDER SIZE VCL 150 LB.						

Which Section Needs This Additional Text? : 5 (1-9)

OTHER DATA: THE ODOR THRESHOLD FOR CHLORINE GAS IS 0.02-0.2 PPM ALTHOUGH OLEFACTORY FATIGUE MAY DEVELOP AFTER CHRONIC LOW LEVEL EXPOSURES. AT 0.2-0.5 PPM IN AIR THERE ARE NO REPORTED LONG-TERM EFFECTS; 1-3 PPM IRRITATE THE NOSE AND EYES; 6 PPM IRRITATES THE THROAT; 30 PPM CAUSES INTENSE COUGHING; 40-60 PPM MAY CAUSE SERIOUS DAMAGE; 100 PPM MAY CAUSE LETHAL DAMAGE; 1000 PPM MAY BE FATAL WITH A FEW DEEP BREATHS.

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

MSDS

Stockcode (Product ID) : LP150-M07723 Page number 1 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 1/6/92 Trade Secret? N Product CAS:

Product Name: CHLORINE 90 % AVAILABLE 50 POUND PAILS

Special Handling Instructions:

KEEP OUT OF REACH OF CHILDREN. HIGHLY CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. CAUSES BURNS TO SKIN. IRRITATING TO NOSE AND THROAT. MAY BE FATAL IF SWALLOWED.

General Short Name: CHLORINE

Synonym 1 : FREESTYLE SLOW TABS 50#

2 : 1,3,5 - TRICHLORO-S-TRIAZINE - 2,4,6

3 : (1H,3H,5H) - TRIONE TRICHLOROISOCYANURIC ACID

4 : TRICHLORO-S-TRIAZINETRIONE

5 :

HEADER INFORMATION

NA

Manufacturer: HARCROS CHEMICALS

Catalog # 26-20800-03 FORMULA: C(3)N(3)O(3)CL(3)

PRODUCT ID TEXT

HARCROS CHEMICALS 5200 SPEAKER RD KANSAS CITY, KS 66106 PHONE NO.: 913-321-3131
TRANSPORTATION EMERGENCY PHONE NO.: 1-800-424-9300

SECTION II -- HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	PCT	FORMULA	PEL	TLV
TRICHLORO-S-TRIAZINETRIONE	87-90-1	99	C3N3O3Cl3	ND	10mg/m3

HAZARDOUS INGREDIENTS TEXT

SECTION III - PHYSICAL DATA

Appearance: WHITE TO OFF-WHITE SOLID

Odor: SLIGHT CHLORINE ODOR

Boiling Point: N/A Specific Gravity (H2O=1) :

Melting Point: 437-466 F Vapor Pressure (mm Hg) : N/A

Solubility in Water: 1.2 % Vapor Density (air=1) : N/A

Evaporation Rate (butyl acetate=1) : N/A

PHYSICAL DATA TEXT

NA

SECTION IV -- FIRE/EXPLOSION HAZARD

Flash Point : NON-FLAMMABL

Flash Point Method Used:

Lower Explosion Limit: N/A Upper Explosion Limit: N/A

Extinguishing Media:

FLOOD WITH WATER

Special Fire Fighting Procedures:

PREVENT HUMAN EXPOSURE TO FIRE, FUMES, SMOKE, AND PRODUCTS OF COMBUSTION. EVACUATE NON ESSENTIAL PERSONNEL. FIRE FIGHTERS SHOULD WEAR FULL FACE, SELF CONTAINED BREATHING APPARATUS AND IMPERVIOUS PROTECTIVE CLOTHING.

Unusual Fire & Explosion Hazard:

SMALL QUANTITIES OF WATER REACT WITH TRICHLORO-S-TRIAZINETRIONE TO FORM HAZARDOUS QUANTITIES OF NITROGEN TRICHLORIDE WHICH IS VIOLENTLY EXPLOSIVE.

MSDS

Stockcode (Product ID) : LP150-M07723 Page number 2 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 1/6/92 Trade Secret? N Product CAS:

Product Name: CHLORINE 90 % AVAILABLE 50 POUND PAILS

NFPA Labeling :

1	Health Hazard	-- Blue	Label (0-4)
0	Flammability	-- Red	Label (0-4)
2	Reactivity	-- Yellow	Label (0-4)
OXY	Special Note	-- White	Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

EXTINGUISHING MEDIA: PRODUCT, WHEN HEATED TO 460-480 F WILL UNDERGO SELF-SUBSTAINING DECOMPOSITION WITH EVOLUTION OF HEAT AND NOXIOUS GASES. THIS THERMAL DECOMPOSITION CAN BE EXTINGUISHED BY FLOODING WITH COPIOUS QUANTITIES OFWATER, OR BY ISOLATING THE DECOMPOSING MATERIAL AND ALLOWING IT TO BE CONSUMED SPECIAL FIRE FIGHTING PROCEDURES: FIREFIGHTERS AND OTHERS SUBJECTED TO PROD-UCTS OF DECOMPOSITION SHOULD WEAR FULL PROTECTIVE CLOTHING AND SELF-CONTAINEDBREATHING APPARATUS, CHLORINE-CONTAINING GASES WITH TRACES OF PHOSGENE CAN BELIBERATED AT TEMPERATURES IN EXCESS OF 400 F. IN CASE OF FIRE, IF POSSIBLE,ISOLATE CONTAINER IN OPEN AIR OR WELL VENTILATED AREA. FLOOD WITH LARGE VOLUMEOF WATER.

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N) :	IARC Monographs	N	OSHA Regulated	N	NTP	N
Route of Entry (Y or N) :	Inhalation	Y	Ingestion	Y	Skin	Y

Signs & Symptoms of Exposure:

EYE CONTACT MAY CAUSE IRRITATION AND IRREVERSIBLE EYE DAMAGE. SKIN CONTACT MAY CAUSE IRRITATION AND BURNS. INHALATION MAY CAUSE COUGHING, CHOKING, PAIN, VOMITING, NAUSEA, HEADACHE AND DIZZINESS. INGESTION MAY CAUSE GASTROINTESTINAL DAMAGE, EVEN DEATH. OVEREXPOSURE MAY DAMAGE OR ADVERSELY AFFECT THE LUNGS AND LIVER.

Medical Conditions Aggravated by Exposure:

DISORDERS OF THE SKIN AND MUCOUS MEMBRANES.

Emergency & First Aid Procedures:

EYES: IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION. SKIN: IMMEDIATELY BRUSH OFF CHEMICAL AND FLUSH WITH WATER WHILE REMOVING CONTAMINATED CLOTHING AND SHOES, FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING OR SHOES UNTIL CLEANED. IF IRRITATION PERSISTS, GET MEDCIAL ATTENTION. INHALATION: REMOVE PERSON TO FRESH AIR, CALL PHYSICIAN. INGESTION: IF SWALLOWED DO NOT INDUCE VOMITING. DRINK LARGE QUANTITIES OF WATER. IF VOMITING OCCURS SPONTANEOUSLY KEEP HEAD BELOW HIPS TO AVOID ASPIRATION INTO LUNGS. CALL A PHYSICIAN IMMEDIATELY.

HEALTH HAZARDS TEXT

NA

SECTION VI -- REACTIVITY DATA

Stable (Y or N) : Y Hazardous Polymerization (Y or N): N

Stability Conditions to Avoid:

HEAT, HEATED SURFACES, STATIC ELECTRICITY, ELETRIC ARCS, SPARKS AND FLAMES.

Hazardous Polymerization Conditions to Avoid:

WILL NOT OCCUR

Incompatibility (Materials to Avoid):

STRONG REDUCING AGENTS SUCH AS HYDROGEN, HYDRAZINE, SULFIDES, SULFITES AND NITRITES.

Hazardous Decomposition or By Products:

CHLORINE-CONTAINING GASES CAN BE PRODUCED. TRACES OF PHOSGENE CAN BE LIBERATED

REACTIVITY DATA TEXT

NA

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

MSDS

Stockcode (Product ID) :	LP150-M07723				Page number	3	of 4
MSDS Part	1	of 1	Kit? N	Hazardous?	Y	Product from MMIS?	Y
MSDS's Date:	1/6/92			Trade Secret?	N	Product CAS:	
Product Name:	CHLORINE 90 % AVAILABLE 50 POUND PAILS						

ANY SPILLED MATERIAL SHOULD BE CLEANED UP AS SOON AS POSSIBLE TO PREVENT CONTAIMINATION WITH FOREIGN MATERIAL WITH WHICH IT MAY REACT. KEEP SPILLED MATERIAL DRY. DO NOT ALLOW WATER OR OTHER INCOMPATIBLE SUBSTANCES TO COME INTO CONTACT WITH THE SPILLED MATERIAL. KEEP PRODUCT OUT OF SEWERS, WATERSHEDS AND WATER SYSTEMS. FOLLOW ALL PROTECTIVE MEASURES INDICATED IN THIS DOCUMENT.

Waste Disposal Method:

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

SAFE HANDLING PROCEDURES TEXT

SWEEP, SCOOP, OR VACUUM UP ALL SPILLED MATERIAL, CONTAMINATED SOIL, AND OTHER CONTAMINATED MATERIAL AND PLACE IN CLEAN, DRY CONTAINERS FOR DISPOSAL. COMPLETE CLEAN UP ON A DRY BASIS. AS CURRENTLY DEFINED, UNNEUTRALIZED PRODUCT IS A HAZARDOUS SUBSTANCE UNDER CERCLA. IF 100 POUNDS OR MORE AREA RELEASED INTO THE ENVIRONMENT, IT MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER (800-414-8802 OR 202-427-2675). SINCE LOCAL, STATE AND FEDERAL LAWS MAY VARY, CONSULT YOUR ATTORNEY OR APPROPRIATE REGULATORY OFFICALS FOR INFORMATION RELATING TO SPILL REPORTING. KEEP UNNEUTRALIZED PRODUCT OUT OF SEWERS, WATERSHEDS, AND WATER SYSTEMS. AS CURRENTLY DEFINED IN RCRA REGULATIONS, PRODUCT, WHEN DISCARDED, IS A HAZARDOUS WASTE EXHIBITING THE CHARACTERISTICS OF IGNITABILITY (D-001) AND REACTIVITY (D-003). SEE 40CFR 261.21 AND 261.23. ITS DISPOSAL, THEREFORE, IS REGULATED BY FEDERAL RCRA REGULATIONS. CONSULT YOUR ATTORNEY OR APPROPRIATE REGULATORY OFFICIALS FOR INFORMATION REGARDING ADDITIONAL STATE AND LOCAL WASTE DISPOSAL REQUIREMENTS. DO NOT DISPOSE OF FILLED OR PARTIALLY FILLED CONTAINERS IN A COMMON WASTE COMPACTOR. CONTAMINANTS IN THE COMPACTOR SUCH AS OIL, SAWDUST, FLOOR-SWEEPING

SECTION VIII – SPECIAL PROTECTION

Protective Gloves:	LIQUID-PROOF RUBBER GLOVES
Eye Protection:	GAS-TIGHT CHEMICAL SAFETY GOGGLES

Respiratory Protection (specific type):

IF EXPOSURE LIMITS ARE EXCEEDED, OR EXPOSURE MAY OCCUR, USE A NIOSH/MSA RESPIRATOR APPROVED FOR THE CONDITIONS OF EXPOSURE. IN ACCORDANCE WITH 29CFR1910.134.

Ventilation Instructions:

PROVIDE VENTILATION TO CONTROL EXPOSURE LEVELS BELOW AIRBORNE EXPOSURE LIMITS. LOCAL EXHAUST VENTILATION PREFERRED AT SOURCE OF AIR CONTAMINATION.

Other Protective Clothing or Equipment:

FULL COVER CLOTHING. SAFETY SHOWER, EYE BATH, AND WASHING FACILITIES SHOULD BE AVAILABLE.

Work/Hygenic Practices:

NA

SPECIAL PROTECTION TEXT

NA

SECTION IX – SPECIAL PRECAUTIONS

Handling/Storage Precautions:

KEEP OUT OF REACH OF CHILDREN. RETIE POLYETHYLENE LINER AFTER EACH USE AND KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY PLACE..DO NOT ALLOW WATER TO GET INTO CONTAINER. KEEP CONTAINERS OFF WET FLOORS.

SPECIAL PRECAUTIONS TEXT

DO NOT CONTAMINATE WATER, FOOD OR FEED BY STORAGE OR DISPOSAL. IN THE EVENT OF CONTAMINATION OF DECOMPOSITION DO NOT RESEAL CONTAINER. MINIMIZE SKIN CONTACT. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOK- ING OR USING TOILET FACILITIES. WARNING STATEMENTS: DANGER! HIGHLY CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. CAUSES BURNS TO SKIN. IRRITATING TO NOSE AND THROAT. MAY BE FATAL IF SWALLOWED WILL BURN WITH THE EVOLUTION OF CHLORINE AND EQUALLY TOXIC GASES. DECONPOSES AT 460 F TO 480 F WITH LIBERATION OF HARMFUL GASES. MIX ONLY WITH WATER. USE CLEAN DRY UTENSILS. DO NOT ADD THIS PRODUCT TO ANY DISPENSING DEVICE CONTAINING REMNANTS OF ANY OTHER PRODUCT. SUCH USE MAY CAUSE A VIOLENT REACTION LEADING TO FIRE OR EXPLOSION. CONTAMINATION WITH MOISTURE, ORGANIC MATTER, OR

MSDS

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MSDS's Date:	1/6/92			Trade Secret?	N	Product CAS:	
Product Name:	CHLORINE 90 % AVAILABLE 50 POUND PAILS						

OTHER CHEMICALS MAY START A CHEMICAL REACTION WITH GENERA- TION OF HEAT, LIBERATION OF HAZARDOUS GASES, AND POSSIBLE GENERATION OF FIRE AND EXPLOSION. THE PREPARATION OF CONCENTRATED SOLUTIONS OR SLURRIES OF PRODUCT CHLORINATING COMPOSITION IS NOT RECOMMENDED. ALSO, PRODUCT IS NOT RECOMMENDED FOR FORMULATED BLEACHES CONTAINING STRONG ALKALI, SURFACTANTS OR HYDRATED CHEMICALS.

TRAILER TEXT

1st SECTION EXTRA TEXT

Which Section Needs This Additional Text? : 5 (1-9)

CHLORINE, INCLUDING PULMONARY EDEMA AND PNEUMONITIS, MAY BE DELAYED. INGESTION: HARMFUL IF SWALLOWED, ONLY SLIGHTY TOXIC BASED ON ANIMAL TESTING.

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : 7 (1-9)

ETC. COULD CAUSE SPONTANEOUS DECOMPOSITION AND FUSION OF THE MATERIAL AT AMBIENT REMPERATURES RESULTING IN RUPTURE OF THE DRUM. DISPOSAL BY INCINERATION IN AS EPA APPROVED HAZARDOUS WASTE INCINERATOR IS RECOMMENDED IF MATERIAL IS DRY. DO NOT TRANSPORT WET MATERIAL. AN ALTERNATE METHOD FOR DISPOSAL IS BY NEUTRALI ZATION TO A NON-OXIDIZING RESIDUE WHICH CAN THEN BE DISCARDED SAFELY. WASTES OF THIS PESTICIDE MAY CAUSE IRREVERSIBLE EYE DAMAGE AND BURNS TO SKIN AND MAY BE DANGEROUS. IMPROPER DISPOSAL OF EXCESS PESTICIDE, SPRAY MIXTURE, OR RINSATE IS VIOLATION OF FEDERAL LAW. IF THESE WASTES CANNOT BE DISPOSED OF BY USE ACCORDING TO LABEL INSTRUCTIONS, CONTACT YOUR STATE PESTICIDE OR ENVIROMEN TAL CONTROL AGENCY, OR THE HAZARDOUS WASTE REPRESENTATIVE AT THE NEAREST EPA REGIONAL OFFICE FOR GUIDANCE. CONTAINER DISPOSAL: COMPLETELY EMPTY LINER BY SHAKING AND TAPPING SIDES AND BOTTOM TO LOOSEN CLINGING PARTICLES. EMPTY RESIDUE INTO APPLICATION EQUIPMENT, THEN DISPOSE OF LINER IN A SANITARY LANDFILL OR BY INCINERATION IF ALLOWED BY STATE AND LOCAL AUTHORITIES. RINSE EMPTY CONTAINER WITH WATER, AND DISPOSE OF IN SAME MANNER. EPA REGISTRATION NO.: 148-1281 EPA ESTABLISHMENT NO.: 39841-MO-1

MSDS *Material Safety Data Sheet*

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

Mallinckrodt CHEMICALS

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

CITRIC ACID

1. Product Identification

Synonyms: 2-Hydroxy-1,2,3-propanetricarboxylic acid, monohydrate
CAS No.: 77-92-9 (Anhydrous) 5949-29-1 (Monohydrate)
Molecular Weight: 210.14
Chemical Formula: H3C6H5O7.H2O
Product Codes:
J.T. Baker: 0110, 0115, 0116, 0118, 0119, 0120
Mallinckrodt: 0616, 0627, 7788

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Citric Acid	77-92-9	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 1 - Slight
Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: Green (General Storage)

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. Extremely large oral dosages may produce gastrointestinal disturbances. Calcium deficiency in blood may result in severe cases of ingestion.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain.
Eye Contact:
Highly irritating; may also be abrasive.
Chronic Exposure:
Chronic or heavy acute ingestion may cause tooth enamel erosion.
Aggravation of Pre-existing Conditions:
No adverse health effects expected.

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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.
Skin Contact:
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 lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Autoignition temperature: 1011C (1852F)
As with most organic solids, fire is possible at elevated temperatures or by contact with an ignition source.
Explosion:
Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.
Fire Extinguishing Media:
Water spray, dry chemical, alcohol foam, or carbon dioxide.
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.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. 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:
None established.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. 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):

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 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.

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9. Physical and Chemical Properties

Appearance:
White granules.

Odor:
Odorless.

Solubility:
ca. 60 g/100 ml @ 20C (Anhydrous)

Density:
1.542

pH:
2.2 (0.1 N sol)

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
No information found.

Melting Point:
ca. 100C (ca. 212F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
No information found.

Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Metal nitrates (potentially explosive reaction), alkali carbonates and bicarbonates, potassium tartrate. Will corrode copper, zinc, aluminum and their alloys.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 3 g/kg; irritation skin rabbit: 500 mg/24H mild; eye rabbit: 750 ug/24H severe.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Citric Acid (77-92-9)	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
Citric Acid (77-92-9)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Citric Acid (77-92-9)	Yes.	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Citric Acid (77-92-9)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Citric Acid (77-92-9)	No	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: 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: 2 Flammability: 1 Reactivity: 0
Label Hazard Warning:
WARNING! CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give

oxygen. In all cases, get medical attention.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 3.

Disclaimer:

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****

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P.O. Box 1346
Pittsburgh, PA 15230-1346

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I. PRODUCT IDENTIFICATION

PRODUCT NAME: CL-50 Corrosion and Deposit Inhibitor

CHEMICAL DESCRIPTION: Aqueous phosphate solution

PRODUCT CLASS: Corrosion and deposit inhibitor

II. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS No.	% by Weight	Oral LD50 (rat)	Dermal LD50 (rabbit)	ACGIH TLV OSHA PEL

HAZARD COMMUNICATION STATUS: This product is not considered to be hazardous according to the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

III. TYPICAL PHYSICAL PROPERTIES

BOILING POINT: > 212°F

VAPOR PRESSURE: Similar to water

VAPOR DENSITY (air=1): Similar to water

% VOLATILE BY WEIGHT: ~ 60

APPEARANCE AND ODOR: Clear, slightly viscous liquid.

SOLUBILITY IN WATER: Complete

SPECIFIC GRAVITY: 1.37 - 1.42 @ 25°C

pH: 6.0 - 7.0

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: This product is not flammable or combustible.

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

SPECIAL FIREFIGHTING PROCEDURES: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

NFPA RATINGS: Health = 0 Flammability = 0 Reactivity = 0 Special Hazard = NONE

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

V. REACTIVITY DATA

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITY: Strong oxidizers, carbon steel.

HAZARDOUS DECOMPOSITION PRODUCTS: Disodium oxide and phosphorus oxides.

VI. HEALTH HAZARD DATA

PRIMARY ROUTES OF ENTRY: None

TARGET ORGANS: None

EFFECTS OF OVEREXPOSURE:

ACUTE

EYE CONTACT: This product would be classified as practically non-irritating to the eye. Instillation of 0.1 ml of the product in rabbit eyes produced slight conjunctival irritation but showed no iritis or corneal opacity.. All eyes cleared by Day 2. The eye scores on Day 1 ranged from 0-4/110.

SKIN CONTACT: The product is not expected to cause skin irritation upon contact. The primary skin irritation index in rabbits was found to be only 0.21/8. No data is available to suggest that this product may produce an allergic skin reaction or be absorbed through the skin in harmful amounts.

INGESTION: This product would be considered practically non-toxic by ingestion. The acute oral LD50 in rats is > 5.0 g/kg. If ingested in large amounts, nausea, vomiting, and diarrhea are probable. Since phosphates are slowly and incompletely absorbed, systemic reactions are unlikely when these salts are swallowed. Polyphosphates are thought to be hydrolyzed to orthophosphates before absorption, which may induce a metabolic acidosis. If appreciable amounts of the intact polymer are absorbed from the alimentary tract, hypocalcemic tetany (muscular contractions, pains, tingling, etc. caused by a deficiency of calcium salts) may be a danger due to the binding of ionized calcium.

INHALATION: This product is not expected to present an inhalation hazard.

SUBCHRONIC, CHRONIC

No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product.

CARCINOGENICITY:

NTP: No ingredients listed
IARC: No ingredients listed
OSHA: No ingredients listed

HMIS RATINGS: Health = 0 Flammability = 0 Reactivity = 0 Personal Protective Equipment = A

VII. APPLICABLE CONTROL MEASURES

APPROPRIATE HYGIENIC PRACTICES: As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the product and ensure prompt removal from eyes, skin and clothing.

PERSONAL PROTECTIVE EQUIPMENT:

EYE PROTECTION: Chemical splash goggles recommended as a good industrial hygiene practice.

SKIN PROTECTION: No special requirement.

RESPIRATORY PROTECTION: None required.

HANDLING AND STORAGE PRECAUTIONS: Wash thoroughly after handling.
Keep container closed when not in use.

VIII. FIRST AID

EYE CONTACT: Not expected to require first aid measures.

SKIN CONTACT: Not expected to require first aid measures.

INGESTION: Not an expected route of overexposure.

INHALATION: Not an expected route of overexposure.

IX. SPILL OR LEAK PROCEDURES/WASTE DISPOSAL

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container. Hose spill area well since product can make floor slippery.

WASTE DISPOSAL: Dispose of in accordance with local, state and federal regulations.
Do not allow to contaminate sewers and waterways.

ENVIRONMENTAL DATA: Although the principal problem of phosphates in the environment is not directly related to human health, there is considerable concern about the effects of phosphorus from various sources on water quality. Phosphate is a major cause of the eutrophication process in lakes and ponds.

X. REGULATORY STATUS

TSCA STATUS: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

RCRA STATUS: This product as sold would not be considered a RCRA Hazardous Waste.

CERCLA reportable quantity of EPA hazardous substances in product:
Chemical = Sodium phosphate, tribasic
RQ = 5000

Notify EPA of product spills exceeding 12,594 lb

X. REGULATORY STATUS (continued)

SARA TITLE III:

Section 302 Extremely Hazardous Substances: None

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[no]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals: None

DOT CLASSIFICATION:

Hazard Class: Not restricted unless shipped in a quantity > 12,594 lb, then: 9

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (contains Sodium phosphate, tribasic), RQ

ID number: UN 3082

Label: CLASS 9

PREPARED BY: P.J. Maloney

IMP-0569/S

CALGON CORPORATION

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MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **CL-103**

CHEMICAL DESCRIPTION: Surface active nonionic polyol
PRODUCT CLASS: Deposit penetrant
MSDS CODE: 0J54

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Polyoxyethylene-polyoxypropylene copolymer	9003-11-6	20	None established	None established

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

CAUTION!
May cause eye irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact

TARGET ORGANS: Eye

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: None reported.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may produce minor, temporary irritation upon contact with the eye.

SKIN CONTACT: No irritation is likely after brief contact but may be irritating after prolonged or repeated contact. No data is available to suggest that this product may produce an allergic skin reaction or be absorbed through the skin in harmful amounts.

INGESTION: This product would be expected to be practically non-toxic by ingestion. Swallowing large amounts may cause diarrhea and weakness.

Continued on Page 2

INHALATION: This product is not expected to present an inhalation hazard unless mists or vapors are generated. Significant air concentrations are not achieved unless the product is heated or sprayed as a mist.

SUBCHRONIC, CHRONIC:
There are no known chronic effects associated with this material.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water. Seek medical aid if irritation persists.

SKIN CONTACT: Not expected to require first aid measures. However, follow good industrial hygiene practices and, in case of contact, wash affected skin areas thoroughly with soap and water. Seek medical aid if irritation occurs.

INGESTION: Not an expected route of overexposure. If swallowed, do not induce vomiting. Call a physician. This product would be expected to be practically non-toxic by ingestion.

INHALATION: Not an expected route of overexposure. However, if exposure by inhalation is suspected, remove to fresh air. Aid in breathing if necessary and seek medical aid if symptoms occur.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: > 400°F (COC)
This product is not by definition a "flammable liquid" or a "combustible liquid".

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Water fog, carbon dioxide, foam, dry chemical.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: No unusual hazards.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide and carbon monoxide.

Continued on Page 3

NFPA RATINGS: Health = 1 Flammability = 1 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

Section 7. HANDLING AND STORAGE

HANDLING: Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Store in a cool, dry, well-ventilated location.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles
SKIN PROTECTION: Chemical resistant gloves recommended as a good industrial hygiene practice.
RESPIRATORY PROTECTION: If airborne concentrations become irritating, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local exhaust ventilation at elevated temperatures or if mists are generated.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not available

VAPOR PRESSURE: Not available

VAPOR DENSITY (air=1): Not available

%VOLATILE BY WEIGHT: 80 (water)

APPEARANCE AND ODOR: Clear, colorless liquid.

SOLUBILITY IN WATER: Complete

SPECIFIC GRAVITY: 0.99 - 1.03 @ 25°C

pH: 6.6 - 7.0 @ 25°C

FREEZING POINT: Not available

Continued on Page 4

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Excessive heat and contamination of any kind.

INCOMPATIBILITY: No significant incompatibilities known

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide and carbon monoxide.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
No information available on the formulated product.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Polyoxyethylene-polyoxypropylene copolymer	2300 - 16000 mg/kg	Not available	Not available

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
Aquatic toxicity data on active ingredient:
96 hr LC_{50} (rainbow trout): 801 ppm
96 hr NOEC (rainbow trout): 500 ppm
96 hr LC_{50}(bluegill sunfish): 740 ppm
96 hr NOEC (bluegill sunfish): 500 ppm
48 hr EC_{50}(Daphnia magna): 229 ppm
48 hr NOEC (Daphnia magna): 80 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: Not restricted
Proper Shipping Name: Not applicable
Label: None

Continued on Page 5

Packing Group: Not applicable
ID Number: Not applicable

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
There are no reportable SARA 313 Toxic Chemicals in this product.		

FDA: This product is FDA approved under 21 CFR Section(s):
173.340 (Defoaming agents)
175.105 (Adhesives. Subpart B - Substances for use only as components of adhesives)
176.200 (Defoaming agents used in coatings)
176.210 (Defoaming agents used in the manufacture of paper and paperboard)
176.300 (Slimicides. Subpart B - Substances for use only as components of paper and paperboard)
177.1200 (Cellophane)
177.1400 (Hydroxyethyl cellulose film, water-insoluble)
178.1010 (Sanitizing solutions)
178.3120 (Animal glue)
Consult your sales representative for any use limitations.

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 1 Flammability = 1 Reactivity = 0
Personal Protective Equipment = B

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Continued on Page 6

MSDS REVISION SUMMARY: Not applicable

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

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MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: CL-363

CHEMICAL DESCRIPTION: Multicomponent liquid
PRODUCT CLASS: Surfactant
MSDS CODE: 0631-07-16-91

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Isopropanol	67-63-0	40	TWA 400 ppm, 980 mg/m^3; STEL 500 ppm, 1225 mg/m^3	TWA 400 ppm, 983 mg/m^3; STEL 500 ppm, 1230 mg/m^3

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May be harmful if swallowed.
May cause eye and respiratory tract irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, ingestion

TARGET ORGANS: Eye, skin, central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Unknown

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may be expected to cause irritation to the eye upon contact. Symptoms may include redness, tearing, a stinging sensation, and blurred vision. Product vapors may also irritate the eye.

Continued on Page 2

SKIN CONTACT: This product may cause drying and cracking of the skin upon prolonged or repeated contact. Isopropanol is absorbed by the skin but is expected to be practically non-toxic by this route of exposure. No data were available to suggest that this product may produce an allergic skin reaction.

INGESTION: Ingestion of isopropanol has been known to cause stomach cramps, nausea, vomiting, diarrhea, headache, and central nervous system depression similar to ethanol intoxication. The single lethal dose of isopropanol for a human adult is about 250 ml although as little as 100 ml can be fatal. There are, however, reports of serious illness from as little as 10 ml of isopropanol taken internally. Vomiting with aspiration is a serious threat and dangerous complication in clinical isopropanol poisonings.

INHALATION: Inhalation of isopropanol vapors can cause irritation of the nose and throat. Isopropanol has good warning properties because it causes a mild irritation of the eyes, nose and throat at a concentration level of 400 ppm. Human systemic effects by ingestion or inhalation include flushing, pulse rate decrease, blood pressure lowering, anesthesia, narcosis, headache, dizziness, mental depression, hallucinations, distorted perceptions, shortness of breath, respiratory depression, nausea or vomiting, coma.

SUBCHRONIC, CHRONIC:
No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product.

Isopropanol has demonstrated teratogenic and reproductive effects in laboratory animals. In a nine-day rate probe study for longer term inhalation research with isopropanol, the report of preliminary findings indicates a kidney disorder was observed in male rats.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid.

SKIN CONTACT: Not expected to require first aid measures. However, follow good industrial hygiene practices and, in case of contact, wash affected skin areas thoroughly with soap and water. Seek medical aid if irritation occurs.

INGESTION: If swallowed, do NOT induce vomiting. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Continued on Page 3

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: 70°F (TCC)
This product is a flammable liquid.

LOWER FLAMMABLE LIMIT: 2% (for isopropanol) UPPER FLAMMABLE LIMIT: 12.7% (for isopropanol)

AUTO-IGNITION TEMPERATURE: 750°F (for isopropanol)

EXTINGUISHING MEDIA: Use alcohol foam, carbon dioxide or dry chemical.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions. Product vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back.

DECOMPOSITION PRODUCTS: Carbon monoxide and carbon dioxide

NFPA RATINGS: Health = 2 Flammability = 3 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Ventilate area of spill. Remove all sources of ignition. Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

Section 7. HANDLING AND STORAGE

HANDLING:
Avoid contact with eyes.
Avoid prolonged or repeated contact with skin.
Avoid breathing vapor.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE:
Keep away from heat, sparks, and flame.
Outside or detached storage is preferred.
Inside storage should be in a standard flammable liquids storage warehouse, room, or cabinet.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles

Continued on Page 4

SKIN PROTECTION: Chemical resistant gloves recommended as a good industrial hygiene practice.
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local and/or general exhaust ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: An eye wash station should be accessible in the immediate area of use.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not determined

SOLUBILITY IN WATER: Miscible

VAPOR PRESSURE: 33 mmHg @ 68°F (for isopropanol)

SPECIFIC GRAVITY: 0.91 - 0.92 @ 25°C

VAPOR DENSITY (air=1): 2.07 (for isopropanol)

pH: 5.7 - 6.5

%VOLATILE BY WEIGHT: 90

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, yellow liquid with an alcohol odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep away from heat, sparks, and flame.

INCOMPATIBILITY: Isopropanol can react vigorously with oxidizers and reacts with oxygen to form dangerously unstable peroxides. Contact with hydrogen peroxide sharply reduces the autoignition temperature.

DECOMPOSITION PRODUCTS: Carbon monoxide and carbon dioxide

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
No information available on the formulated product.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Isopropanol	5045 mg/kg	12800 mg/kg	LC_{Lo}: 12000 ppm/8H

Continued on Page 5

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
No information available on the formulated product.

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Isopropanol	96 hr LC_{50} (fathead minnow): 8,300 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of ignitability. The EPA Hazardous Waste Number is D001.

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 3
Proper Shipping Name: Isopropanol solution
Label: Flammable liquid
Packing Group: II
ID Number: UN 1219

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Continued on Page 6

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[yes]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight

There are no reportable SARA 313 Toxic Chemicals in this product.

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 2 Flammability = 3 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Reason for reissue: Update to new format.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

BETZ
Trevose, PA 19053-6783 (215)355-3300

Material Safety Data Shee

Emergency Telephone
Health/Accident (800)877-1940

PRODUCT:CLAM-TROL CT-2 NW00076

EFFECTIVE DATE:09-16-94

REVISIONS TO SECTIONS: APP

PRODUCT APPLICATION:WATER-BASED MICROBIAL CONTROL AGENT.

1) HAZARDOUS INGREDIENTS

INFORMATION ON PHYSICAL HAZARDS,HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD IS LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE AND CHRONIC HAZARDS OF THIS FORMULATION.

(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE***CAS# 68424-85-1; CORROSIVE(SKIN AND EYES); PEL:NOT DETERMINED;TLV:NOT DETERMINED

ETHYL ALCOHOL(ETHANOL)***CAS# 64-17-5;FLAMMABLE;EYE IRRITANT;POTENTIAL LIVER AND KIDNEY TOXIN.MAY CAUSE CNS DEPRESSION;PEL:1000PPM;TLV:1000PPM

2) TYPICAL PHYSICAL DATA

PH: AS IS(APPROX.) 8.9	ODOR: MILD
FL.PT.(DEG.F): 130 P-M(CC)	SP.GR.(70F): 0.965
VAPOR PRESSURE(mmHG): 44.0	VAPOR DENSITY(AIR=1): < 1.00
VISC cps70F: 73	%SOLUBILITY(WATER): 100.0
EVAP RATE: > 1.00(ETHER=1)	APPEARANCE: COLORLESS TO YELLOW
PHYSICAL STATE:LIQUID	FREEZE POINT(DEG.F): -7.00

3) REACTIVITY DATA

STABLE.MAY REACT WITH STRONG OXIDIZERS.DO NOT CONTAMINATE.BETZ TANK CLEAN-OUT CATEGORY 'B'

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

PRODUCT:CLAM-TROL CT-2

4) HEALTH HAZARD EFFECTS

ACUTE SKIN EFFECTS *** PRIMARY ROUTE OF EXPOSURE
SEVERE IRRITANT TO THE SKIN.POTENTIAL SKIN SENSITIZER
ACUTE EYE EFFECTS ***
CORROSIVE TO THE EYES
ACUTE RESPIRATORY EFFECTS ***
VAPORS,GASES,MISTS AND/OR AEROSOLS MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT.
CHRONIC EFFECTS OF OVEREXPOSURE***
PROLONGED OR REPEATED EXPOSURES MAY CAUSE LIVER AND KIDNEY TOXICITY,CNS DEPRESSION AND SKIN SENSITIZATION.
MEDICAL CONDITIONS AGGRAVATED ***
NOT KNOWN
SYMPTOMS OF EXPOSURE ***
INHALATION OF VAPORS/MISTS/AEROSOLS MAY CAUSE EYE,NOSE,THROAT AND LUNG IRRITATION;SKIN CONTACT MAY CAUSE SEVERE IRRITATION OR BURNS.
PRECAUTIONARY STATEMENT BASED ON TESTING RESULTS ***
MAY BE TOXIC IF ORALLY INGESTED.

5) FIRST AID INSTRUCTIONS

SKIN CONTACT ***
REMOVE CLOTHING.WASH AREA WITH LARGE AMOUNTS OF SOAP SOLUTION OR WATER FOR 15 MIN.IMMEDIATELY CONTACT PHYSICIAN
EYE CONTACT***
IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES.IMMEDIATELY CONTACT A PHYSICIAN FOR ADDITIONAL TREATMENT
INHALATION EXPOSURE***
REMOVE VICTIM FROM CONTAMINATED AREA.APPLY NECESSARY FIRST AID TREATMENT.IMMEDIATELY CONTACT A PHYSICIAN.
INGESTION***
DO NOT FEED ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSIVE VICTIM
DO NOT INDUCE VOMITING.IMMEDIATELY CONTACT PHYSICIAN. DILUTE CONTENTS OF STOMACH USING 3-4 GLASSES MILK OR WATER

6) SPILL,DISPOSAL AND FIRE INSTRUCTIONS

SPILL INSTRUCTIONS***
VENTILATE AREA,USE SPECIFIED PROTECTIVE EQUIPMENT.CONTAIN AND ABSORB ON ABSORBANT MATERIAL.PLACE IN WASTE DISPOSAL CONTAINER.THE CONTAMINATED ABSORBANT SHOULD BE CONSIDERED A PESTICIDE AND DISPOSED OF IN AN APPROVED PESTICIDE LANDFILL.SEE PRODUCT LABEL STORAGE AND DISPOSAL INSTRUCTIONS.
REMOVE IGNITION SOURCES.FLUSH AREA WITH WATER.SPREAD SAND/GRIT.
DISPOSAL INSTRUCTIONS****
WATER CONTAMINATED WITH THIS PRODUCT MAY BE SENT TO A SANITARY SEWER TREATMENT FACILITY,IN ACCORDANCE WITH ANY LOCAL AGREEMENT,A PERMITTED WASTE TREATMENT FACILITY OR DISCHARGED UNDER A NPDES PERMIT
PRODUCT(AS IS)-
DISPOSE OF IN APPROVED PESTICIDE FACILITY OR ACCORDING TO LABEL INSTRUCTIONS
FIRE EXTINGUISHING INSTRUCTIONS***
FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS(FULL FACE-PIECE TYPE).PROPER FIRE EXTINGUISHING MEDIA:
DRY CHEMICAL,CARBON DIOXIDE,FOAM OR WATER

7) SPECIAL PROTECTIVE EQUIPMENT

USE PROTECTIVE EQUIPMENT IN ACCORDANCE WITH 29CFR SECTION 1910.132-134.USE RESPIRATORS WITHIN USE LIMITATIONS OR ELSE USE SUPPLIED AIR RESPIRATORS.
VENTILATION PROTECTION***
ADEQUATE VENTILATION TO MAINTAIN AIR CONTAMINANTS BELOW EXPOSURE LIMITS
RECOMMENDED RESPIRATORY PROTECTION***
IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY, USE A RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE & DUST/MIST PREFILTER
RECOMMENDED SKIN PROTECTION***
RUBBER GLOVES
WASH OFF AFTER EACH USE REPLACE AS NECESSARY.
RECOMMENDED EYE PROTECTION***
SPLASH PROOF CHEMICAL GOGGLES

8) STORAGE AND HANDLING PRECAUTIONS

STORAGE INSTRUCTIONS***
KEEP CONTAINERS CLOSED WHEN NOT IN USE.
KEEP AWAY FROM FLAMES OR SPARKS. BOND CONTAINERS DURING FILLING OR DISCHARGE WHEN PERFORMED AT TEMPERATURES AT OR ABOVE THE PRODUCT FLASH POINT.
HANDLING INSTRUCTIONS***
COMBUSTIBLE. DO NOT USE AROUND SPARKS OR FLAMES. BOND CONTAINERS DURING FILLING OR DISCHARGE WHEN PERFORMED AT TEMPERATURES AT OR ABOVE THE PRODUCT FLASH POINT.
****
THIS MSDS WAS WRITTEN TO COMPLY WITH THE OSHA HAZARD COMMUNICATION STANDARD
****

APPENDIX: REGULATORY INFORMATION

THE CONTENT OF THIS APPENDIX REPRESENTS INFORMATION KNOWN TO BETZ ON THE EFFECTIVE DATE OF THIS MSDS. THIS INFORMATION IS BELIEVED TO BE ACCURATE. ANY CHANGES IN REGULATIONS WILL RESULT IN UPDATED VERSIONS OF THIS DOCUMENT.

...TSCA: THIS IS AN EPA REGISTERED BIOCIDE AND IS EXEMPT FROM TSCA INVENTORY REQUIREMENTS
...FIFRA(40CFR):EPA REG.NO.: 3876- 149
...USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS-AUTHORIZED CAT.: SEC.G5,G7
...REPORTABLE QUANTITY(RQ) FOR UNDILUTED PRODUCT:
NO REGULATED CONSTITUENT PRESENT AT OSHA THRESHOLDS
...RCRA: IF THIS PRODUCT IS DISCARDED AS A WASTE,THE RCRA HAZARDOUS WASTE IDENTIFICATION NUMBER IS:D001=IGNITABLE
...DOT HAZARD/UN#/ER GUIDE# IS :COMBUSTIBLE LIQUID/NA1993/#27
...CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) MATERIALS:
NO REGULATED CONSTITUENT PRESENT AT OSHA THRESHOLDS
...SARA SECTION 302 CHEMICALS:
NO REGULATED CONSTITUENT PRESENT AT OSHA THRESHOLDS
...SARA SECTION 313 CHEMICALS:
NO REGULATED CONSTITUENT PRESENT AT OSHA THRESHOLDS
...SARA SECTION 312 HAZARD CLASS:IMMEDIATE(ACUTE);DELAYED(CHRONIC);FIRE
...MICHIGAN CRITICAL MATERIALS:
NO REGULATED CONSTITUENT PRESENT AT OSHA THRESHOLDS
NFPA/HMIS : HEALTH - 3; FIRE - 2; REACTIVITY - 0; SPECIAL - NONE; PE - B

CHEMICAL CODE: M069
PRODUCT NAME: CLEANING AGENT M69

EFFECTIVE DATE: 18 NOV 88 PREPARED BY: W. W. SHEPHERD

HMIS RATING:
Health 2 Flammability 1 Reactivity 0

HAZARDOUS INGREDIENTS:	CAS NUMBER
ETHYLENEDIAMINETETRAACETIC ACID	000060-00-4

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Acid	Form: Crystals
Color: White	Odor: None
Vap.Density: Not available	%Sol. In Water: 0.1
pH: Not determined	Sp. Gravity: Not determined
Pour Point: Not determined	Boiling Pt.: Not available
Vap.Pressure:Not available	% Volatile: 1
Viscosity: Not determined	Bulk Density: 54 lbs/cu.ft.

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C) Method Used: Pensky-Martens CC
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: Not determined Upper: Not determin
Extinguishing Media: Water Fog, Alcohol Foam, CO2, Dry Chemical
Special Fire Fighting Equipment and Hazards:
Wear protective fire fighting clothing and avoid breathing vapors. Use self-contained breathing apparatus in closed areas.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility:
Oxidizing material. Contact with aluminum releases hydrogen.
Hazardous Decomposition:
When heated strongly or burned, oxides of carbon, nitrogen oxides, ammonia and harmful organic chemical fumes are released.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Immediately flush eyes with water for 15 minutes while holding eyelids open. See a doctor.
Skin Contact:	Wash thoroughly with soap and water. See a doctor if irritation occurs. Wash clothes thoroughly before reusing.
Swallowing:	If several grams are swallowed, induce vomiting with ipecac (preferred), or by giving water and sticking finger down throat. After vomiting give milk (preferred) or water and consult physician.
Inhalation:	Remove to fresh air. See a doctor if effects occur.
Notes:	None

Ventilation: General and local ventilation are required.
Respiratory Protection:
Use NIOSH approved respirator with dust and mist protection (3M No. 8710).
Protective Clothing:
Clean, body-covering clothing and impervious gloves. For spills and emergencies, also wear boots and slicker (rain) suit.
Eye Protection:
Chemical goggles required and an eye wash in work area.
Exposure Guidelines: TWA 10 mg/m3 dust.

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Scoop into containers. Flush residual with plenty of water.
Disposal Method	
Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for incineration (preferred) or landfilling.
Container:	Send empty bags to sanitary landfill. Render other types of containers unuseable by puncturing or crushing and sanitary landfill unless prohibited by local regulations.
Degradability:	Not biodegradable.
Fish Toxicity:	No information.

CERCLA Reportable Quantity: 5,000 pounds (EDTA).
RCRA Hazardous Waste Number: None.

SECTION 7 - TOXICOLOGY:

Eye Contact:	Irritant. May cause pain, redness, discomfort.
Skin Contact:	No effect expected. Prolonged or repeated contact may cause mild irritation.
Swallowing:	No effect expected. Swallowing large amounts may cause illness. LD50 (rats) is greater than 4,000 mg/kg.
Inhalation:	No effect expected. Prolonged or repeated exposure may cause mild irritation. Nuisance dust.
Carcinogens:	Not listed by IARC, USA NTP, or USA OSHA.

Other:
May cause birth defects, genetic effects, reproductive effects.

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.
Physical Hazard: None.
Handling and Storage Precautions:
No special precautions required.
Packaging Requirements:
Paper bag (minimum 3 ply), or other industrial container designed fc powders and granulated materials.
Additional Information: Q1,Q6 (Protective Equipment Code)
Will react with aluminum to release hydrogen gas when wet.

Health 2 ; Flammability 1 ; Reactivity 0 ; Other: None
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

SHIPPING INFORMATION:

ICC Tariff Classification:
Compound, Boiler Cleaning, Scale Removing, Dry
ICC Item Number: ICC Class: 55 LTL TL
Department of Transporation - (DOT):
Description: Hazardous Material/Hazardous Substance ****
Hazard Class: Class 9
Shipping Name: Environmentally Hazardous Substance, solid, N.O.S. (ethylenediaminetetraacetic acid), 9, UN 3077, PG III, RQ
DOT Label: Class 9
Comment: Not regulated unless RQ exceeded in single container.
Tank Exempt.#: N/A
CERCLA RQ: 5,000 pounds (EDTA).

US Foreign Trade Schedule B# (Export):

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith: however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

SWS SOUTHERN WATER SERVICES, INC.

COOLITE 118

Formulated for Scale and Corrosion Control
in Cooling Towers and Evaporative Condensers

PRODUCT DESCRIPTION:

Coolite 118 is a synergistic combination of phosphorus compounds which inhibit calcium carbonate and calcium phosphate scale formation. Coolite 118 also contains a special organic corrosion inhibitor blended with tolytriazole and sodium molybdate to inhibit corrosion of both ferrous and non-ferrous metals.

APPLICATION AND FEED REQUIREMENTS:

Coolite 118 should be used in cooling towers and evaporative condensers to inhibit scale and corrosion. No acid treatment is necessary with Coolite 118. Coolite 118 may be fed on a slug-basis directly into the system being treated, or on a continuous basis by means of a proportioning chemical pump. Dosage levels vary according to operational conditions; your Southern Water Services' representative will determine exact dosages necessary to maintain proper concentrations.

COOLITE 118 ADVANTAGES:

- No acid treatment necessary.
- No heavy metals detrimental to the environment.
- Excellent protection from ferrous corrosion.

SAFETY DATA:

Coolite 118 is an alkaline compound that is harmful if swallowed. Direct contact with the concentrated product can cause eye and skin irritation. Workmen handling the product should wear rubber gloves and goggles or face shield and should avoid contact with eyes, skin or clothing. If Coolite 118 comes into contact with skin or eyes, flush with large amounts of water. If irritation persists, consult a physician.

Weight: 9.54 lbs/gallon
Appearance: Dark Amber
pH of concentrate: 12.1

1505 River Oaks Road East • P.O. Box 23253 • Harahan, LA 70183 • (504) 733-7527

OU07411 004

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)
COOLITE 118

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

Manufacturer's Name
SOUTHERN WATER SERVICES, INC.

Address (Number, Street, City, State, and ZIP Code)
1505 RIVER OAKS RD. EAST

HARAHAN, LA 70123

Emergency Telephone Number
1-800-424-9300

Telephone Number for Information
504-733-7527

Date Prepared
10/95

Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
*Potassium hydroxide-dry	CAS#1310-58-3	$2 mg/m^3$ ceiling		
*Maleic anhydride, polymer w/ethyl acrylate & vinyl acetate, hydrolyzed	CAS#113221-69-5			
*Hydroxyphosphono-Acetic Acid	CAS#23783-26-8			
2-Propenoic acid, polymer with sodium phosphinate	CAS#71050-62-9			

*Subject to reporting under SARA Title III, Sec. 313

Section III — Physical/Chemical Characteristics

Boiling Point	210°F	Specific Gravity (H_2O = 1)	1.115
Vapor Pressure (mm Hg)		Melting Point	1
Vapor Density (AIR = 1)		Evaporation Rate (Ether = 1)	12.1

Solubility in Water
Complete

Appearance and Odor
Reddish brown liquid. Musty odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Not available			

Extinguishing Media
CO_2, dry chemical, foam or water

Special Fire Fighting Procedures
none

Unusual Fire and Explosion Hazards
none

Post-it™ Fax Note 7671	Date 5/2/97	# of pages ▸ 10
To Brian Falgout	From	
Co./Dept. Entergy	Co. Southern Water Serv.	
Phone #	Phone # 733-7527	
Fax # 464-3499	Fax # 733-4680	

(Reproduce locally)

OSHA 174, Sept. 19

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	

Incompatibility (*Materials to Avoid*)
Strong acids

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion?

Health Hazards (*Acute and Chronic*)

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

Signs and Symptoms of Exposure
May cause skin irritation or severe eye irritant

Medical Conditions
Generally Aggravated by Exposure

Emergency and First Aid Procedures
If contact with skin, flush with plenty of water. If eye contact, flush with water for 15 min. and get medical attention. If swallowed, get immediate medical attention.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled
Do not discharge into lakes or streams. Product toxic to fish. Wash area of spillage with plenty of water.

Waste Disposal Method
By permit according to local permits as to organic wastes in sanitary sewers.

Precautions to Be Taken in Handling and Storing
Store in dry clean area, avoid contact with oxidizing agents or acids.

Other Precautions
Avoid skin or eye contact.

Section VIII — Control Measures

Respiratory Protection (*Specify Type*)
NIOSH mask for organics

Ventilation	Local Exhaust: Acceptable	Special
	Mechanical (*General*)	Other

Protective Gloves: Rubber gloves
Eye Protection: Safety Goggles

Other Protective Clothing or Equipment

Work/Hygienic Practices

★U.S. Government Printing Office: 1987—181-864/64

Material Safety Data Sheet

HydroChem Industrial Services, Inc.
6210 Rothway, Houston, Texas 77040

CHEMTREC Emer. No:1-800-424-9300
HydroChem Phone: 1-800-934-9376

CHEMICAL CODE: M276
PRODUCT NAME: COPPER PASSIVATING AGENT M276

EFFECTIVE DATE: 25 OCT 88 PREPARED BY: W. W. SHEPHEF

HMIS RATING:
Health 2 Flammability 1 Reactivity 0

HAZARDOUS INGREDIENTS: CAS NUMBER
PROPRIETARY AQUEOUS SOLUTION OF AN AMINE SALT

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Amine	Form: Liquid
Color: Dark amber	Odor: Not determined
Vap.Density: Not determined	%Sol. In Water: 100
pH: 11.5	Sp. Gravity: 1.26
Pour Point: Not determined	Boiling Pt.: 226 F, 108 C
Vap.Pressure:24 mmHg at 25 C	% Volatile: 50
Viscosity: Not determined	Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C) Method Used: Setaflash CC
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: Not available Upper: Not available
Extinguishing Media: Water Fog, Alcohol Foam, CO2, Dry Chemical
Special Fire Fighting Equipment and Hazards:
Wear protective fire fighting clothing and avoid breathing vapors. Use self-contained breathing apparatus in closed areas.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility: Oxidizers
Hazardous Decomposition:
When heated strongly or burned, oxides of carbon, sulfur oxides, nitrogen oxides, ammonia and harmful organic fumes are released.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Immediately flush eyes with water for 30 minutes while holding eyelids open. See a doctor at once.
Skin Contact:	Immediately wash with soap and water for 30 minutes. See a doctor at once. Destroy contaminated shoes and clothing.
Swallowing:	DO NOT induce vomiting. Give activated charcoal in water. If charcoal unavailable, give 2 glasses of milk (preferred) or water. Take to hospital at once
Inhalation:	Remove to fresh air. See a doctor if effects occur.
Notes:	None

SECTION 5 - HANDLING PRECAUTIONS:

Ventilation:
General and local ventilation if mist or vapors are generated.
Respiratory Protection:
None normally needed. If dust or mist is generated use NIOSH approved respirator with dust and mist protection (3M No. 8710).
Protective Clothing:
Face shield, boots, slicker (rain) suit, impervious (neoprene) gloves.
Eye Protection:
Chemical goggles required and an eye wash in work area.
Exposure Guidelines: Not established.

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Contain with dikes. Put in steel or plastic drum. Flush residual with plenty of water.
Disposal Method Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for incineration (preferred) or disposal well injection of all liquids and landfilling of solids.
Container:	Sell to approved drum reconditioner or render container unuseable by puncturing or crushing. Send to sanitary landfill unless prohibited by local regulations.
Degradability:	Not determined
Fish Toxicity:	Toxic to fish. Do not allow to enter waterway. LC50 (goldfish) = 2 ppm.

CERCLA Reportable Quantity: Not established
RCRA Hazardous Waste Number: None

SECTION 7 - TOXICOLOGY:

Eye Contact:	Corrosive. Rapidly causes pain, burns, corneal injury. May cause permanent damage and blindness.
Skin Contact:	Corrosive. Rapidly causes pain, burns, redness, swelling and damage to tissue. Not likely to be absorbed in toxic amounts. Possible sensitizer.
Swallowing:	Corrosive. Causes pain and severe burns to mouth, throat and stomach. LD50 (rats) = 3,000 mg/kg.
Inhalation:	Severe irritant (mist). Causes pain, choking, coughing, burning sensation. Can cause soreness.
Carcinogens:	Not listed by IARC, USA NTP, or USA OSHA.
Other:	None.

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.
Physical Hazard: None.
Handling and Storage Precautions:
Avoid freezing. If frozen, mix well after thawing.
Packaging Requirements:
Steel or plastic drum or can.
Additional Information: Q5 (Protective Equipment Code)

SECTION 9 - REGULATORY INFORMATION:

NFPA Rating:
Health 2 ; Flammability 1 ; Reactivity 0 ; Other: None
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

SHIPPING INFORMATION:

ICC Tariff Classification: Compound, Boiler Cleaning, Scale Removing
ICC Item Number: 50093 ICC Class: 55 LTL 35 TL
Department of Transporation - (DOT):
Description: Hazardous Material
Hazard Class: 8 (corrosive)
Shipping Name: Corrosive liquid, N.O.S. (contains aromatic mercaptan), 8, UN 1760, PG III
DOT Label: Corrosive 8
Comment:
Tank Exempt.#: N/A
CERCLA RQ: Not established

US Foreign Trade Schedule B# (Export):

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

Material Safety Data Sheet

Distributor Name and Address:	Product Name:	Prepared by:	Date:
Univar, Inc. 34200 VW & R Lane Geismar, Louisiana 70737	Framatome Copper Solvent Concentrate	Barry Hugghins	9/26/2003

Distributor Emergency Phone:	Product Code:
225-473-1100	FTI #2

HMIS CODE INFORMATION:	Health	Flammability	Reactivity	Personal Protection
	2	1	0	D

Section 1 - Hazardous Ingredients and Sara Title III Information

Reportable Components:

Ingredient:	% wt	CAS #	OSHA PEL / STEL	ACGIH TLV
Ethylenediamine	14.934	000107-15-3	10 ppm	10 ppm
Ammonium Carbonate	11.242	506-87-6	None Established	None Established

DOT Shipping Name:
Corrosive liquid, N.O.S. (contains ethylenediamine, aqueous solution), 8, UN-1760, PGIII, Guide 152
RQ = 85246# in a single package, based on ethylenediamine content

Notes:
N/A = Not Applicable

Section 2 - Physical and Chemical Characteristics

Boiling Point:	> 212 F	Vapor Density:	Heavier Than Air
Evaporation Rate:	Slower Than Water	Solubility In Water:	Complete
Appearance and Odor:	Clear Liquid With Odor of Ammonia	Specific Gravity:	1.0307

Section 3 - Fire and Explosion Data

Flash Point:	> 212 F	Method Used:	Closed Cup

Flammable Limits In Air, by Volume	Lower: Not Established Upper: Not Established
Extinguishing Media:	Use CO2, water fog or fine spray, foam, or dry chemical extinguishing media
Special Firefighting Procedures:	Use water to cool containers exposed to fire. Firefighters should be edquipped with self-contained breathing apparatus and turn-out gear
Unusual Fire and Explosion Hazards:	There are no known unusual fire or explosion hazards

Section 4 - Physical Hazards and Reactivity Data

Stability:	Stable at ambient temperatures.
Conditions and Materials to Avoid:	Concentration of solution by evaporation of water. Avoid contact with aluminum. Product absorbs carbon dioxide from the air. Avoid contact with acids, acid salts, oxidizing materials, sodium hypochlorite, iron salts, zinc, alkaloids, calomel, sodium nitrate and nitrites. Corrosive to nickel, coipper, and other alloys.
Hazardous Decomposition Products:	Ammonia, Hydrogen, Carbon Dioxide. Extreme heat may produce carbon monoxide and nitrogen oxides.
Hazardous Polymerization:	Will not occur.

Section 5 - Health Hazards Data

Signs and Symptoms of Exposure:

Eye and Skin Contact and Absorption:	Skin contact may cause irritation. Eye contact may cause irritaton, and possible permanent vision impairment. May also cause allergic skin reactions.
Ingestion:	Ingestion may cause severe irritation of the digestive tract, with ulceration, and severe burns of the mouth and throat.
Inhalation:	May cause irritation to the upper respiratory tract and lungs.

Medical Conditions Generally Aggravated by Exposure:

Skin Contact:	Prolonged or repeated exposure may cause more severe irritation, defatting of the skin, and allergic skin sensitization in some individuals.
Inhalation:	Prolonged or repeated exposure may cause continous bronchitis.

Carcinogen Information:

IARC Monographs?	No component of this product is listed by the IARC as a possible human carcinogen.
NTP?	No component of this product is listed as a Substance Reasonably Anticipated to be Carcinogenic.
OSHA?	No component of this product is regulated by OSHA as a carcinogen

Emergency and First Aid Procedures:

Eyes:	Immediately flush with large amounts of flowing water for 30 minutes. Call a physician at once.
Skin:	Immediately flush with water for 30 minutes. If irritation develops, consult physician.
Ingestion:	Get medical attention immediately. Do not induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person.
Inhalation:	Move to fresh air; administer oxygen is necessary. If not breathing, administer CPR. Get immediate medical attention.

Section 6 - Precautions and Spill Procedures

Handling and Storage Precautions:	Store away from heat, sparks, open flame, and oxidants. Keep storage containers closed when not in use. Store only in a well ventilated areas. All containers, lines, and piping should be electrically grounded. Store below 120 F.
Steps to be taken if material is Released or Spilled:	Evacuate and isolate the spill area. Prevent spill from entering natural waterways. Responders should wear self-contained breathing apparatus (SCBA) due to the presence of hydrazine.
Waste Disposal Method:	Dispose of spilled material in accordance with all local, state, and federal regulations.

Section 7 - Special Protection Information and Control Measures

Respiratory Protection:	Use a NIOSH approved full face, positive pressure, supplied air respirator if any exposure occurs.
Ventilation:	Use a NIOSH approved full face, positive pressure, supplied air respirator
Eye Protection:	Use chemical goggles and a faceshield.
Protective Gloves:	Butyl Rubber
Work and Hygienic Practices:	An eye wash and safety shower should be provided in the immediate work area.
Other protective equipment:	A full impervious suit is recommended if exposure is possible to a large portion of the body. In other cases, wear impervious gloves, boots and apron, at a minimum.

Disclaimer:

This safety information is provided to assist customers in assessing measures necessary for compliance with health, safety, and environmental regulations. Individuals handling this product should be informed of the recommended safety precautions, and should have access to this information. The information contained herein is based on available data, and is believed to be accurate. No guarantee or warranty is provided, since the use of this product is within the exclusive control of the user, and it is the user's responsibility to satisfy itself that this information is suitable and complete for its particular use. Customers are responsible for compliance with local, state, and federal regulations that may be pertinent in the storage, application, and disposal of this product.

SWS SOUTHERN WATER SERVICES, INC.

CORNITE L

A Liquid Blended Formula
for Corrosion Protection
In Closed Systems

PRODUCT DESCRIPTION:
Cornite L is a buffered, liquid nitrite based corrosion inhibitor designed to prevent corrosion on internal surfaces of closed heating and cooling systems.

APPLICATION AND FEED REQUIREMENTS:
Cornite L is recommended for closed systems to prevent corrosion of ferrous and non-ferrous metals. Makeup to these systems is usually low, thus chemical feed using a by-pass feeder is satisfactory.

CORNITE L ADVANTAGES:
- Self-buffered to maintain a proper alkalinity level.
- Protects ferrous and non-ferrous metals.
- Does not attack seals or gaskets.
- Compatible with glycol-based anti-freezes.
- Non-staining.

SAFETY PRECAUTIONS:
Cornite L is a strong oxidizer. Do not store near combustible materials. Should liquid contact the skin, flush with water. If eyes are affected, flush with water and consult a physician.

Weight: 9.36 lbs/gallon

Appearance: blue liquid

Packaged in unlined steel drums, closed heads and plastic pails, closed heads.

1505 River Oaks Road East • P.O. Box 23253 • Harahan, LA 70183 • (504) 733-7527

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)
CORNITE L

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

H HEALTH 2
F FLAMMABILITY 0
1
PERSONAL PROTECTION X

Section I

Manufacturer's Name SOUTHERN WATER SERVICES, INC.	Emergency Telephone Number 1-800-424-9300
Address (Number, Street, City, State, and ZIP Code) 1505 RIVER OAKS RD. EAST	Telephone Number for Information 504-733-7527
HARAHAN, LA. 70123	Date Prepared 1/91
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
*Sodium Nitrite ($NaNO_2$)	CAS#7632-00-0			

*Subject to reporting under SARA Title III, Sec. 3

Section III — Physical/Chemical Characteristics

Boiling Point	216°F	Specific Gravity (H_2O = 1)	1.123
Vapor Pressure (mm Hg.)		Melting Point	
Vapor Density (AIR = 1)		Evaporation Rate (Butyl Acetate = 1)	>1
Solubility in Water Complete		pH	8.9

Appearance and Odor
Clear royal blue liquid with no detectable odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) SETA cc above 230°F	Flammable Limits	LEL	UEL

Extinguishing Media
CO_2 recommended

Special Fire Fighting Procedures
Water runoff presents contaminant problem to sewers and waterways because this product contains sodium nitrite. Use self-contained breathing apparatus.

Unusual Fire and Explosion Hazards Oxidizing agents. Can supply oxygen to stimulate the combustion of organic matter. At high temperatures 600-750°F or above, will release toxic nitrogen oxides. Sulfur dioxide may be formed under fire conditions.

(Reproduce locally)

Section V — Reactivity Data

Stability			Conditions to Avoid
	Unstable		High temperatures & open flames. Avoid storage with strong
	Stable	X	mineral acids, combustible & reducing agents.

Incompatibility (Materials to Avoid)
Acidic & reducing materials, ammonium salts & Combustible organics, chemically reactive met

Hazardous Decomposition or Byproducts
umes of nitrogen oxides, carbon monoxide carbon dioxide & Sulfur dioxide.

Hazardous Polymerization			Conditions to Avoid
	May Occur		
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Skin? Ingestion?

Health Hazards (Acute and Chronic)

Carcinogenicity: NTP? IARC Monographs? OSHA Regulated?

Signs and Symptoms of Exposure
Possible irritation of eyes & Skin. Ingestion - may cause nauses, vomiting, diarrhea, tremors and dizziness.

Emergency and First Aid Procedures: Eyes - Flush with plenty of H_2O. Get medical attention. Skin - wash with soap and H_2O. Remove contaminated clothing. Ingestion - Give 2 glasses of water and induce vomiting. Contact a physician immediately.

tion VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled
Cover with inert absorbant material; sweep up and deposit in waste disposal container. Flush area with water. Avoid contaminating sewers, streams, ponds, etc.; may cause damage to environment.

Waste Disposal Method
Disposal must be made in accordance with Federal, State and local regulations.

Precautions to Be Taken in Handling and Storing
Store in cool dry place away from acids, combustibles and reducing agents. Avoid eye and skin contact.

Other Precautions
None

Section VIII — Control Measures

Respiratory Protection (Specify Type)

Ventilation	Local Exhaust	Special
	acceptable	face shield
	Mechanical (General)	Other

Protective Gloves	Eye Protection
Rubber gloves	safety goggles

Other Protective Clothing or Equipment
rubber shoes, impervious apron, eye bath and safety shower

Work/Hygienic Practices

U.S. Government Printing Office 1987-181-094/60551

CHEMICAL CODE: A251
PRODUCT NAME: CORROSION INHIBITOR A251

EFFECTIVE DATE: 21 APR 92 PREPARED BY: W. W. SHEPHERD

HMIS RATING:
Health 2 Flammability 3 Reactivity 0

HAZARDOUS INGREDIENTS:	CAS NUMBER
PROPRIETARY MIXTURE OF ORGANIC NITROGEN AND ORGANIC SULFUR COMPOUNDS CONTAINING:	
ISOPROPANOL	000067-63-0
THIOUREA	000062-56-6
INORGANIC HALOGEN	
ETHYLENE GLYCOL BUTYL ETHER	000111-76-2

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Inhibitor
Form: Liquid
Color: Amber
Odor: Alcohol
Vap.Density: >1
%Sol. In Water: 100
pH: 4.4
Sp. Gravity: 0.98
Pour Point: Not determined
Boiling Pt.: 194 deg F
Vap.Pressure:1.6 psi at 100 deg F
% Volatile: 64
Viscosity: Not determined
Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: 88 F (31 C) Method Used: Setaflash CC
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: Not determined Upper: Not determined
Extinguishing Media: Water Fog, Alcohol Foam, CO2, Dry Chemical
Special Fire Fighting Equipment and Hazards:
Vapors may travel along the ground and ignite when an ignition source is contacted. Avoid breathing vapors. Use SCBA in closed areas.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility:
Oxidizing material, acrylaldehyde, hydrogen peroxide, nitric acid.
Hazardous Decomposition:
When heated strongly or burned, oxides of carbon, sulfur oxides, nitrogen oxides, ammonia, halogen, and harmful organic fumes are released.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Immediately flush eyes with water for 30 minutes while holding eyelids open. See a doctor at once.
Skin Contact:	Immediately wash with soap and water for 30 minutes. See a doctor at once. Destroy contaminated shoes and clothing.
Swallowing:	DO NOT induce vomiting. Give activated charcoal in water. If charcoal unavailable, give 2 glasses of milk (preferred) or water. Take to hospital at once
Inhalation:	Remove to fresh air. See a doctor if effects occur.
Notes:	None

Ventilation: General ventilation is required.
Respiratory Protection:
Use NIOSH approved respirator with organic vapor/acid gas protection (color coded yellow). Use SCBA (self contained breathing apparatus) in confined areas and for emergencies.
Protective Clothing:
Boots, slicker (rain) suit, impervious gloves. For spills and emergencies, also wear face shield.
Eye Protection:
Chemical goggles required and an eye wash in work area.
Exposure Guidelines:
Exposure guidelines: TLV is TWA 400 ppm, STEL 500 ppm for isopropyl alcohol. PEL is 400 ppm for isopropyl alcohol.

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Contain with dikes. Use explosion proof equipment to recover. Remove all sources of ignition. Soak up residual on inert absorbant (sand). Put in steel or plastic drum approved for flammables.
Disposal Method	
Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for incineration (preferred) or disposal well injection of all liquids and landfilling of solids.
Container:	Leave label on drum and sell drum to an approved drum reconditioner or triple rinse, crush, and ship to sanitary landfill unless prohibited by local regulations.
Degradability:	Partially biodegradable.
Fish Toxicity:	Highly toxic to fish. Do not allow to enter waterway.

CERCLA Reportable Quantity: 25 gal. (thiourea)
RCRA Hazardous Waste Number: D001

SECTION 7 - TOXICOLOGY:

Eye Contact:	Severe irritant. Causes pain and redness. Prolonged or repeated contact may cause mild burn. Possible permanent impairment of vision.
Skin Contact:	Irritant. Harmful if absorbed through the skin. May cause pain, redness, dermatitis, illness.
Swallowing:	Irritant. Harmful if swallowed. May cause pain or discomfort to mouth, throat and stomach. Large amounts may cause illness or death. May cause nausea. LD50 rats 1300 mg/kg.
Inhalation:	Irritant. May cause pain and coughing.
Carcinogens:	Thiourea is listed by NTP and IARC as known to cause cancer in animals; it possibly causes cancer in humans. Repeated and prolonged exposure increases the risk.

Other:
Anesthetic or narcotic effect may occur. May damage kidneys and live

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.
Physical Hazard: fire

Handling and Storage Precautions:
Keep away from heat, sparks, and flame. Store out of direct sunlight in well ventilated area. Keep container closed when not in use. Use with adequate ventilation. Do not cut or weld on container.
Packaging Requirements:
Plastic (all poly) drum (DOT 34) or plastic can.
Additional Information: Q3,Q7 (Protective Equipment Code)

SECTION 9 - REGULATORY INFORMATION:
This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:
Thiourea (5 percent), ethylene glycol monobutyl ether (24 percent).
This product contains the following chemicals on the Massachusetts Substance List:
isopropanol (18 percent), thiourea (5 percent), ethyleneglycol monobutyl ether, CAS Number 111-76-2 (24 percent).
NFPA Rating:
Health 3 ; Flammability 3 ; Reactivity 0 ; Other: None
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:
HMIS

SHIPPING INFORMATION:
ICC Tariff Classification:
Compound, Boiler Cleaning, Scale Removing, Liquid
ICC Item Number: 50093 ICC Class: 55 LTL 35 TL
Department of Transporation - (DOT):
Description: Hazardous Material and Hazardous Substance
Hazard Class: 3 (flammable liquid)
Shipping Name: Flammable Liquids, N.O.S. (Contains Isopropanol), 3, UN 1993, PG III, RQ
DOT Label: Flammable Liquid 3
Comment:
Tank Exempt.#: N/A
CERCLA RQ: 25 gal. (thiourea)

US Foreign Trade Schedule B# (Export): 3823.90.7000

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: DIMETHYLAMINE HYDROCHLORIDE
FORMULA: (CH3)2NH HCL
FORMULA WT: 81.55
CAS NO.: 00506-59-2
NIOSH/RTECS NO.: IQ0220000
COMMON SYNONYMS: DIMETHYLAMMONIUM CHLORIDE; HYDROCHLORIC ACID DIMETHYLAMINE
PRODUCT CODES: J412
EFFECTIVE: 11/23/85
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN
CAUSES IRRITATION
AVOID CONTACT WITH EYES, SKIN, CLOTHING.
KEEP IN TIGHTLY CLOSED CONTAINER. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
DIMETHYLAMINE HYDROCHLORIDE	90-100	506-59-2

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: 171 C (340 F)
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 0.60 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE, ODORLESS CRYSTALS.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE 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.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, AMMONIA

---

5 - HEALTH HAZARD DATA

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
NO EFFECTS OF OVEREXPOSURE WERE DOCUMENTED.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, AMMONIA, AMINES

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND

COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, UNIFORM, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

BETZ
Trevose, PA 19053-6783 (215)355-3300

Material Safety Data Shee

Emergency Telephone
Health/Accident (800)877-1940

PRODUCT:BETZ DTG WN:C00076

EFFECTIVE DATE 11-13-91

REVISIONS TO SECTIONS: 1

PRODUCT APPLICATION : A DETOXIFYING AGENT.

1) HAZARDOUS INGREDIENTS

INFORMATION ON PHYSICAL HAZARDS, HEALTH HAZARDS, PEL'S AND TLV'S FOR SPECIFIC PRODUCT INGREDIENTS AS REQUIRED BY THE OSHA HAZARD COMMUNICATIONS STANDARD IS LISTED. REFER TO SECTION 4 (PAGE 2) FOR OUR ASSESSMENT OF THE POTENTIAL ACUTE AND CHRONIC HAZARDS OF THIS FORMULATION.

RESPIRABLE QUARTZ(CRYSTALLINE SILICA)***CAS#14808-60-7;SUSPECT HUMAN CARCINOGEN (IARC=2A);MAY CAUSE LONG TERM LUNG DISEASE(SILICOSIS); RESPIRATORY IRRITANT;PEL/TLV:0.1MG/M3.

2) TYPICAL PHYSICAL DATA

PH: 5% SUSP. (APPROX.) 8.8	ODOR: NONE
FL.PT.(DEG.F): >200 P-M(CC)	SP.GR.(70F)OR DENSITY: 58LBS./CU.FT.
VAPOR PRESSURE(mmHG): <1	VAPOR DENSITY(AIR=1): <1
VISC cps70F: NA	%SOLUBILITY(WATER): 0
EVAP.RATE: <1 ETHER=1	APPEARANCE: GRAY TO BROWN
PHYSICAL STATE: GRANULES	FREEZE POINT(DEG.F): NA

3) REACTIVITY DATA

STABLE.MAY REACT WITH STRONG OXIDIZERS.DO NOT CONTAMINATE.BETZ TANK CLEAN-OUT CATEGORY 'B'

THERMAL DECOMPOSITION (DESTRUCTIVE FIRES) YIELDS ELEMENTAL OXIDES.

PRODUCT:BETZ DTG

4) HEALTH HAZARD EFFECTS

ACUTE SKIN EFFECTS ***
NON-HAZARDOUS TO SKIN
ACUTE EYE EFFECTS ***
POTENTIAL EYE IRRITANT DUE TO MECHANICAL ACTION ONLY
ACUTE RESPIRATORY EFFECTS *** PRIMARY ROUTE OF EXPOSURE
DUSTS MAY CAUSE IRRITATION TO UPPER RESPIRATORY TRACT;INHALATION MAY RESULT IN SHORTNESS OF BREATH AND REDUCED PULMONARY FUNCTION.
CHRONIC EFFECTS OF OVEREXPOSURE***
PROLONGED OR REPEATED OVEREXPOSURE MAY CAUSE SILICOSIS AND MAY INCREASE RISK OF CANCER.
MEDICAL CONDITIONS AGGRAVATED ***
RESPIRATORY AILMENTS

SYMPTOMS OF EXPOSURE ***
INHALATION OF THE DUST MAY CAUSE IRRITATION TO THE UPPER RESPIRATORY TRACT AND CREATE BREATHING DIFFICULTIESSUCH AS SHORTNESS OF BREATH.

5) FIRST AID INSTRUCTIONS

SKIN CONTACT***
NO TREATMENT REQUIRED
EYE CONTACT***
IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES.IMMEDIATELY CONTACT A PHYSICIAN FOR ADDITIONAL TREATMENT
INHALATION EXPOSURE***
NO TREATMENT REQUIRED-NO HAZARD
INGESTION***
DO NOT FEED ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSIVE VICTIM
DILUTE CONTENTS OF STOMACH.INDUCE VOMITING BY ONE OF THE STANDARD METHODS.IMMEDIATELY CONTACT A PHYSICIAN

6) SPILL,DISPOSAL AND FIRE INSTRUCTIONS

SPILL INSTRUCTIONS***
VENTILATE AREA,USE SPECIFIED PROTECTIVE EQUIPMENT.SWEEP UP AND PLACE IN WASTE DISPOSAL CONTAINER.
FLUSH AREA WITH WATER. WET AREA MAY BE SLIPPERY. SPREAD SAND/GRIT.
DISPOSAL INSTRUCTIONS***
WATER CONTAMINATED WITH THIS PRODUCT MAY BE SENT TO A SANITARY SEWER TREATMENT FACILITY,IN ACCORDANCE WITH ANY LOCAL AGREEMENT,A PERMITTED WASTE TREATMENT FACILITY OR DISCHARGED UNDER A NPDES PERMIT
PRODUCT(AS IS)-
INCINERATE OR BURY IN APPROVED LANDFILL
FIRE EXTINGUISHING INSTRUCTIONS***
FIREFIGHTERS SHOULD WEAR POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS(FULL FACE-PIECE TYPE).PROPER FIRE EXTINGUISHING MEDIA:
DRY CHEMICAL,CARBON DIOXIDE,FOAM OR WATER

7) SPECIAL PROTECTIVE EQUIPMENT

USE PROTECTIVE EQUIPMENT IN ACCORDANCE WITH 29CFR SECTION 1910.132-134. USE RESPIRATORS WITHIN USE LIMITATIONS OR ELSE USE SUPPLIED AIR RESPIRATORS.
VENTILATION PROTECTION***
ADEQUATE VENTILATION TO MAINTAIN AIR CONTAMINANTS BELOW EXPOSURE LIMITS
RECOMMENDED RESPIRATORY PROTECTION***
IF VENTILATION IS INADEQUATE OR SIGNIFICANT PRODUCT EXPOSURE IS LIKELY, USE A RESPIRATOR WITH DUST/MIST FILTERS.
RECOMMENDED SKIN PROTECTION***
RUBBER GLOVES
WASH OFF AFTER EACH USE.REPLACE AS NECESSARY
RECOMMENDED EYE PROTECTION***
SAFETY GLASSES

8) STORAGE AND HANDLING PRECAUTIONS

STORAGE INSTRUCTIONS***
KEEP DRUMS & PAILS CLOSED WHEN NOT IN USE.
KEEP DRY
HANDLING INSTRUCTIONS***
NORMAL CHEMICAL HANDLING
****
THIS MSDS WAS WRITTEN TO COMPLY WITH THE OSHA HAZARD COMMUNICATION STANDARD
****

APPENDIX: REGULATORY INFORMATION

THE CONTENT OF THIS APPENDIX REPRESENTS INFORMATION KNOWN TO BETZ ON THE EFFECTIVE DATE OF THIS MSDS. THIS INFORMATION IS BELIEVED TO BE ACCURATE. ANY CHANGES IN REGULATIONS WILL RESULT IN UPDATED VERSIONS OF THIS DOCUMENT.

...TSCA: ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY
...REPORTABLE QUANTITY(RQ) FOR UNDILUTED PRODUCT:
NOT APPLICABLE
...RCRA: IF THIS PRODUCT IS DISCARDED AS A WASTE,THE RCRA HAZARDOUS WASTE IDENTIFICATION NUMBER IS: NOT APPLICABLE
...DOT HAZARD/UN#/ER GUIDE# IS: NOT APPLICABLE
...CALIFORNIA SAFE DRINKING WATER ACT (PROPOSITION 65) MATERIALS: NONE
...SARA SECTION 302 CHEMICALS: NONE
...SARA SECTION 313 CHEMICALS: NONE
...SARA SECTION 312 HAZARD CLASS: DELAYED(CHRONIC)
...MICHIGAN CRITICAL MATERIALS: NONE
NFPA/HMIS : HEALTH - 0 ; FIRE - 0 ; REACTIVITY - 0 ; SPECIAL - NONE ; PE - A

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.

WATER MANAGEMENT DIVISION

STRATEGIC CHEMICALS

Bulletin No. 15-4

EC-220
DEFOAMER

DESCRIPTION

CALGON EC-220 Defoamer is a highly stable, water-based, silicone antifoam emulsion. **EC-220** was specifically formulated to prevent or suppress foam in a broad range of municipal and industrial waste-water and water treatment systems. Although **EC-220** can be used to suppress or control foam, it is most effective in preventing foam formation and is often added to aqueous systems before foaming begins.

ADVANTAGES

- Safe, easy-to-use liquid.
- Water dispersible.
- Effective over a wide pH range.
- Effective in low concentrations.
- Quick-acting for immediate foam control.
- Long-lasting to maintain foam control.

TYPICAL PROPERTIES

Appearance	white, opaque liquid
Density (lbs./gallon)	8.23
Flash Point	None
Viscosity (cps @ 25°C)	2,000
Shelf Life	6 months

FEED REQUIREMENTS

Calgon **EC-220** Defoamer can be metered directly from the drum into the foaming system. It can also be dispersed in water and can be fed into a mixing tee or eductor through which water is flowing. The resulting dispersion should be added immediately to the system.

Your Calgon representative will assist you in determining the optimum dosage and method of feeding **EC-220** for your specific application needs.

PACKAGING

Calgon **EC-220** Defoamer is available in 5-gallon plastic pails and 55-gallon steel drums.

SHIPPING

DOT Hazardous Class ..... Not Restricted
DOT Proper Shipping Name ..... Not Restricted
UN Number ..... Not Applicable

STORAGE AND HANDLING

- Store this product at temperatures between 50° and 90°F.

MATERIALS COMPATIBILITY

Recommended materials for pump "liquid ends" and piping include carbon steel, 304 or 316 SS, polyethylene, polypropylene, PVC, Kynar†, Viton*, or Hypalon*.

† ® Trademark of Pennwall
* ® Trademark of DuPont

Information concerning human environmental exposure may be reviewed on the Material Safety Data Sheet and label for this product. For additional information regarding incidents involving human and environmental exposure, call (412) 777-8000 and ask for the Health & Environmental Affairs Department.

All names in boldface are trademarks or service marks of Merck & Co., Inc., Rahway, NJ.

For more information, contact your local Calgon Representative or write:
Water Management Division, Calgon Corporation, P.O. Box 1346, Pittsburgh, PA 15230.

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO. INC.

K&SD 5/92

MSDS

Stockcode (Product ID) : NWC00145/EC-220 Page number 1 of 3

MSDS Part 1 of 1 Kit? N Hazardous? N Product from MMIS? N

MSDS's Date: 9/28/95 Trade Secret? Y Product CAS:

Product Name: CHEMICAL: CALGON EC-220, DEFOMAR

Special Handling Instructions:

THIS PRODUCT POSES LITTLE OR NO IMMEDIATE HAZARD.

General Short Name: EC-220

Synonym 1 : POLYDIMETHYLSILOXANE EMULSION

2 : DEFOMAR

3 :

4 :

5 :

HEADER INFORMATION

NA

Manufacturer: CALGON

Catalog # EC-220 FORMULA: NA

PRODUCT ID TEXT

CALGON CORP., PO BOX 1346, PITTSBURGH, PA 15230-1346, PHONE - 412-494-8000

SECTION II -- HAZARDOUS INGREDIENTS

HAZARDOUS INGREDIENTS TEXT

NO HAZARDOUS INGREDIENTS. CHEMICAL IS A POLYDIMETHYSILOXANE EMULSION DEFOAMER.

SECTION III - PHYSICAL DATA

Appearance: MILKY-WHITE LIQUID

Odor: MILD

Boiling Point: >212 F Specific Gravity (H2O=1) : 0.981

Melting Point: NA Vapor Pressure (mm Hg) : <20

Solubility in Water: DISPERSIBLE Vapor Density (air=1) : >1

Evaporation Rate (butyl acetate=1) : ND

PHYSICAL DATA TEXT

NA

SECTION IV -- FIRE/EXPLOSION HAZARD

Flash Point : NONE

Flash Point Method Used: NA

Lower Explosion Limit: ND Upper Explosion Limit: ND

Extinguishing Media:

APPROPRIATE FOR SURROUNDING FIRE.

Special Fire Fighting Procedures:

EXERCISE CAUTION WHEN FIGHTING ANY CHEMICAL FIRE. A SCBA AND PROTECTIVE CLOTHING ARE ESSENTIAL.

Unusual Fire & Explosion Hazard:

ND

NFPA Labeling :

0	Health Hazard	-- Blue	Label (0-4)
0	Flammability	-- Red	Label (0-4)
0	Reactivity	-- Yellow	Label (0-4)
	Special Note	-- White	Label (W,OXY,ACID,ALK,COR)

MSDS

Stockcode (Product ID): NWC00145/EC-220 Page number 2 of 3

MSDS Part 1 of 1 Kit? N Hazardous? N Product from MMIS? N

MSDS's Date: 9/28/95 Trade Secret? Y Product CAS:

Product Name: CHEMICAL: CALGON EC-220, DEFOMAR

FIRE/EXPLOSION HAZARD TEXT

NA

SECTION V – HEALTH HAZARDS

Carcinogenicity (Y or N): IARC Monographs N OSHA Regulated N NTP N

Route of Entry (Y or N): Inhalation N Ingestion N Skin N

Signs & Symptoms of Exposure:

THIS PRODUCT POSES LITTLE OR NO IMMEDIATE HAZARD.NO APPLICABLE INFORMATION WAS FOUND CONCERNING ANY POTENTIAL HEALTH EFFECTS RESULTING FROM SUBCHRONIC OR CHRONIC EXPOSURE TO THIS PRODUCT.

Medical Conditions Aggravated by Exposure:

NONE

Emergency & First Aid Procedures:

NO EXPECTED TO REQUIRE FIRST AID.

HEALTH HAZARDS TEXT

TOXICOLOGICAL INFORMATION: ORAL LD50(RAT)=>64 ML/KG, LD50(RABBIT)=>20 ML/KG

SECTION VI – REACTIVITY DATA

Stable (Y or N): Y Hazardous Polymerization (Y or N): N

Stability Conditions to Avoid:

PROTECT FROM LOW TEMPERATURES.

Hazardous Polymerization Conditions to Avoid:

NONE

Incompatibility (Materials to Avoid):

STRONG OXIDIZERS

Hazardous Decomposition or By Products:

CO, CO2, AND OXIDES OF SILICON.

REACTIVITY DATA TEXT

NA

SECTION VII – SAFE HANDLING PROCEDURES

Spill or Release Measures:

CONTAIN SPILL, COLLECT ONTO INERT ABSORBANT AND PLACE IN SUITABLE CONTAINER.

Waste Disposal Method:

DISCARDED PRODUCT AS, AS SOLID, WOULD NOT BE CONSIDERED A RCRA HAZARDOUS WASTE. DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

SAFE HANDLING PROCEDURES TEXT

aQUATIC TIOXICITY DATA: 96 HOUR LC50(FLATHEAD MINNOW)= >1000 PPM, 48 HOUR LC50(DAPHNIA MAGNA)= 3497 PPM

SECTION VIII – SPECIAL PROTECTION

Protective Gloves: NO SPECIAL RECOMMENDATION

Eye Protection: CHEMICAL SPLASH GOGGLES OR SAFETY GLASSES

Respiratory Protection (specific type):

NA

Ventilation Instructions:

NA

MSDS

Stockcode (Product ID) :	NWC00145/EC-220					Page number	3	of	3
MSDS Part	1	of	1	Kit?	N	Hazardous?	N	Product from MMIS?	N
MSDS's Date:	9/28/95					Trade Secret?	Y	Product CAS:	
Product Name:	CHEMICAL: CALGON EC-220, DEFOMAR								

Other Protective Clothing or Equipment:

NA

Work/Hygenic Practices:

NA

SPECIAL PROTECTION TEXT

NA

SECTION IX – SPECIAL PRECAUTIONS

Handling/Storage Precautions:

AS PART OF GOOD INDUSTRIAL AND PERSONAL HYGIENE AND SAFETY PROCEDURE, AVOID ALL UNNECESSARY EXPOSURE TO THE PRODUCT AND ENSURE PROMPT REMOVAL FROM EYES, SKIN AND CLOTHING. MIX THJOUROUGHLY BEFORE USE. WASH THOROUGHLY AFTER HANDLING. KEEP CONTAINER CLOWED WHEN NOT IN USE. KEEP WATER AND MOIST AIR OUT OF THE CONTAINER. PRODUCT MUST BE MAINTAINED AT 50 F OR HIGHER. PROTECT FROM LOW TEMPERATURE.

SPECIAL PRECAUTIONS TEXT

NA

TRAILER TEXT

1st SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

MATERIAL SAFETY DATA SHEET

NALCO

PRODUCT

ELIMIN-OX OXYGEN SCAVENGER

Emergency Telephone Number

Medical(800)462-5378(24 hours)(800)I-M-ALERT

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: ELIMIN-OX OXYGEN SCAVENGER
DESCRIPTION: An aqueous solution of a modified amino compound

NFPA 704M/HMIS RATING: 1/1 HEALTH 0/0 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 COMPOSITION/INGREDIENT INFORMATION

Our hazard evaluation of the ingredient(s) under OSHA's Hazard Communication Rule, 29 CFR 1910.1200 has found none of the ingredient(s) hazardous.

SECTION 3 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:
CAUTION: May cause skin irritation. Avoid contact with skin and clothing. Avoid prolonged or repeated breathing of vapor. Use with adequate ventilation. Do not take internally.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin

EYE CONTACT: Non-irritating.
SKIN CONTACT: Can cause mild, short-lasting irritation.

SYMPTOMS OF EXPOSURE: A review of available data does not identify any symptoms from exposure.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

SECTION 4 FIRST AID INFORMATION

EYES: Flush with water for 15 minutes.
SKIN: Flush with water for 15 minutes.
INGESTION: Induce vomiting. Give water. Call a physician.
INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.

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SECTION 5 FIRE FIGHTING

FLASH POINT: None (PMCC) ASTM D-93

EXTINGUISHING MEDIA: Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve NOx under fire conditions. Containers exposed in a fire should be cooled with water to prevent vapor pressure buildup leading to a rupture.

SECTION 6 ACCIDENTAL RELEASE MEASURES

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (800) I-M-ALERT or (800) 462-5378.

SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 15.

Large liquid spills: Dike to prevent further movement and reclaim into recovery salvage drums or tank truck for disposal. Refer to CERCLA in Section 15.

For large indoor spills, evacuate employees and ventilate area. Those responsible for control and recovery should wear the protective equipment specified in Section 8 .

SECTION 7 HANDLING AND STORAGE

Handling: Avoid contact with skin, eyes, and clothing.

Storage : Keep container closed when not in use.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Respiratory protection is not normally needed since the volatility and toxicity are low. If significant vapors, mists or aerosols are generated, wear a NIOSH approved or equivalent respirator.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a positive pressure, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended.

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SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

PROTECTIVE EQUIPMENT: Use impermeable gloves and chemical splash goggles when attaching feeding equipment, doing maintenance or handling product. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton and butyl (compatibility studies have not been performed).

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION: Based on Nalco's recommended product application and our recommended personal protective equipment, the potential human exposure is: LOW.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: Colorless	FORM: Liquid	
DENSITY:	8.5-8.6 lbs/gal.	
SOLUBILITY IN WATER:	Completely	
SPECIFIC GRAVITY:	1.02-1.03 @ 60 Degrees F	ASTM D-1298
pH (NEAT) =	6 - 10 pH (at 1%) 6.7	ASTM E-70
VISCOSITY:	3 cps @ 60 Degrees F	ASTM D-2983
FREEZE POINT:	28 Degrees F	ASTM D-1177
FLASH POINT:	None (PMCC)	ASTM D-93
VAPOR PRESSURE:	12 mm Hg @ 68 Degrees F	ASTM D-323
VOLATILE ORGANIC COMPOUND (VOC):	0 lbs/gal.	EPA METHOD 24

NOTE: These physical properties are typical values for this product.

SECTION 10 STABILITY AND REACTIVITY

INCOMPATIBILITY: Avoid mineral acids and nitrites.

Avoid contact with strong oxidizers (eg. chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

STORAGE: Store at temperatures below 120 Degrees F and above 40 Degrees F. At temperatures below 40 Degrees F, this product looses its stability and form precipitates. Once formed, the precipitate cannot be resolubilized and loss of product activity will occur.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO2, NOx may

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SECTION 10 STABILITY AND REACTIVITY (CONTINUED)

be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY STUDIES: Acute toxicity studies have been conducted on this product. The results are shown below.

ACUTE ORAL TOXICITY (ALBINO RATS): LD50 = Greater than 5 g/kg

ACUTE DERMAL TOXICITY (ALBINO RABBITS): LD50 = Greater than 2 g/kg

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):
SKIN IRRITATION INDEX DRAIZE RATING: 0.23/8.0 Minimal irritation

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):
EYE IRRITATION INDEX DRAIZE RATING: 0.33/110.0 Practically non-irritating

HUMAN HAZARD CHARACTERIZATION: Based on our hazard characterization, the potential human hazard is: LOW

SECTION 12 ECOLOGICAL INFORMATION

AQUATIC DATA:

Results below are based on the product.

96 hour static acute LC50 to Bluegill Sunfish = 190 ppm

96 hour static acute LC50 to Rainbow Trout = 360 ppm

96 hour static acute LC50 to Fathead Minnow = 400 mg/L

96 hour no observed effect concentration is 100 mg/L based on no mortality or abnormal effects.

48 hour static acute LC50 to Daphnia magna = 96 mg/L

48 hour no observed effect concentration is 20 mg/L based on no mortality or abnormal effects.

If released into the environment, see CERCLA in Section 15.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION: Based on our Hazard

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SECTION 12 ECOLOGICAL INFORMATION (CONTINUED)

Characterization, the potential environmental hazard is: LOW.
Based on Nalco's recommended product application and the product's characteristics, the potential environmental exposure is: LOW.

SECTION 13 DISPOSAL CONSIDERATIONS

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be deep-well injected in accordance with local, state and federal regulations.

SECTION 14 TRANSPORTATION INFORMATION

PROPER SHIPPING NAME/HAZARD CLASS MAY VARY BY PACKAGING, PROPERTIES, AND MODE OF TRANSPORTATION. TYPICAL PROPER SHIPPING NAMES FOR THIS PRODUCT ARE:

ALL TRANSPORTATION MODES : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

SECTION 15 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:
Based on our hazard evaluation, this product is not hazardous.

CERCLA, 40 CFR 117, 302:
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):

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SECTION 15 REGULATORY INFORMATION (CONTINUED)

This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):
This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):
The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

's product has been certified as KOSHER/PAREVE for year-round use INCLUDING PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:
Consult Section 13 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 (formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, Sec. 111 (40 CFR 60), Sec. 112 (40 CFR 61, 1990 Amendments), Sec. 611 (40 CFR 82, CLASS I and II Ozone depleting substances):
This product does not contain ingredients covered by the Clean Air Act.

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
Hydrazine is known to the State of California to cause cancer. This product contains levels of hydrazine as an impurity at less than 0.01%.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical Materials Register.

STATE RIGHT TO KNOW LAWS:

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SECTION 15 REGULATORY INFORMATION (CONTINUED)

The following ingredient(s) are disclosed for compliance with State Right To Know Laws:

Carbohydrazide	497-18-7
Water	7732-18-5

INTERNATIONAL REGULATIONS:

This is not a WHMIS controlled product under The House of Commons of Canada Bill C-70.

SECTION 16 OTHER INFORMATION

None

SECTION 17 RISK CHARACTERIZATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our ·ommended use of this product, we have characterized the product's general k. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: LOW.
* The environmental risk is: LOW.

Any use inconsistent with Nalco's recommendations may affect our risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

SECTION 18 REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and

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SECTION 18 REFERENCES (CONTINUED

Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (CD-ROM version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (CD-ROM version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, Ohio (CD-ROM version), Micromedex, Inc., Englewood, CO.

Shepard's Catalog of Teratogenic Agents (CD-ROM version), Micromedex, Inc., Englewood, CO.

Suspect Chemicals Sourcebook (a guide to industrial chemicals covered under major regulatory and advisory programs), Roytech Publications (a Division of Ariel Corporation), Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, Washington (CD-ROM version), Micromedex, Inc., Englewood, CO.

PREPARED BY: William S. Utley, PhD., DABT, Manager, Product Safety
DATE CHANGED: 09/28/95 DATE PRINTED: 07/01/97

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AREA (630)305-1000

003 04/04/01 ETHYLENEDIAMINE

****

PRODUCT IDENTIFICATION

****

ODUCT NAME: ETHYLENEDIAMINE
DS NUMBER: UZN0138K
DATE ISSUED: 6/23/2000
SUPERCEDES; 2/28/2000
ISSUED BY: 009053

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name
ETHYLENEDIAMINE
Chemical Name
1,2-Ethanediamine
Chemical Family
Ethyleneamines
Formula
C2H8N2
Synonym
EDA; EDA-HP; EDA-UHP

1.3 EMERGENCY TELEPHONE NUMBER

24 hours a day: CHEMTREC 1-800-424-9300.

2. COMPOSITION INFORMATION
Component
CAS #
ount (%W/W)

thylenediamine
107-15-3
>= 99 <= 99.9 %

3. HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Appearance Transparent colorless

Physical State Liquid

Odor Strong Ammoniacal Fishy

Hazards of product
DANGER!
MAY CAUSE ASTHMA WITH POSSIBLE LONG-TERM LUNG DAMAGE.
CROSS-SENSITIZATION TO OTHER AMINES MAY OCCUR.
CAUSES EYE AND SKIN BURNS.
HARMFUL AND CORROSIVE IF SWALLOWED.
HARMFUL IF INHALED OR ABSORBED THROUGH SKIN.
MAY CAUSE ALLERGIC SKIN REACTION.
COMBUSTIBLE.
PLASTIC CONTAINER, IF PRESENT, MAY CAUSE STATIC IGNITION HAZARD.

ASPIRATION MAY CAUSE LUNG DAMAGE.
Y CAUSE RESPIRATORY SYSTEM DAMAGE.

.2 POTENTIAL HEALTH EFFECTS

Effects of Single Acute Overexposure

Inhalation Vapor is irritating and may cause excessive tear formation, burning sensation of the nose and throat, coughing, wheezing, shortness of breath, nausea and vomiting. Extremely high vapor concentrations may cause lung damage. Some individuals may develop asthma. (See "Other Effects of Overexposure.")

Eye Contact Vapor may cause temporary disturbance of vision. (See "Notes to Physician".) Causes corneal injury and iritis. Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the eye. Corneal injury may be severe, extensive, and, if not treated promptly, could result in permanent impairment of vision.

Skin Contact Causes local discomfort or pain, severe excess redness and swelling, tissue destruction, fissures, ulceration, and possibly bleeding into the injured area.

Skin Absorption Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

Swallowing Moderately toxic. May cause burns of mouth and throat, abdominal pain, nausea, vomiting, diarrhea, dizziness, weakness, thirst, collapse, and possible coma. The nature and severity of these signs and symptoms will be dependent on the amount swallowed. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury.

Chronic, Prolonged or Repeated Overexposure

Effects of Repeated Overexposure Prolonged or repeated inhalation may lead to kidney, liver, and respiratory system injury.

Other Effects of Overexposure Inhalation of ethyleneamines may cause sensitization of the respiratory tract and the development of an asthmatic reaction on further exposure. There may be susceptible* individuals who develop long-term hyperreactive airways, asthma and other respiratory injury following exposure to extremely low concentrations of ethyleneamines, even below the irritation threshold. Other respiratory irritants may produce a reaction in individuals whose airways have become hyperreactive. *Since there are no definitive screening methods available to identify susceptible individuals, we suggest that people with asthma, or other longstanding respiratory conditions (for example, chronic bronchitis, emphysema, etc.) should be protected from any potential exposure to ethyleneamines. Skin contact may cause sensitization and an allergic skin reaction. Cross-sensitization may occur by skin contact with this material and other amines.

Medical Conditions Aggravated by Exposure

Skin contact may aggravate an existing dermatitis. Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary disease.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION

Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen may be given by qualified personnel. Obtain medical attention.

4.2 EYE CONTACT

Immediately flush eyes with water and continue washing for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferably from an ophthalmologist.

4.3 SKIN CONTACT

Immediately flush skin thoroughly with water for at least 15 minutes while removing contaminated clothing and shoes. Obtain medical attention without

delay. Wash clothing before reuse. Discard contaminated leather articles such as shoes and belt.

4.4 SWALLOWING

f patient is fully conscious, give two glasses of milk or water at once. DO T INDUCE VOMITING. Obtain medical attention without delay.

4.5 NOTES TO PHYSICIAN

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.
Due to the severely irritating or corrosive nature of the material, swallowing may lead to ulceration and inflammation of the upper alimentary tract with hemorrhage and fluid loss. Also, perforation of the esophagus or stomach may occur, leading to mediastinitis or peritonitis and the resultant complications. The stomach should be evacuated carefully in case of ingestion. Due to the irritating nature of the material, any aspiration during vomiting could result in severe lung injury. Therefore, emesis should not be induced mechanically or pharmacologically. However, the acute peroral systemic toxicity of the material indicates that evacuation of the stomach contents should be undertaken at the earliest possible time by means carrying the least likelihood of aspiration (e.g., the use of gastric lavage with endotracheal intubation).
Exposure to the vapor may cause minor transient edema of the corneal epithelium. This condition, referred to as "glaucopsia", "blue haze" or "blue-gray haze", produces a blurring of vision against a general bluish haze and the appearance of halos around bright objects. The effect disappears spontaneously within a few hours of the end of an exposure and leaves no sequelae. Although not detrimental to the eye per se, glaucopsia predisposes an affected individual to physical accidents and reduces the ability to undertake skilled tasks, such as driving a motorized vehicle.

5. FIRE FIGHTING MEASURES

1 FLAMMABLE PROPERTIES

Flash Point - Closed Cup: Tag Closed Cup ASTM D 56 43.3 C 110 F

Flash Point - Open Cup: Tag Open Cup ASTM D 1310 39.4 C 103 F

Autoignition Temperature: Not currently available.

Flammable Limits In Air:
Lower 4.2 %(V)
Upper 14.4 %(V)

5.2 EXTINGUISHING MEDIA
Extinguish fires with water spray or apply alcohol-type or all-purpose-type foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.
5.3 EXTINGUISHING MEDIA TO AVOID
No information currently available.
5.4 SPECIAL FIRE FIGHTING PROCEDURES
Do not direct a solid stream of water or foam into burning molten material; this may cause spattering and spread the fire.
5.5 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Use self-contained breathing apparatus, eye protection, and protective clothing.
5.6 UNUSUAL FIRE AND EXPLOSION HAZARDS
During a fire, oxides of nitrogen may be produced.

ee Section 8.3 - Engineering Controls

.7 HAZARDOUS COMBUSTION PRODUCTS
Burning can produce the following products: Oxides of carbon and nitrogen. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant. Acute overexposure to the products of

combustion may result in irritation of the respiratory tract.

6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled:
Small spills could be flushed with large amounts of water. Larger spills should be collected for disposal.

Personal Precautions: Wear suitable protective equipment. Avoid contact with liquid and vapors. See Section 8.2 - Personal Protection.

Environmental Precautions: At very low concentration in water (about 10 ppm), ethylenediamine is biodegradable in a biological wastewater treatment system. However, at about 500 ppm concentration or higher, it can be toxic to the biomass in a treatment system. Also, it is toxic to fish. Therefore, avoid discharge to sewers or to natural waters.

7. HANDLING AND STORAGE

7.1 HANDLING

General Handling
Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
Do not swallow.
Keep away from heat and flame.
Do not handle or empty in presence of flammable vapor.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Ventilation
General (mechanical) room ventilation is expected to be satisfactory where this product is stored and handled in closed equipment. Special, local ventilation is needed at points where vapor can be expected to escape to the workplace air.

Other Precautions
Do not add nitrites or other nitrosating agents. A nitrosamine, which may cause cancer, may be formed. This product freezes at approximately 10 C (50 F). Thaw by moving to warm area. Mix before sampling or using. NOTICE! Heat material carefully to avoid excess generation of and exposure to vapors which can easily exceed the TLV. If thawing is required, DO NOT use open flame to thaw product. Product is best thawed by storage in a "warm room" at a temperature of 30 to 35 C. Excessive heat could melt the polyethylene drum liner and result in release of product. Note that EDA may approach its open cup flashpoint (39 C) if excessive heat is applied. A bung should be loosend during thawing to prevent pressure build-up in the drum. Use adequate ventilation while thawing. Vapor released during thawing should be vented to a scrubber or other emission control device. Washing will not make the container safe for food, potable water or cosmetic storage.
7.2 STORAGE

Store at normal ambient temperatures.
8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1 EXPOSURE LIMITS

Component
Exposure Limits
Skin
Form

Ethylenediamine
10 ppm TWA8 ACGIH
Yes

25 mg/m3 TWA8 ACGIH
:Yes

10 ppm TWA8 OSHA

5 mg/m3 TWA8 OSHA

10 ppm TWA8 US-UCC
Yes

In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.

A "Yes" in the Skin Column indicates a potential significant contribution to overall exposure by the cutaneous (skin) route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance. A "Blank" in the Skin Column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.

8.2 PERSONAL PROTECTION

Respiratory Protection:

Positive pressure supplied air respirator equipped with a full facepiece should be used during any operation where there is potential for release of this product to workplace air.

Ventilation:

General (mechanical) room ventilation is expected to be satisfactory where this product is stored and handled in closed equipment.
Special, local ventilation is needed at points where vapor can be expected to escape to the workplace air.

Eye Protection:

Monogoggles

Protective Gloves:

Butyl
Neoprene

Other Protective Equipment:

Eye bath, safety shower and chemical apron. When breaking open any equipment (or in the event of a large spill or release), full protective clothing is needed (i.e. rainsuit, boots, cuffed gloves, etc.).

8.3 ENGINEERING CONTROLS

PROCESS HAZARD: Sudden release of hot organic chemical vapor or mists from process equipment operating at elevated temperature and pressure, or sudden ingress of air into hot equipment under a vacuum, may result in ignitions without the presence of obvious ignition sources. Published "autoignition" or "ignition" temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated-temperature processes should be thoroughly evaluated to establish and maintain safe operating conditions. Further information is available in a technical bulletin entitled "Ignition Hazards of Organic Chemical Vapor."

9. PHYSICAL AND CHEMICAL PROPERTIES
Physical State: Liquid

Appearance: Transparent colorless

pH: Not currently available.

Solubility in Water (by weight): 20 C 100 %

Odor: Strong Ammoniacal Fishy

Flash Point - Closed Cup: Tag Closed Cup ASTM D 56 43.3 C 110 F

Flash Point - Open Cup: Tag Open Cup ASTM D 1310 39.4 C 103 F

Percent Volatiles : 100 Wt%

Molecular Weight: 60.10 g/mol

Boiling Point (760 mmHg): 117.0 C 242.6 F

Freezing Point: 11 C 52 F

Specific Gravity (H2O = 1): 0.898 20 C / 20 C

Vapor Pressure at 20 C: 1.3 kPa 10 mmHg

Vapor Density (air = 1): 2.1

Evaporation Rate (Butyl Acetate = 1): 0.9

Melting Point: Not applicable.

10. STABILITY AND REACTIVITY

10.1 STABILITY/INSTABILITY Stable

Conditions to Avoid: This product will react with carbon dioxide in the air to form solid carbamates which may be visible as a white, smoke-like fume. Some decomposition can occur upon vigorous heating; e.g., application of high-pressure steam or flame.

Incompatible Materials: Acids. Oxidizing agents. Aldehydes. Ketones. Epoxides. Acrylates. Organic halides.

Thermal Decomposition: Thermal decomposition can produce the following decomposition products: Volatile amines. Ammonia.

10.2 HAZARDOUS POLYMERIZATION Will Not Occur.

10.3 INHIBITORS/STABILIZERS Not applicable.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Peroral

Rat; male; LD50 = 1.12 (0.58 - 2.16) ml/kg

Major Signs: sluggishness, deep breathing

Gross Pathology: liver, spleen, kidneys discolored, stomach and intestines distended and liquid-filled

Percutaneous

Rabbit; LC50 = 0.630 (0.386 - 1.03) ml/kg; 24 h occluded.

Gross Pathology: necrosis at application site, kidneys discolored

Inhalation

Vapor Studies, 8 hour Rat = 4000 ppm

Mortality: 6/6

Inhalation
Vapor Studies, 8 hour Rat = 2000 ppm

Mortality: 0/6
Irritation
Eye: Rabbit; 0.005 ml
Result: moderate to severe corneal injury with iritis, marked edema, purulence, injection, moderate hemorrhage, and necrosis of lids

Eye: Rabbit; 0.5 ml; 5% dilution in water
Result: moderate to severe corneal injury with iritis, marked edema, purulence, injection, moderate hemorrhage, and necrosis of lids
SENSITIZATION (ANIMAL AND HUMAN STUDIES)
Guinea pig, mild to moderate positive reaction in 7/7 upon challenge after intradermal injections of a 0.1% dilution in saline

SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS
Repeated oral exposures may cause kidney and liver changes.
Contains one or more amines which may react with nitrites to form nitrosamines. Some nitrosamines have been shown to be carcinogenic in laboratory animals.12. ECOLOGICAL INFORMATION

12.1 ENVIRONMENTAL FATE

BOD (% Oxygen consumption)

Day 5
Day 10
Day 15
Day 20
Day 30

68 %
100 %
100 %

BOD (% Oxygen consumption)

Day 5
Day 10
Day 15
Day 20
Day 30

24 %
44 %
47 %

12.2 ECOTOXICITY

Ecotoxicity to Micro-organisms Toxicity to Micro-organisms
Bacterial Inhibition; IC50
Result value: 500 - 1000 mg/l

Ecotoxicity to Aquatic Invertebrates Toxicity to Aquatic Invertebrates
Daphnia; 48 h; LC50
Result value: 4.5 mg/l

Ecotoxicity to Aquatic Plants Ecotoxicity to Fish Toxicity to Fish
Fathead Minnow; 96 h; LC50
Result value: 210 mg/l

Toxicity to Fish
Fathead Minnow; 96 h; LC50

Result value: 145 mg/l

12.3 FURTHER INFORMATION

Theoretical Oxygen Demand (THOD) - measured: 1.30 mg/mg
Theoretical Oxygen Demand (THOD) - calculated: 1.33 mg/mg

13. DISPOSAL CONSIDERATIONS

13.1 WASTE DISPOSAL METHOD

Incinerate in a furnace where permitted under Federal, State, and local regulations. Dispose in accordance with all applicable Federal, State, and local environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

13.2 DISPOSAL CONSIDERATIONS

See Section 13.1

Disposal methods identified are for the product as sold. For proper disposal of used material, an assessment must be completed to determine the proper and permissible waste management options permissible under applicable rules, regulations and/or laws governing your location.

14. TRANSPORT INFORMATION

14.1 U.S. D.O.T.

NON-BULK
Proper Shipping Name : ETHYLENEDIAMINE
ID Number : UN 1604
Hazard Class : 8, 3
Packing Group : PG II

BULK
Proper Shipping Name : ETHYLENEDIAMINE
ID Number : UN 1604
Hazard Class : 8, 3
Packing Group : PG II
Reportable Quantity : 5,000 LB

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

15.1 FEDERAL/NATIONAL

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 SECTION 103 (CERCLA)

The following components of this product are specifically listed as hazardous substances in 40 CFR 302.4 (unlisted hazardous substances are not identified) and are present at levels which could require reporting:

Component
CAS #
Amount

Ethylenediamine
107-15-3
<= 99.9000 %

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA)

SECTIONS 302 AND 304

The following components of this product are listed as extremely hazardous substances in 40 CFR Part 355 and are present at levels which could require reporting and emergency planning:

Component
CAS #
Amount

Ethylenediamine
107-15-3
<= 99.9000 %

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA) SECTION 313

The following components of this product are listed as toxic chemicals in 40 CFR 372.65 and are present at levels which could require reporting and customer notification under Section 313 and 40 CFR Part 372:

- This product does not contain toxic chemicals at levels which require reporting under the statute.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EPCRA) SECTIONS 311 AND 312
Delayed Hazard : Yes
Fire Hazard : Yes
Immediate Health Hazard : Yes
Reactive Hazard : No
Sudden Release of Pressure Hazard : No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)

This product is on the EINECS inventory.

CEPA - DOMESTIC SUBSTANCES LIST (DSL)

The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

15.2 STATE/LOCAL
PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT)

This product is subject to the Worker and Community Right-to-Know Act. The following components of this product are at levels which could require identification in the MSDS:

Component
CAS #
Amount

Ethylenediamine
107-15-3
<= 99.9000 %

MASSACHUSETTS (HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS)
The following components of this product appear on the Massachusetts Substance List and are present at levels which could require identification in the MSDS:
Component

CAS #
Amount

Ethylenediamine
7-15-3
<= 99.9000 %

NEW YORK (HAZARDOUS SUBSTANCES BULK STORAGE ACT)
New York State Bulk Storage Regulations (6 NYCRR Parts 595-599) This product is covered by 6 NYCRR for bulk storage and release reporting and response. Technical guidance and recommended practices are as follows: MATERIALS OF CONSTRUCTION - Suitable materials of construction are: stainless steel - Materials not to be used: steel, lined steel, copper and copper alloys, zinc, nickel, galvanized iron, pvc, aluminum. Plastics are not recommended for "flammable liquids". STORAGE SYSTEM DESIGN - Design should comply with applicable industry, Federal, and local codes for a flammable liquid with regards to mechanical, electrical, safety and health components. Should also comply with the current versions of the applicable reference documents cited in NYS/DEC Chemical Bulk Storage Regulations Sections 598.1(j), 598.2, 598.3 to 598.5 (for existing tanks) or Sections 599.1 and 599.15 (for new or substantially modified tanks). CONDITIONS FOR STORAGE - Store at normal ambient temperatures. INSPECTION AND MAINTENANCE - A testing/inspection program which ensures structural integrity and proper system operation should be established. Inspection and maintenance procedures and testing of equipment should comply with NYS/DEC Regulations Sections 598.6 to 598.10. TRANSFER AND UNLOADING - These operations should comply with NYS/DEC Regulations, Section 598.4. See also other sections of this MSDS.
CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1, LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC : Vapor pressure 10.0 mmHg @ 20 C
892 g/l
896 g/l less water and less exempted solvents

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

16.2 SPECIFIC HAZARD RATING SYSTEM
HMIS
ratings for this product are:
H - 3
F - 2
R - 0

NFPA
ratings for this product are:
H - 3
F - 2
R - 0

These ratings are part of specific hazard communications program(s) and should be disregarded where individuals are not trained in the use of these hazard rating systems. You should be familiar with the hazard communication applicable to your workplace.

16.3 RECOMMENDED USES AND RESTRICTIONS
FOR INDUSTRY USE ONLY

16.5 LEGEND

Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
A
Asphyxiant
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
Bacterial/NA
Non Acclimated Bacteria
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
F
Fire
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
H
Health
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
HMIS
Hazardous Materials Information System
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
N/A
Not available
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
NFPA
tional Fire Protection Association
te that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
O
Oxidizer
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
P
Peroxide Former
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
R
Reactivity
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
TS
Trade Secret
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
VOL/VOL
Volume/Volume
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
W
Water Reactive
Note that below the phrase code prints in Col 1 and the Phrase in Col2. Symbol is for MSDS Phrase 2
W/W
ight/Weight

---------- NOTICE ----------

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PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN,

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AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

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* * * E N D O F M S D S * * *

EVAC™ BIOCIDE

ACTIVE INGREDIENT:
Mono(N, N-dimethylalkylamine**) salt of endothall* 53.0%
INERT INGREDIENTS: 47.0%
TOTAL: 100.0%

Contains 2 lb. Technical endothal* per gallon
*7-oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid equivalent 23.36%
**Alkyl as in fatty acids of coconut oil

KEEP OUT OF REACH OF CHILDREN

DANGER

STATEMENT OF PRACTICAL TREATMENT

IF SWALLOWED, call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting.

IF ON SKIN, wash with plenty of soap and water. Get medical attention.

IF IN EYES, hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention.

IF INHALED, remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

See Side Panel for Additional Precautionary Statements.

EPA Registration No. 4581-380 EPA Establishment No. 4581-MI-1

Net Contents 30 U.S. Gallons / 113.5 Liters

Elf Atochem ATO

ELF ATOCHEM NORTH AMERICA, INC.—AGRICHEMICALS GROUP
2000 Market Street, Philadelphia, PA 19103

effective in controlling established populations of Zebra Mussel and in preventing settlement of the immature forms of Zebra Mussel and Quagga Mussel. EVAC Biocide has also shown activity against various slime organisms in systems that recirculate water.

The toxicity of EVAC Biocide to Zebra Mussel is dependent on rate of application and the time of exposure. In lab studies, treatments of EVAC Biocide at 2.3 ppm for 6-7 hours were equivalent to those at 5 ppm for 2 hours. EVAC Biocide rapidly dissipates in water. Degradation in the environment is microbial only; it does not hydrolize or photolyze in an aquatic environment. EVAC Biocide does not require a holding period or deactivation after use.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

For control of established populations of Zebra Mussel in recirculating and once through cooling water systems, EVAC Biocide should be applied at 16.2 to 48.6 milliliters per 1000 gallons of water (equivalent to 1.0 to 3.0 ppm endothall technical) for six to twelve hours of exposure.

EVAC Biocide can be metered directly into the system with a positive displacement pump or into a flow of dilution water for use in a distribution header. One continuous application should be made at a convenient point of uniform mixing, such as a basin area, pump area or other reservoir or collecting area from which treated water will be circulated uniformly throughout the system.

Higher rates of application and exposure times are required for heavy populations of fouling mussels and/or with cooler water temperatures (less than 70°F).

EVAC Biocide has also shown potential for treating service water, auxiliary water, waste water, influent and fire protection water systems.

Suspension of the blow down from cooling towers for six to twelve hours after EVAC Biocide application and/or segmenting plant-wide treatments will reduce the level of product remaining in the effluent.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

Storage Instructions: Store in the original container. Do not store in a manner where cross-contamination with other biocides could occur. In the event of spillage during handling or storage, absorb with sand or other inert material and dispose of absorbent in accordance with the Pesticide Disposal Instructions for your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office.

Pesticide Disposal: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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Made and Printed in U.S.A. S-K112F-01 B7 (2/97)

EVAC composition:

Mono (N, N-dimethylamine) salt of endothall***	**53%**
inert ingredients	**47%**
Total	**100%**

2lbs. Active technical endothall per gallon
2.61lbs. Active amine per gallon

***7-oxabicycol(2.2.1)heptane-2,3-dicarboxylic acid equivalent 23.36%**
****Alkyl as in fatty acids of coconut oil**

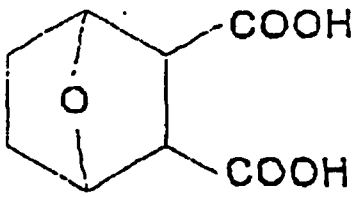
The amine portion of this product has a high affinity to surfaces. In field applications it has been observed that the amine does not reach the outfall. It comes out of solution and coats available surfaces including the target organisms. The method of action against molluscs is that the product coats the gill surface and interferes with oxygen transfer.

LC50 concentrations, mg/L

	Endothall Technical	Amine
Daphnia magna	92	0.37
Rainbow trout	49	1.15
Bluegill sunfish	77	1.96

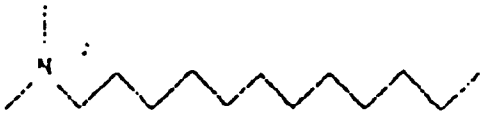
EVAC is a registered trademark of elf atochem North America, inc.

Endothall



$C_8H_{10}O_5$
Molecular weight = 186.16

Dodecyl dimethylamine



$C_{14}H_{31}N$
Molecular weight = 213.41

EVAC REFERENCES:

Toledo Edison Acme Station	Mr. Terry Flood
CEI East lake Station	Available upon request

Material Safety Data Sheet

HydroChem Industrial Services, Inc.
6210 Rothway, Houston, Texas 77040

CHEMTREC Emer. No:1-800-424-9300
HydroChem Phone: 1-800-934-9376

CHEMICAL CODE: M238
PRODUCT NAME: FERRIC ION CORROSION-CONTROL AGENT M238

EFFECTIVE DATE: 28 AUG 91 PREPARED BY: W. W. SHEPHERD

HMIS RATING:
Health 0 Flammability 1 Reactivity 0

HAZARDOUS INGREDIENTS: CAS NUMBER
PROPRIETARY SALT OF AN ORGANIC ACID

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Salt	Form: Powder
Color: White	Odor: None
Vap.Density: Not available	%Sol. In Water: 100
pH: 5-8 (5 percent)	Sp. Gravity: Not determined
Pour Point: Not determined	Boiling Pt.: Not determined
Vap.Pressure:Not available	% Volatile: Not determined
Viscosity: Not determined	Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C) Method Used: Not applicable
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: Not determined Upper: Not determine
Extinguishing Media: Water Fog, Alcohol Foam, CO2, Dry Chemical, Water
Special Fire Fighting Equipment and Hazards:
Wear protective fire fighting clothing and avoid breathing vapors.
Use self-contained breathing apparatus in closed areas.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility: Oxidizers
Hazardous Decomposition:
When heated strongly or burned, oxides of carbon and harmful organic chemical fumes are released.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Flush eyes with water for 5 minutes. See a doctor if irritation occurs.
Skin Contact:	Wash thoroughly with soap and water. See a doctor if irritation occurs. Wash clothes thoroughly before reusing.
Swallowing:	If several grams are swallowed, give 2 glasses of milk (preferred) or water and consult physician.
Inhalation:	Remove to fresh air. See a doctor if effects occur.
Notes:	None

SECTION 5 - HANDLING PRECAUTIONS:

Ventilation: General and local ventilation are required.
Respiratory Protection:
Use NIOSH approved respirator with dust and mist protection (3M No. 8710).
Protective Clothing: Clean, body-covering clothing.
Eye Protection:
Chemical goggles required and an eye wash in work area.
Exposure Guidelines: TLV for nuisance dust is TWA = 10 mg/m3.

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Scoop into containers. Flush residual with plenty of water.
Disposal Method	
Product:	May be incinerated (preferred) or hazardous waste landfilled. Material may be acceptable in some sanitary landfills; check local regulations.
Container:	Send empty bags to sanitary landfill. Render other types of containers unuseable by puncturing or crushing and sanitary landfill unless prohibited by local regulations.
Degradability:	Not determined
Fish Toxicity:	No information.

CERCLA Reportable Quantity: Not established.
RCRA Hazardous Waste Number: None.

SECTION 7 - TOXICOLOGY:

Eye Contact:	No effect expected. Prolonged or repeated contact may cause mild irritation.
Skin Contact:	No effect expected. Prolonged or repeated contact may cause mild irritation.
Swallowing:	No effect expected. Swallowing large amounts may cause illness. Some grades of this chemical are good additives.
Inhalation:	No effect expected. Prolonged or repeated exposure may cause mild irritation. Nuisance dust.
Carcinogens:	Not listed by IARC, USA NTP, or USA OSHA.
Other:	None.

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.
Physical Hazard: dust
Handling and Storage Precautions:
No special precautions required.
Packaging Requirements:
Paper bag (minimum 3 ply), or other industrial container designed fc powders and granulated materials.
Additional Information: Q6 (Protective Equipment Code)

SECTION 9 - REGULATORY INFORMATION:

NFPA Rating:
Health 0 ; Flammability 1 ; Reactivity 0 ; Other: None
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

SHIPPING INFORMATION:

ICC Tariff Classification:
Compound, Boiler Cleaning, Scale Removing, Dry
ICC Item Number: ICC Class: 55 LTL TL
Department of Transporation - (DOT):
Description: Not Regulated
Hazard Class: Not Regulated
Shipping Name: Not regulated
DOT Label: (none)
Comment:
Tank Exempt.#: N/A
CERCLA RQ: Not established.

US Foreign Trade Schedule B# (Export):

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

MATERIAL SAFETY DATA SHEET

PRODUCT

H-130 MICROBIOCIDE

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **H-130 MICROBIOCIDE**

APPLICATION : BIOCIDE TWIN-CHAIN QUATERNARY AMMONIUM COMPOUND CONCENTRATE

COMPANY IDENTIFICATION : Ondeo Nalco Company
Ondeo Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 2 / 2 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Didecyl-Dimethyl-Ammonium chloride	7173-51-5	50.0
Ethanol	64-17-5	10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Combustible. May cause tissue damage. Toxic to aquatic organisms. KEEP OUT OF REACH OF CHILDREN. Corrosive to eyes and skin. Do not get in eyes, on skin or clothing. May be fatal if swallowed or inhaled. Do not swallow. Do not breathe vapour or mist.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep away from heat. Keep away from sources of ignition - No smoking. Use with adequate ventilation. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful if inhaled. Avoid breathing vapor. Remove contaminated clothing and wash before reuse. Harmful or fatal if swallowed. Avoid contamination of food.
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve HCl under fire conditions. May evolve ammonia (NH4) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
May cause burns to mouth and gastro-intestinal tract.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract. Can cause central nervous system depression.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

For eye contact, flush eyes with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. If physician is not available, flush for additional 15 minutes. Obtain immediate medical attention.

IF ON SKIN: Immediately flush contact areas with copious quantities of water for at least 15 minutes. Remove and wash contaminated clothing before reuse.

IF SWALLOWED: Promptly drink a large quantity of milk, beaten egg white or gelatin solution. If these are not available, drink large quantitiesof water. Avoid alcohol. Call a physician immediately. NEVER give an unconscious person anything by mouth.

INHALATION: Remove to fresh air. If breathing is difficult, administer oxygen. If symptoms persist, call a physician.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : 109 °F / 43 °C (SETAFLASH)

EXTINGUISHING MEDIA :
Foam, Carbon dioxide, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.
Water mist may be used to cool closed containers.

FIRE AND EXPLOSION HAZARD :
Combustible Liquid; may form combustible mixtures at or above the flash point. Empty product containers may contain product residue. Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions. May evolve HCl under fire conditions. May evolve ammonia (NH4) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Notify appropriate government, occupational health and safety and environmental authorities. Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Eliminate ignition sources. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish and other water organisms. Do not discharge directly into lakes, ponds, streams, waterways or public water supplies.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid release of vapors or mists into workplace air. Keep the containers closed when not in use. Do not use in locations where vapor is likely to travel to welding flames or arcs or to other hot surfaces. Vapors are much heavier than air, this can result in uneven distribution. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store away from heat and sources of ignition. Connections must be grounded to avoid electrical charges. Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

Ethanol	TWA: 1,000 ppm , 1,880 mg/m3

OSHA/PEL :
Substance(s)

Ethanol	TWA: 1,000 ppm , 1,900 mg/m3

ENGINEERING MEASURES :
Use general ventilation with local exhaust ventilation.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. An organic vapor cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Neoprene gloves, Viton# gloves

SKIN PROTECTION :
Wear impervious apron and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Use good work and personal hygiene practices to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow

ODOR	Alcoholic

SPECIFIC GRAVITY	0.93 @ 77 °F / 25 °C
DENSITY	7.7 lb/gal
SOLUBILITY IN WATER	Complete
pH (1 %)	7.0 - 8.0
VISCOSITY	< 100 cps @ 77 °F / 25 °C
FREEZING POINT	12 °F /
VAPOR PRESSURE	30 mm Hg @ 77 °F / 25 °C
VOC CONTENT	10 %

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Heat and sources of ignition including static discharges.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) may generate heat, fires, explosions and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, HCl

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 4 g/kg	Product

Rating : Non-Hazardous

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	2.2 mg/l	
Bluegill Sunfish	96 hrs	0.92 mg/l	

Rating : Very toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	0.19 mg/l		
Mysid Shrimp (A. bahia)	96 hrs	0.14 mg/l		

Rating : Very toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II

Flash Point :	43 °C / 109 °F
DOT Reportable Quantity (per package) :	1,000 lbs
DOT RQ Component :	ETHANOL

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II
IATA Cargo Packing Instructions :	
IATA Cargo Aircraft Limit :	(Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, FLAMMABLE, N.O.S.
Technical Name(s) :	DIDECYLDIMETHYLAMMONIUM CHLORIDE, ETHANOL
UN/ID No :	UN 2920
Hazard Class - Primary :	8
Hazard Class - Secondary :	3
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Didecyl-Dimethyl-Ammonium chloride : Corrosive
Ethanol : Flammable

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance	RQ
Ethanol	1,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
Ethanol :	Sec. 111

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

ONDEO Nalco

MATERIAL SAFETY DATA SHEET

PRODUCT

H-130 MICROBIOCIDE

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

Prepared By : Product Safety Department
Date issued : 07/10/2000
Replaces : 07/08/1999

CALGON CORPORATION
P.O. Box 1346
Pittsburgh, PA 15230-1346

24 Hour Emergency Telephone - - (412) 777-8000

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.

I. PRODUCT IDENTIFICATION

PRODUCT NAME: H-133A

CHEMICAL DESCRIPTION: Acidic aqueous solution

PRODUCT CLASS: Microbiocide and deposit inhibitor

II. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS No.	% by Weight	Oral LD50 (rat)	Dermal LD50 (rabbit)	ACGIH TLV OSHA PEL
Ethylene glycol	107-21-1	40	4700 mg/kg	9530 mg/kg	Ceiling 50 ppm, 125 mg/m^3
n-Dodecylguanidine hydrochloride	13590-97-1	12.25	820 mg/kg*	9200 mg/kg*	Not listed
Isopropanol	67-63-0	5.25	5045 mg/kg	12800 mg/kg	TWA 400 ppm STEL 500 ppm
Dodecylamine	124-22-1	1.4	1020 mg/kg	Not available	Not listed

*Test results on a 40% solution.

III. TYPICAL PHYSICAL PROPERTIES

BOILING POINT: > 212°F

VAPOR PRESSURE: Not available

VAPOR DENSITY (air=1): Not available

% VOLATILE BY WEIGHT: ~ 47

APPEARANCE AND ODOR: Clear, colorless liquid

SOLUBILITY IN WATER: Miscible

SPECIFIC GRAVITY: 1.02 - 1.05 @ 25°C

pH: 2.4 - 3.0

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 122°F (TCC); This product is a combustible liquid.

EXTINGUISHING MEDIA: Dry chemical, foam or CO_2.

SPECIAL FIREFIGHTING PROCEDURES: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Emits toxic gases under fire conditions.

NFPA RATINGS: Health = 3 Flammability = 2 Reactivity = 0 Special Hazard = NONE

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

V. REACTIVITY DATA

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Keep away from heat and flame. Avoid temperatures below 77°F because the product will turn cloudy and will not turn clear again with increased temperature. (This will not affect product performance.)

INCOMPATIBILITY: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, hydrogen chloride, ammonia, nitrogen oxides, hydrogen cyanide, and amines.

VI. HEALTH HAZARD DATA

PRIMARY ROUTES OF ENTRY: Eye and skin contact; ingestion, inhalation

TARGET ORGANS: Eye, skin, kidney, central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Impaired kidney function from preexisting disorders may be aggravated by exposure to this product.

DANGER!
May cause severe eye damage.
May be harmful or fatal if swallowed.
May cause skin and respiratory tract irritation.

EFFECTS OF OVEREXPOSURE:

ACUTE

EYE CONTACT: This product would be expected to produce severe eye damage (chemical burns) upon contact. The product produced primary eye irritation scores ranging from 63-83/110.

SKIN CONTACT: This product is expected to produce severe irritation upon contact with the skin. The primary skin irritation index (rabbit) is 5.08/8. This product would not be expected to be absorbed through the skin in harmful amounts or to produce an allergic skin reaction.

INGESTION: This product may be harmful or fatal if swallowed. Ingestion of large volumes of ethylene glycol may result in central nervous system depression followed by respiratory and cardiac failure, kidney and brain damage. Isopropanol is also a CNS depressant; swallowing large quantities may cause flushing, headache, dizziness, mental depression, nausea and vomiting. Kidney damage may be evidenced by changes in urine output, urine appearance or edema (swelling from fluid retention).

INHALATION: This product is not expected to present an inhalation hazard unless mists or vapors are generated. Inhalation of product mist may cause irritation of the nose and throat with headache, tearing and coughing. High vapor concentrations caused, for example, by heating the product in an enclosed and poorly ventilated workplace, may produce irritation of the upper respiratory tract, nausea, vomiting, headache, dizziness, and irregular eye movements.

VI. HEALTH HAZARD DATA (continued)

SUBCHRONIC, CHRONIC

No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product.

Repeated inhalation of ethylene glycol mist may produce signs of central nervous system involvement, particularly dizziness and nystagmus (rhythmical oscillation of the eyeballs, either horizontal, rotary, or vertical).

In one study, when ethylene glycol was administered in the diet at daily doses up to 1.0 g/kg to pregnant rats, no maternal toxicity, no embryotoxicity nor teratogenicity were observed. In a more recent study, when ethylene glycol was administered by gavage at daily doses of 1.25 g/kg and above to pregnant rats, or at 750 mg/kg and above to pregnant mice, there was an increase in the number of malformed fetuses at all dose levels. Except at the lowest dose level in mice, there was also evidence of maternal toxicity at all dose levels. Observations suggest that ethylene glycol is to be regarded as an animal teratogen; there is currently no available information to suggest that ethylene glycol has caused birth defects in humans.

In a recent test, a nine-day rate probe study for longer term inhalation research with isopropanol, the report of preliminary findings indicates a kidney disorder was observed in male rats. This study represents the first time that such an effect has been reported for a short-chain alcohol.

CARCINOGENICITY:

NTP: No ingredients listed
IARC: No ingredients listed
OSHA: No ingredients listed

HMIS RATINGS: Health = 3* Flammability = 2 Reactivity = 0
Personal Protective Equipment = to be supplied by user depending on use conditions

*There are potential chronic health effects to consider.

VII. APPLICABLE CONTROL MEASURES

APPROPRIATE HYGIENIC PRACTICES: Do not get in eyes. Avoid contact with skin and clothing. Avoid prolonged or repeated breathing of mist or vapor.

PERSONAL PROTECTIVE EQUIPMENT:

EYE PROTECTION: Chemical splash goggles

SKIN PROTECTION: Chemical resistant gloves

RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area.

HANDLING AND STORAGE PRECAUTIONS: Best if stored above 77°F.
It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.
Do not contaminate water, food, or feed by storage or disposal.
Keep away from heat and flame.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

ENGINEERING CONTROLS: General (mechanical) room ventilation may be sufficient if handled at ambient temperatures or in covered equipment. If temperatures are elevated or if operations exist which may produce misting, local exhaust ventilation is needed.

VIII. FIRST AID

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, flush skin with plenty of water. Remove contaminated clothing. Seek medical aid if irritation persists. Wash clothing before reuse.

INGESTION: If swallowed, call physician or Poison Control Center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger or, if available, by administering syrup of ipecac. Do not induce vomiting or give anything by mouth to an unconscious person. NOTICE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed.

INHALATION: If inhaled and irritation or difficulty in breathing occurs, remove to fresh air. Seek medical aid if irritation or discomfort persists.

IX. SPILL OR LEAK PROCEDURES/WASTE DISPOSAL

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Ventilate area of spill. Remove sources of ignition. Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Plastic Containers - Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration, or if allowed by State and local authorities, by burning. If burned, stay out of smoke.

AQUATIC TOXICITY DATA: 96-hr. LC50 (fathead minnow): 3.3 mg/l
48-hr. LC50 (Daphnia pulex): 0.55 mg/l

ENVIRONMENTAL HAZARDS: This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified and addressed in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the Environmental Protection Agency.

X. REGULATORY STATUS

TSCA STATUS: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

RCRA STATUS: This product as sold would be considered a RCRA Hazardous Waste based on the characteristic of ignitability. The EPA Hazardous Waste Number is D001.

CERCLA reportable quantity of EPA hazardous substances in product: None

X. REGULATORY STATUS (continued)

SARA TITLE III:

Section 302 Extremely Hazardous Substances: None

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[yes]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical = Ethylene glycol CAS #107-21-1 % by weight = 40

DOT CLASSIFICATION: Not restricted unless shipped in a quantity > 110 gallons, then:

Hazard Class: Combustible liquid
Proper shipping name: Combustible liquid, N.O.S. (Contains Isopropanol)
ID number: NA 1993
Label: None

PREPARED BY: P.J. Maloney

IMP-0862/T

H-550

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone-(412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: H-550

CHEMICAL DESCRIPTION: Glutaraldehyde, 50% aqueous solution
PRODUCT CLASS: Biocide
MSDS CODE: 0885-01-29-96

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Glutaraldehyde	111-30-8	50	None established	Ceiling 0.2 ppm, 0.82 mg/m³

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

Clear, colorless liquid with sharp odor.
DANGER!
May cause severe eye and skin damage.
Harmful if inhaled.
May be fatal if swallowed.
Harmful if absorbed through skin.
Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.
Causes asthmatic signs and symptoms in hyper-reactive individuals.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, skin absorption, ingestion

TARGET ORGANS: Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin contact may aggravate an existing dermatitis. Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary disease.

Continued on Page 2

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: Liquid will cause a severe and persistent conjunctivitis, seen as excess redness and marked swelling of the conjunctiva with profuse discharge. Severe corneal injury may develop, which could permanently impair vision if prompt first-aid and medical treatment are not obtained. Vapor will cause stinging sensations in the eye with excess tear production, blinking, and possibly a slight excess redness of the conjunctiva.

SKIN CONTACT: Brief contact with the product will cause itching with mild to moderate local redness and possibly swelling. Prolonged contact may result in pain, severe redness and swelling, with ulceration, tissue destruction, and possibly bleeding into the inflamed area. Glutaraldehyde may be absorbed through intact skin. Therefore, prolonged or widespread contact with the product may result in the absorption of potentially harmful amounts of material and may affect the central nervous system producing headache, dizziness, and dullness. This product may cause allergic contact dermatitis in a small portion of individuals. Sensitization reactions usually result from contact with the liquid, but occasionally there may be a reaction to glutaraldehyde vapor.

INGESTION: Swallowing this product may cause moderate to marked irritation and possibly chemical burns of the mouth, throat, esophagus, and stomach, with discomfort or pain in the mouth, throat, chest, and abdomen, nausea, vomiting, diarrhea, dizziness, faintness, drowsiness, weakness, thirst, circulatory shock, collapse, and coma.

INHALATION: Product vapor is irritating to the respiratory tract, causing stinging sensations in the nose and throat, discharge from the nose, possibly bleeding from the nose, coughing, chest discomfort and tightness, difficulty with breathing, and headache. Severe exposure may cause central nervous system depression with dizziness and drowsiness. The odor threshold of glutaraldehyde is 0.04 ppm whereas the irritation threshold is 0.3 ppm. If vapors are concentrated enough to be irritating, the TLV is probably being exceeded. Inhalation of product can cause signs and symptoms of an asthmatic attack in hyper-reactive individuals.

SUBCHRONIC, CHRONIC:
Repeated skin contact may cause a cumulative dermatitis.

CARCINOGENICITY:
NTP:
"No ingredients listed in this section"
IARC:
"No ingredients listed in this section"
OSHA:
"No ingredients listed in this section"

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Do not remove contact lenses, if worn. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical aid immediately. Wash clothing before reuse.

Continued on Page 3

INGESTION: DO NOT INDUCE VOMITING. Do not give anything to drink. Seek medical advice with urgency. Note to Physician: Aspiration may cause lung damage. Probable mucosal damage may contraindicate the use of gastric lavage.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: None
Non-flammable (aqueous solution): After water evaporates, remaining material will burn.

LOWER FLAMMABLE LIMIT: Not determined UPPER FLAMMABLE LIMIT: Not determined

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use alcohol-type or all-purpose-type foam, applied by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

FIRE-FIGHTING INSTRUCTIONS. Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: No unusual hazards.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide and carbon monoxide.

NFPA RATINGS: Health = 3 Flammability = 0 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wear suitable protective equipment. Toxic to fish; avoid discharge to natural waters. Very low concentrations (5 ppm or less of glutaraldehyde) can be degraded in a biological treatment system Thus, small spills can be flushed with large quantities of water. Large quantities or "slugs" can be harmful to the treatment system. Thus, large spills should be collected for disposal. It may also be possible to decontaminate spilled material by careful application of aqueous sodium hydroxide or dibasic ammonium phosphate solution. Depending on conditions, considerable heat and fumes can be liberated by the decontamination reaction.

Continued on Page 4

Section 7. HANDLING AND STORAGE

HANDLING: It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Do not get in eyes, on skin or clothing.
Avoid breathing vapor.
Use with adequate ventilation.
Wash thoroughly after handling. Keep container closed when not in use.
Remove contaminated clothing and wash before reuse.
Discard contaminated leather articles such as shoes and belt.

STORAGE: Glutaraldehyde solutions can be stored and handled in polyethylene, stainless steel, or reinforced epoxy-plastic equipment. For short storage times (up to about 1 month), temperatures of up to 100°F (38 °C) can be tolerated but the preferred maximum storage temperature is about 80°F (27 °C).

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
(Recommended glove materials include rubber, nitrile (NBR), butyl, and polyethylene.)
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134)

ENGINEERING CONTROLS: General (mechanical) room ventilation is expected to be satisfactory if this material is kept in covered equipment or if the solution is highly diluted. However, if vapors are strong enough to irritate the nose or eyes, the exposure limits are probably being exceeded and special ventilation may be required.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

SATISFACTORY MATERIALS OF CONSTRUCTION: Stainless steel types 304 and 316. Nickel, Polyethylene, and Fiberglass-reinforced plastics: Polyester (e.g., Atlac 382) and Vinylester (e.g., Derakane 411 or 470).
Recommended gasket materials: Silicone, Teflon, Kalrez, or Grafoil.

UNSATISFACTORY MATERIALS OF CONSTRUCTION: Glutaraldehyde solutions are incompatible with many commonly used materials of construction such as carbon steel, iron, aluminum, tin, zinc, copper and monel. Lined steel containers are not recommended for bulk storage, since pinholes could cause product contamination. Rubber linings are also unsuitable because of swelling. Do not use Viton.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 214.2°F (101.2°C) @ 760 mmHg

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: 15.0 mmHg @ 20°C

SPECIFIC GRAVITY: 1.127 - 1.133 @ 20/20°C

Continued on Page 5

VAPOR DENSITY (air=1): 1.05 pH: 3.1 - 4.5 @ 25°C

%VOLATILE BY WEIGHT: Not available FREEZING POINT: -6°F (-21°C)

APPEARANCE AND ODOR: Clear, colorless liquid with sharp odor.

VISCOSITY: 21 cps @ 20°C

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Avoid high temperature and evaporation of water. Although polymerization may occur, it is not hazardous.

INCOMPATIBILITY: Alkalies catalyze an aldol-type condensation reaction, which is exothermic but not expected to be violent.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide and carbon monoxide.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:

Toxicological data on inhalation effects: An NTP inhalation study indicated that glutaraldehyde exposure in rats and mice resulted in a spectrum of necrotic, inflammatory, and regenerative lesions in the upper respiratory tract. The no-observed-adverse-effect level for respiratory lesions in rats was 125 parts per billion. The study, however, did not detect any no-observed-adverse-effect level for mice. Inflammation was found in the frontal nasal passage of the mouse at concentrations as low as 62.5 ppb.

Toxicological data on chronic effects: Studies in humans have shown that glutaraldehyde is neither phototoxic nor a photosensitizer. Subchronic drinking water studies in rats, mice and dogs using concentrations up to 1000 ppm showed no evidence for any target organ toxicity. In vitro studies for genotoxicity using a variety of assays have given results varying from no activity to weakly positive; however, all in vivo studies for genotoxicity have been uniformly negative. Several developmental toxicity studies have demonstrated that at maternally nontoxic doses, glutaraldehyde does not produce fetotoxic, embryotoxic or teratogenic effects. In a chronic (2-year) continuous drinking water combined chronic toxicity-oncogenicity study using Fischer 344 rats, there was no evidence for non-oncogenic target organ toxicity. The only possible oncogenicity-related finding was an increase in the incidence of large granular cell lymphocytic leukemia in female, but not male, rats. The pattern of the response suggests that it does not represent direct chemical carcinogenic activity but, rather, a modifying influence on the expression of this spontaneous and commonly occurring neoplasm in the Fischer 344 rat.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Glutaraldehyde	134 mg/kg	2560 mg/kg (25% soln)	480 mg/m³/4H

Continued on Page 6

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Environmental data:
This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

Modified Test for Ready Biodegradation: 79.7% DOC

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Glutaraldehyde (50% active solution)	96 hr LC_{50} (bluegill sunfish): 22 ppm 96 hr LC_{50} (rainbow trout): 24 ppm 48 hr LC_{50} (Daphnia): 12 ppm 96 hr LC_{50} (fathead minnow): 12 ppm 96 hr LC_{50} (sheepshead minnow): 64 ppm 96 hr LC_{50} (mysid shrimp): 14 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 8
Proper Shipping Name: Corrosive liquid, acidic, organic, n.o.s. (contains Glutaraldehyde)
Label: Corrosive
Packing Group: II
ID Number: UN 3265

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

Continued on Page 7

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
There are no reportable SARA 313 Toxic Chemicals in this product.		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 0 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0-Minimal 1-Slight 2-Moderate 3-Serious 4-Severe

MSDS REVISION SUMMARY: Supersedes MSDS issued on 09/25/97. The MSDS has been changed in Section 2.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON

PREPARED BY: P.J. Maloney

CALGON CORPORATION

COOLING WATER PRODUCTS & SERVICES

Bulletin No. 11-528d

H-940 MICROBIOCIDE

DESCRIPTION

H-940 Microbiocide is a bromine-donating compound in liquid form designed to supplement conventional oxidants for control of biofouling on heat exchanger surfaces in once-through and recirculating cooling systems. When introduced into a water stream containing an oxidant, H-940 releases hypohalous acids providing superior biocidal effectiveness at costs that approximate chlorination. H-940 also controls the growth of microorganisms in the bulk water and removes existing biofouling from system surfaces. Residual oxidant concentrations are greatly reduced so that discharge restrictions can be easily met.

ADVANTAGES

More Effective than Chlorine Alone

When feeding H-940, lower total halogen is required to maintain microbiological control than when chlorine is used alone.

Hypobromous acid is a more effective biocide than hypochlorous acid, producing greater kills in a shorter period of time. The hypobromous acid formed is about four times more active than hypochlorous acid.

Effective Over a Wide pH Range

H-940 effectively controls microorganisms in cooling water systems over a pH range of 6.0-9.0. The hypobromite ion (OBr) is nearly as effective as undissociated hypobromous acid. The hypochlorite ion (OCl), which is the predominant form at pH>8.0, is significantly less effective than the hypochlorous acid. Therefore, at high pH, H-940 is more effective in maintaining microbiological control at lower treatment levels than chlorine fed alone.

Reduces Toxic By-product Discharge

Chlorine reacts with naturally occurring organics in water to form toxic compounds such as trihalomethanes (THMs). By using H-940, chlorine feed is typically cut in half, significantly reducing THM formation and discharge.

Broad Spectrum Activity

H-940 provides broad spectrum control of slime-producing microorganisms such as bacteria, fungi, and algae in open recirculating cooling water systems.

Unaffected in the Presence of Ammonia

H-940 remains active in the presence of ammonia. When ammonia is present in cooling waters, both chlorine and bromine will react with it to form haloamines. The chloramines formed are less effective biocides. Bromamines have relatively the same biocidal effectiveness as hypobromous acid.

No adverse Effect on System Wood or Metallurgy

Because lower total halogen is required for microbiological control, there is reduced potential for wood delignification or corrosion of system metallurgy.

REGISTRATIONS AND APPROVALS

H-940 is registered by the United States Environmental Protection Agency (EPA Registration Numbers: 5785-81-10445, 3377-25-10445), as a biocide for use in recirculating and once-through cooling water systems, brewery pasteurizing systems, wastewater systems, and (except in California) industrial water scrubbing systems, and influent systems such as flow-through filters and lagoons, etc.

H-940 is authorized by the USDA for use in federally inspected meat and poultry plants.

DIRECTIONS FOR USE

Badly fouled systems MUST BE cleaned before treatment is begun.

Feed H-940 into the water to be treated after the oxidant injection point. Be sure rapid mixing of the treated water, H-940, and oxidant is achieved. Your Calgon Representative will recommend appropriate feed equipment to assure complete mixing of the material.

Dosage Rates

Add H-940 to the system at 0.25 to 1.0 $NaBr/Cl_2$ mole ratio. For example:

1. 0.07-0.29 gallons H-940 per pound chlorine gas (99.9%).
2. 0.09-0.39 gallons H-940 per gallon sodium hypochlorite (12.5%).

Initial Dose

When the system is noticeably fouled, add 0.004 to 0.047 gallons H-940 per 1000 gallons of water in the system and oxidize with either gaseous chlorine (0.004 to 0.15 lbs. per 1000 gallons) or sodium hypochlorite solution (0.003 to 0.12 gallons per 1000 gallons). Maintain a free halogen residual (0.1-0.3 ppm as Cl_2) for a minimum of one hour. Repeat as necessary until control is evident.

Subsequent Dose

When microbial control is evident, add 0.001 to 0.047 gallons of H-940 per 1000 gallons of water in the system and oxidize with either gaseous chlorine (0.008 to 0.15 lbs. per 1000 gallons) or sodium hypochlorite solution (0.006 to 0.12 gallons per 1000 gallons).

Once-Through Cooling Water

Initial Dose

When the system is noticeably fouled, add 0.004 to 0.047 gallons H-940 per 1000 gallons of water in the system and oxidize with either gaseous chlorine (0.02 to 0.30 lbs. per 1000 gallons) or sodium hypochlorite solution (0.02 to 0.25 gallons per 1000 gallons). Maintain a free halogen residual (0.1-0.3 ppm as Cl_2) for a minimum of one hour. Repeat as necessary until control is evident.

Subsequent Dose

When microbial control is evident, add 0.001 to 0.047 gallons H-940 per 1000 gallons of water in the system and oxidize with either gaseous chlorine (0.008 to 0.30 lbs. per 1000 gallons) or sodium hypochlorite solution (0.006 to 0.25 gallons per 1000 gallons).

CONTROL TESTING

The best indication of the successful application of H-940 is visual inspection of tower surfaces or monitoring changes in heat transfer on metal surfaces or process equipment. Usually, a free oxidant residual is required to achieve biological control. Use of on-site bacteria counts or microscopic examination provide relative indicators of system cleanliness and biological control. If bacteria counts are used, note that counts may be high immediately after biocide addition. Counts will decrease as control is achieved.

TYPICAL PROPERTIES

Refer to the Material Safety Data Sheet.

PACKAGING

H-940 is available in 55-gallon drums, returnable stack bins, disposable bins, or delivered to on-site storage facilities via bulk or Calgon **Bulk Liquid Service-Plus.**

STORAGE AND HANDLING

The recommended minimum storage temperature is 0°F. If product freezes (-10°F), warming will return it to its original condition.

MATERIALS COMPATIBILITY

Recommended materials for:

Bulk Storage Tanks

High density, low density, or cross-linked polyethylene, 316 stainless steel, fiberglass with isophthalic polyester lined resin or derakane vinyl ester resin.

Pump "Liquid Ends" and Piping

Polypropylene, PVC, Neoprene, Buna-N, Viton**, Kynar*, Hypalon**, CPVC.

PRECAUTIONS

Hazards to Humans and Domestic Animals

Harmful if swallowed. Avoid breathing vapors. Irritation may develop from eye and skin exposure. Wear gloves and safety goggles. Avoid contact with skin and eyes. Wash contaminated clothing before reuse.

Environmental Hazards

Do not discharge into lakes, streams, ponds, or public water unless in accordance with an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority and the permitting authority has been notified in writing prior to discharge. For guidance, contact your regional office of EPA.

Physical and Chemical Hazards

H-940 is not flammable. However, in fires fueled by other materials, hydrogen bromide or bromine may be released. Wear self-contained breathing apparatus.

Storage

Keep product in tightly closed original container when not in use. Store in a dry, well-ventilated area.

Disposal

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Triple rinse the container (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incinerate. Burn only if allowed by state and local authorities. If burned, stay out of smoke.

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This information and any recommendations contained in this document are presented in good faith and believed to be accurate as of the date of this document, but shall not be part of the terms and conditions of sale of any Calgon product. Because product application and performance are dependent upon many factors, each Calgon customer should conduct appropriate tests to determine whether a Calgon product is suitable for that customers' particular purpose. CALGON CORPORATION MAKES NO WARRANTY, WRITTEN OR ORAL, EXPRESSED OR IMPLIED, AND SPECIFICALLY DISCLAIMS THE WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR PARTICULAR PURPOSE REGARDING THE CALGON PRODUCTS DESCRIBED IN THIS DOCUMENT OR THE ACCURACY OR USE OF THE INFORMATION AND ANY RECOMMENDATIONS CONTAINED IN THIS DOCUMENT.

Information concerning human and environmental exposure may be reviewed on the Material Safety Data Sheet for the product. For additional information regarding incidents involving human and environmental exposure call 1-800-955-0090 and ask for the Health and Environmental Affairs Department.

All names in boldface are trademarks or service marks of Calgon Corporation.

For more information, contact your local Calgon Representative, call 1-800-955-0090, or write: Calgon Corporation, P.O. Box 1346, Pittsburgh, PA 15230.

Internet: http://www.calgon.com

CALGON CORPORATION

INNOVATIVE TECHNOLOGIES, CREATIVE SOLUTIONS...SINCE 1918

MATERIAL SAFETY DATA SHEET

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346

24 Hour Emergency Telephone--(412)777-8000

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: H-940

CHEMICAL DESCRIPTION: Aqueous solution of alkali metal halide
PRODUCT CLASS: Biocide
MSDS CODE: 0A48-11-04-93

Section 2. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium bromide	7647-15-6	40	None established	None established

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

WARNING!
May cause eye and skin irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation of mist

TARGET ORGANS: Eye, skin

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin disorders.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may produce irritation upon contact with the eye.

SKIN CONTACT: This solution was found to be non-irritating to the skin in animal tests. It is not expected to be absorbed in harmful amounts. Prolonged or repeated skin exposure may result in skin irritation and dermatitis. Failure to decontaminate could result in superficial burns.

INGESTION: This product would be regarded as practically non-toxic if swallowed. Excessive ingestion of sodium bromide may produce rashes, depression, emaciation and, in severe cases, psychosis and mental deterioration.

Continued on Page 2

INHALATION: This product would not be expected to be an inhalation hazard unless the product is misted or sprayed. Bromide rashes may occur when bromide inhalation is prolonged. The systemic effects of bromide ion are chiefly mental: drowsiness, irritability, vertigo, confusion, hallucinations.

SUBCHRONIC, CHRONIC:
A three-generation reproduction study in rats fed 4800 mg/kg of solid sodium bromide showed a decrease in fertility. Other animal tests with sodium bromide produced adverse reproductive effects. The physiological effects of sodium bromide are attributable to the bromide ion. Metabolically, bromide has a biologic half-life of about 12 days, is not incorporated into fat or blood proteins, and none is extractable from plasma or hemolyzed blood cells by ether. Nor does the bromide ion interfere with thyroid activity even at large daily doses for extended periods of time.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid.

SKIN CONTACT: In case of contact, flush skin with plenty of water. Remove contaminated clothing. Seek medical aid if irritation persists. Wash clothing before reuse.

INGESTION: Not an expected route of overexposure.

INHALATION: Not an expected route of overexposure.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not flammable

LOWER FLAMMABLE LIMIT: Not applicable UPPER FLAMMABLE LIMIT: Not applicable

AUTO-IGNITION TEMPERATURE: Not applicable

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions.

DECOMPOSITION PRODUCTS: In fires fueled by other material, hydrogen bromide or bromine may be released.

Continued on Page 3

MATERIAL SAFETY DATA SHEET

NFPA RATINGS: Health = 2 Flammability = 0 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

Section 7. HANDLING AND STORAGE

HANDLING: It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Avoid contact with eyes, skin and clothing.
Avoid breathing mist.
Use with adequate ventilation.
Wash thoroughly after handling. Keep container closed when not in use.

STORAGE: Store in a cool, dry, well-ventilated location.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles
SKIN PROTECTION: Chemical resistant gloves
RESPIRATORY PROTECTION: When misting may occur in the work area, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local exhaust ventilation where mist or spray may be generated.

WORK PRACTICES: An eye wash station should be accessible in the immediate area of use.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 217 -219°F (103 -104°C)

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: Similar to water

SPECIFIC GRAVITY: 1.43 @ 25°C

VAPOR DENSITY (air = 1): Similar to water

pH: 5.5 - 9.0 @ 25°C

% VOLATILE BY WEIGHT: 60 (water)

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, colorless liquid with no odor.

Continued on Page 4

MATERIAL SAFETY DATA SHEET

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Overheating.

INCOMPATIBILITY: Product is incompatible with strong oxidizers and acids and is mildly corrosive to aluminum. Sodium bromide is rapidly attacked by bromine trifluoride.

DECOMPOSITION PRODUCTS: In fires fueled by other material, hydrogen bromide or bromine may be released.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
Product Oral LD_{50} (rat): > 5000 mg/kg
Product Dermal LD_{50} (rabbit): > 2000 mg/kg

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Environmental data:
Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless in accordance with an NPDES permit. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: Not restricted
Proper Shipping Name: Not applicable
Label: None
Packing Group: Not applicable
ID Number: Not applicable

Continued on Page 5

MATERIAL SAFETY DATA SHEET

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: Pesticides are exempted by TSCA (the Toxic Substances Control Act), under Section 3(2)(a)ii, from the provisions of the Act. FIFRA (the Federal Insecticide, Fungicide and Rodenticide Act) does not allow the use of registered pesticides in any manner inconsistent with the label.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients listed in this section	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
No ingredients listed in this section			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
No ingredients listed in this section		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 2* Flammability = 0 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Reason for reissue: Update to new format.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

Bayer

MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
PRODUCT SAFETY & REGULATORY AFFAIRS
100 Bayer Road
Pittsburgh, PA 15205-9741

TRANSPORTATION EMERGENCY
CALL CHEMTREC: 800-424-9300
INTERNATIONAL: 703-527-3887

NON-TRANSPORTATION
BAYER EMERGENCY PHONE...: (412) 923-1800
BAYER INFORMATION PHONE.: (800) 662-2927

1. CHEMICAL PRODUCT IDENTIFICATION:

PRODUCT NAME.....: Hydrazine 35 %
PRODUCT CODE.....: V350
CHEMICAL FAMILY.....: Diamines
CHEMICAL NAME.....: Hydrazine
SYNONYMS.....: 54.7 % Hydrazine Hydrate; Aqueous Hydrazine Solution; Diamide Hydrate
FORMULA.....: N2H4.H2O

2. COMPOSITION/INFORMATION ON INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS		CONCENTRATION (%)
***** HAZARDOUS INGREDIENTS *****			
Hydrazine 302-01-2	OSHA :	.10 ppm TWA - Skin .10 mg/m3 TWA - Skin	Approx. 35 %
	ACGIH:	.01 ppm TWA - Skin .013 mg/m3 TWA - Skin	

3. HAZARDS IDENTIFICATION:

EMERGENCY OVERVIEW

WARNING! Toxic; Color: Colorless to slightly yellow; Form: Liquid; Odor: Ammonia like (fishy); May cause eye, skin, and respiratory tract irritation; Harmful if inhaled or ingested; May cause allergic skin reaction; May be fatal

Continued on next page

3. HAZARDS IDENTIFICATION (Continued)

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* if absorbed through skin; May cause liver damage; May cause   *
* kidney damage; May affect nervous system; May cause lung      *
* damage; May cause blood disorders; May cause cancer based on  *
* animal data; Sudden reaction and fire may result when mixed   *
* with oxidizing agents; Use cold water spray to cool           *
* fire-exposed containers to minimize the risk of rupture;      *
* Toxic gases/fumes are given off during burning or thermal     *
* decomposition.                                                *
*****************************************************************
```

POTENTIAL HEALTH EFFECTS:

ROUTE(S) OF ENTRY.....: Not Noted

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:

ACUTE INHALATION.....: In sufficient concentrations, hydrazine vapors will cause irritation to the upper respiratory tract. Symptoms may include coughing, sore throat, dizziness and nausea.

CHRONIC INHALATION.....: Repeated or prolonged inhalation of hydrazine may lead to liver and kidney damage, hemolysis (destruction) of red blood cells, and pneumonia.

ACUTE SKIN CONTACT.....: Direct skin contact with this product may cause local irritation resulting in possible symptoms such as discomfort, itching, reddening and swelling. Hydrazine can be absorbed through the skin. Extensive skin contamination may result in fatal or near fatal consequences due to hepatic (liver) effects, central nervous system effects or other systemic effects.

CHRONIC SKIN CONTACT.....: Prolonged or repeated skin contact may cause dermatitis (inflammation) in the form of erythema (reddening of the skin), blistering or eczema-like (dermatitis) rash. Absorption of hydrazine may lead to liver and kidney damage and hemolysis of red blood cells. Some individuals have exhibited allergic skin reactions which disappear when removed from exposure to hydrazine.

ACUTE EYE CONTACT.....: Direct eye contact with hydrazine causes irritation. Possible symptoms may include discomfort, reddening and tearing. Severe eye exposure to hydrazine vapors has been reported to cause temporary blindness, lasting for as long as twenty-four (24) hours. Eye irritation may be delayed following exposure to hydrazine vapors.

ACUTE INGESTION.....: Hydrazine is irritating to the mucous membranes. Hydrazine is toxic by ingestion. Ingestion can result in fatal to near fatal consequences due to hepatic (liver) damage, central nervous system effects or other systemic effects.

CHRONIC INGESTION.....: Repeated or prolonged absorption of hydrazine into the body may lead to liver and kidney damage and hemolysis of red blood cells.

OTHER EFFECTS OF EXPOSURE.....: While hydrazine is known to be an animal carcinogen, no link has been established to cancer in humans. In an epidemiology study of hydrazine manufacturing workers covering more than thirty (30) years has found no unusual excess of cancer. (1)

CARCINOGENICITY

Continued on next page

3. HAZARDS IDENTIFICATION (Continued)

NTP.....: Hydrazine is listed as a Substance Reasonably Anticipated to be Carcinogenic in the National Toxicology Program (NTP) Seventh Annual Report on Carcinogens, 1994.
IARC.....: Hydrazine is listed by the International Agency for Research on Cancer (IARC) as Group 2B, Possible Human Carcinogen; human evidence inadequate, animal evidence sufficient.
OSHA.....: Not regulated.
OTHER.....: Based on the results of animal studies, the ACGIH has listed hydrazine in appendix A3, Confirmed Animal Carcinogen with Unknown Relevance to Humans in the ACGIH Threshold Limit Values for 1998.

MEDICAL CONDITIONS
AGGRAVATED BY EXPOSURE.....: Persons with preexisting eye, skin or respiratory tract, or impaired liver and/or kidney function conditions may be more susceptible to the effects of this chemical.
EXPOSURE LIMITS.....: Refer to Section 2.

1 Br. J. Ind. Med. 41, 31-34.

4. FIRST AID MEASURES:

FIRST AID FOR EYES.....: Flush the eyes with large amounts of running water at room temperature for at least 15 minutes and see a physician, preferably an ophthalmologist, immediately.
FIRST AID FOR SKIN.....: Wash immediately with cool, running water while removing contaminated clothing and shoes. Avoid using hot water and hard rubbing. Consult a physician, particularly if exposure is extensive, prolonged, or irritation persists after washing. Wash contaminated clothing thoroughly before reuse.
FIRST AID FOR INHALATION: Persons acutely overexposed to hydrazine vapors should be removed from the contaminated environment as quickly as possible by properly protected rescue personnel. Trained persons can administer oxygen to ease breathing. Consult a physician immediately.
FIRST AID FOR INGESTION.: Accidental ingestion of hydrazine solutions should be treated by taking large amounts of water. Never give anything by mouth to an unconscious person. Inducing vomiting is indicated in conscious patients, especially when there has been ingestion within the last thirty (30) minutes. A physician should be contacted immediately.
NOTE TO PHYSICIAN.....: There are no definitive antidotes for hydrazine exposure. Physicians should treat exposed persons symptomatically. Overexposed persons should be closely observed for symptoms of central nervous system involvement, respiratory irritation, bronchitis or edema, and treat accordingly. Parenteral pyridoxine administration has been used by some physicians to treat patients suffering acute central nervous system effects. (In one reported case, following pyridoxine administration parenterally, there was a rapid reversal of coma in 4 hours in a patient who had been comatose for over 60 hours.)

Continued on next page

5. FIRE FIGHTING MEASURES:

FLASH POINT.....: Greater than 212 F (100 C); DIN 51758 (PMCC).
FLAMMABLE LIMITS:
UPPER EXPLOSIVE LIMIT (UEL)(%): 83.4 % by volume in air at 1000 mbar
LOWER EXPLOSIVE LIMIT (LEL)(%): 9.3 % by volume in air at 1000 mbar
AUTO-IGNITION TEMPERATURE.....: Greater than 590 F (310 C).
EXTINGUISHING MEDIA.....: Dry Chemical; Foam; Carbon Dioxide; Water spray for large fires.
SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear full protective clothing including self-contained breathing apparatus. Under fire conditions, hazardous vapors and gases may be emitted. Containers exposed to excessive heat may rupture violently. Use a water spray to keep containers cool. Fight fires from a protected area.

6. ACCIDENTAL RELEASE MEASURES:

SPILL OR LEAK PROCEDURES.....: Use appropriate protective equipment. Contain small spills by diking and digging a containment pit sufficiently large to hold at least 10 times the spill volume. Dilute to approximately 10 times the volume with water. Add sufficient dry commercial calcium hypochlorite (dry chlorine, ETHR, dry bleach) to completely oxidize the hydrazine. Use 7-10 lbs per pound of hydrazine (1 lb. of 35 % Hydrazine = 0.35 lbs. N2H4). Calcium hypochlorite or other oxidizing agents should never be allowed to mix with undiluted hydrazine solutions. The resulting reaction is very vigorous, releasing large amounts of heat and gas. Contaminated surfaces should be treated with household bleach or calcium hypochlorite solution to oxidize the residual hydrazine. In the event of larger spills, contain product, secure area and notify Bayer at (412-923-1800 during normal working hours of 9 am to 5 pm EST) or CHEMTREC at (800-424-9300).

7. HANDLING AND STORAGE:

STORAGE TEMPERATURE(MIN/MAX): Ambient/122 F (50 C).
SHELF LIFE.....: Unlimited in tightly closed containers.
SPECIAL SENSITIVITY.....: Extreme heat, oxidizing materials or catalytic metals.
HANDLING/STORAGE PRECAUTIONS: When handling hydrazine, utilize protective clothing and equipment. Do not get in eyes or on skin. Do not breathe vapors or mists. Wash thoroughly after handling. Store in a dry place away from heat (below 122 F (50 C)) and away from ignition sources and oxidants, preferably outdoors. Shelter drums stored outdoors from direct

Continued on next page

7. HANDLING AND STORAGE (Continued)

sunlight. For indoor storage areas, continuous ventilation should be provided. This product may become electrostatically charged during filling and transferring. Make sure equipment is properly bonded and grounded. Store away from food and beverages.

8. PERSONAL PROTECTION:

EYE PROTECTION REQUIREMENTS.....: Splash goggles or full face shield.
SKIN PROTECTION REQUIREMENTS.....: PVC, neoprene or nitrile splash suits, boots and gloves should be worn when spray or splash protection is required.
VENTILATION REQUIREMENTS.....: Use local exhaust or other means to maintain airborne hydrazine concentration below the current Permissible Exposure Limit (0.1 ppm).
RESPIRATOR REQUIREMENTS.....: Whenever the hydrazine levels exceed the current Permissible Exposure Limit (0.1 ppm), a positive pressure supplied air respirator is recommended.
ADDITIONAL PROTECTIVE MEASURES.....: Safety showers and eyewash stations should be readily available. Do not store or transfer hydrazine solutions in open containers. Because hydrazine can be absorbed into the body by all common routes of exposure, protective equipment must be used. Personal protective equipment is not an adequate substitute for safe work practices, proper equipment design and good maintenance practices.

9. PHYSICAL AND CHEMICAL PROPERTIES:

PHYSICAL FORM.....: Liquid
COLOR.....: Colorless to slightly yellow
ODOR.....: Ammonia like (fishy)
ODOR THRESHOLD.....: 3 to 5 ppm
MOLECULAR WEIGHT.....: (For hydrazine hydrate) 50.06
pH .....: Greater than 12 @ 350 g/l water @ 68 F (20 C), original soln
BOILING POINT.....: Approx. 228.9 F (109.4 C)
MELTING/FREEZING POINT....: Approx. -85 F (-65 C)
VISCOSITY.....: (Dynamic): Approx. 1.26 mPas @ 68 F (20 C)
SOLUBILITY IN WATER .....: Soluble
SPECIFIC GRAVITY .....: Approx. 1.021 @ 68 F (20 C)
BULK DENSITY.....: Not Established
% VOLATILE BY VOLUME.....: 100 %
VAPOR PRESSURE .....: 15 mbar @ 68 F (20 C)
VAPOR DENSITY .....: Approx. 1 (Air = 1)

Continued on next page

10. STABILITY AND REACTIVITY:

STABILITY.....: Stable at normal temperatures and pressures.
HAZARDOUS POLYMERIZATION...: Will not occur.
INCOMPATIBILITIES.....: Brisk or dangerous reactions with strong oxidizers, catalytic metals (Lead, Copper, Zinc, Cadmium, Cobalt, Molybdenum, Gold and Silver) and certain alloys (such as Bronze and Brass).
INSTABILITY CONDITIONS.....: Excessive temperatures. (Also, see INCOMPATIBILITIES)
DECOMPOSITION TEMPERATURE..: Refer to DECOMPOSITION PRODUCTS.
DECOMPOSITION PRODUCTS.....: Under catalytic influence or elevated temperatures, H_2, NH_3 and N_2 and other toxic or flammable nitrogen compounds can be formed. Slow reaction with oxygen from the air is possible at room temperature.

11. TOXICOLOGICAL INFORMATION:

ACUTE TOXICITY
ORAL LD50.....: 60 mg of hydrazine/kg (Rat).
DERMAL LD50.....: For 35 % hydrazine solution: greater than 200 mg/kg (Rabbit; DOT method); For hydrazine: 91 mg/kg (Rabbit).
INHALATION LC50....: For anhydrous hydrazine, LC50 = 570 ppm (Rat, 4 hours); For aerosols generated from a 64 % hydrazine solution, LC50 = 6.5 mg/L (5000 ppm) - the LC50 (1 hour) estimated in terms of hydrazine equivalents, LC50 = 4.2 mg/L (3200 ppm). (1)
EYE EFFECTS.....: Irritating.
SKIN EFFECTS.....: Not Corrosive (Rabbit; DOT protocol).
SENSITIZATION.....: Some individuals (humans) have exhibited allergic skin reactions.
CHRONIC TOXICITY.....: Several studies show increased tumor indidence in mice and rats following long term oral or intraperitoneal administration of hydrazine or its salts. The U.S. Air Force conducted a study concerning the chronic inhalation toxicity of hydrazine. The study concluded that hydrazine is a relatively weak tumorigen able to induce respiratory tumors in a dose related incidence at 1.0 and 5.0 ppm.
OTHER TOXICITY DATA...: (Mutagenic, Teratogenic, Reproductive Tests): Hydrazine has demonstrated mutagenic potential in several test systems such as bacteria, phage, higher plants, drosophila, and the host-mediated assay. It was negative in the dominant lethal assay in mice. Dermal contact with hydrazine at a dose causing skin damage and systemic effects has produced embryolethality in rats.

1 Huntingdon Research Centre, July 1993 (sponsored by the Chemical Manufacturer's Association, CMA).

Continued on next page

12. ECOLOGICAL INFORMATION:

AQUATIC TOXICITY.....: Gold orfe (Leuciscus idus), LC50 (48 hrs.): 0.75 mg/l. Do not allow to escape into waters, wastewater or soil.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD.....: Oxidize or incinerate in accordance with federal, state and local environmental control regulations.

14. TRANSPORTATION INFORMATION:

TECHNICAL SHIPPING NAME.....: Hydrazine solution 35 %
FREIGHT CLASS BULK.....: Item 50093 Compounds, Boiler Cleaning, Preserving
FREIGHT CLASS PACKAGE.....: Item 50093 Compounds, Boiler Cleaning, Preserving
PRODUCT LABEL.....: Hydrazine 35 %

DOT (DOMESTIC SURFACE)

PROPER SHIPPING NAME.....: Hydrazine, Aqueous Solution
HAZARD CLASS OR DIVISION .....: 6.1
UN/NA NUMBER.....: UN3293
PACKING GROUP .....: III
DOT PRODUCT RQ lbs (kgs).....: 2.8 lbs (1.3 kgs)
HAZARD LABEL(s).....: Poison
HAZARD PLACARD(s).....: Poison
* The U.S. Department of Transportation 49 CFR regulations have been revised to allow the use of a "Poison" label in place of a "Keep Away From Food" label for domestic transportation of Division 6.1 PG III materials (See 49 CFR 172.400a(d)).

IMO / IMDG CODE (OCEAN)

PROPER SHIPPING NAME.....: Hydrazine, Aqueous Solution
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN3293
PACKAGING GROUP.....: III
HAZARD LABEL(s).....: Toxic
HAZARD PLACARD(s).....: Toxic

Continued on next page

14. TRANSPORTATION INFORMATION (Continued)

IMO / IMDG CODE (continued)

ICAO / IATA (AIR)

PROPER SHIPPING NAME.....: Hydrazine, Aqueous Solution
HAZARD CLASS DIVISION NUMBER...: 6.1
UN NUMBER.....: UN3293
SUBSIDIARY RISK.....: None
PACKING GROUP.....: III
HAZARD LABEL(s).....: Toxic
RADIOACTIVE?.....: Non-Radioactive
PASSENGER AIR - MAX. QTY. .....: 60 L
PASSENGER PACKING INSTRUCTION..: 611
CARGO AIR - MAX. QTY. .....: 220 L
CARGO AIR PACKING INSTRUCTION..: 618

15. REGULATORY INFORMATION:

OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA STATUS.....: On TSCA Inventory
CERCLA REPORTABLE QUANTITY..: Hydrazine: 1 lb. (0.454 kg).
SARA TITLE III:
SECTION 302 EXTREMELY
HAZARDOUS SUBSTANCES..: Hydrazine, CAS# 302-01-2, Approx. 35 %.
SECTION 311/312
HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard; Reactive Hazard
SECTION 313
TOXIC CHEMICALS.....: Hydrazine, CAS# 302-01-2, Approx. 35 %.
RCRA STATUS.....: When discarded in its purchased form, this product is a listed RCRA hazardous waste and should be managed as a hazardous waste. (40 CFR 261.20-24) Hydrazine has been assigned the hazardous waste number U133. Any contaminated soil, water or debris resulting from the cleanup of a hydrazine spill is considered to be a hazardous waste.

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE

Continued on next page

15. REGULATORY INFORMATION (Continued)

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
Hydrazine 302-01-2	Approx. 35 %	PA2, CA , MA, NJ2, NJ3
Water 7732-18-5	Approx. 65 %	PA3, NJ4

CA = California Proposition 65
MA = Massachusetts Hazardous Substance List
NJ2 = New Jersey Environmental Hazardous Substance List
NJ3 = New Jersey Special Health Hazardous Substance List
NJ4 = New Jersey Other - included in 5 predominant ingredients > 1%
PA2 = Pennsylvania Special Substances List
PA3 = Pennsylvania Non-hazardous present at 3% or greater.

16. OTHER INFORMATION:

HMIS RATINGS:	Health	Flammability	Reactivity
	2*	1	1

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
*=Chronic Health Hazard

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS ratings are provided by Bayer as a customer service.

REASON FOR ISSUE.....: Revised Section 9 (ACGIH Carcinogen status)
PREPARED BY.....: Ann M. Colo
APPROVED BY.....: J. M. Mostowy
APPROVAL DATE.....: 06/29/1999
SUPERSEDES DATE.....: 02/20/1996
MSDS NUMBER.....: 01849

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Material Safety Data Sheet

Section 1. Product and Company Identification

Product Name Hydrogen Peroxide 30%

Product Code VW3742

Manufacturer EMD Chemicals Inc.
P.O. Box 70
480 Democrat Road
Gibbstown, NJ 08027
Prior to January 1, 2003 EMD Chemicals Inc. was EM Industries, Inc. or EM Science, Division of EM Industries, Inc.

Effective Date 3/4/2003

For More Information Call
856-423-6300 Technical Service
Monday-Friday: 8:00 AM - 5:00 PM

In Case of Emergency Call
800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

Synonym None.
Material Uses Laboratory Reagent
Chemical Family Aqueous peroxide solution

Section 2. Composition and Information on Ingredients

Component	CAS #	% by Weight
HYDROGEN PEROXIDE	7722-84-1	30
Water	7732-18-5	70

+ Section 3. Hazards Identification

Physical State and Appearance Liquid.

Emergency Overview
DANGER !
OXIDIZER.
CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.
CORROSIVE MATERIAL
HARMFUL IF INHALED OR SWALLOWED.
CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS.
POSSIBLE CANCER HAZARD
CONTAINS MATERIAL WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA.

Routes of Entry Eye contact. Inhalation. Ingestion.

Potential Acute Health Effects
Eyes Hazardous in case of eye contact (corrosive). Causes eye burns.
Skin Hazardous in case of skin contact (permeator, corrosive). Skin contact produces burns.
Inhalation Hazardous in case of inhalation (lung corrosive).
Ingestion Hazardous in case of ingestion.

Potential Chronic Health Effects
Carcinogenic Effects Classified A3 (Proven for animal.) by ACGIH [HYDROGEN PEROXIDE].

Additional information See Toxicological Information (section 11)

Medical Conditions Aggravated by Overexposure: Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4. First Aid Measures

Eye Contact Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

+ Section 5. Fire Fighting Measures

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 Hazards in Presence of Various Substances **Risks of explosion of the product in presence of static discharge:** No.
Risks of explosion of the product in presence of mechanical impact: No.
Fire Fighting Media and Instructions Use water spray or fog. Use water spray to keep fire exposed containers cool.
Protective Clothing (Fire) Wear MSHA/NIOSH approved self-contained breathing apparatus or equivalent and full protective gear.
Special Remarks on Fire Hazards Contact with combustible material may cause fire.
Special Remarks on Explosion Hazards Contact with strong oxiders may create a fire and explosion hazard.

+ Section 6. Accidental Release Measures

Small Spill and Leak Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: **Neutralize the residue with a dilute solution of sodium carbonate.**

Large Spill and Leak Stop leak if without risk. Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain. Do not get water inside container. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. **Neutralize the residue with a dilute solution of sodium carbonate.** Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Spill Kit Information No specific spill kit required for this product.

Section 7. Handling and Storage

Handling Store in tightly closed container. Avoid contact with combustible materials.
Storage Keep container tightly closed. Keep container in a cool, well-ventilated area. Separate from acids, alkalies, reducing agents and combustibles.

+ Section 8. Exposure Controls/Personal Protection

Engineering Controls Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection

Eyes Face shield.
Body Full suit.
Respiratory Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Hands Gloves.
Feet Boots.

Protective Clothing (Pictograms)

Personal Protection in Case of a Large Spill Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Product Name	Exposure Limits
HYDROGEN PEROXIDE	**AUVA (Austria, 1995).** Spitzenbegrenzung: 2.8 mg/m3 8 times per shift, Period: 5 minute(s). Spitzenbegrenzung: 2 ML/M3 8 times per shift, Period: 5 minute(s). TWA: 1.4 mg/m3 TWA: 1 ML/M3 **NOHSC (Australia, 1995).** TWA: 1.4 mg/m3 TWA: 1 ppm **Lijst Grenswaarden (Belgium, 1998).**

VL: 1.4 mg/m3
VL: 1 ppm
SUVA (Switzerland, 1997).
Momentanwert: 2.8 mg/m3 8 times per shift, Period: 5 minute(s).
Momentanwert: 2 ML/M3 8 times per shift, Period: 5 minute(s).
MAK: 1.4 mg/m3 8 times per shift, Period: 5 minute(s).
MAK: 1 ML/M3 8 times per shift, Period: 5 minute(s).
Ministry of Health (CL, 1992).
TWA: 1.1 mg/m3
TWA: 0.8 ppm
MAK-Werte Liste (Germany, 1998).
Spitzenbegrenzung: 2.8 mg/m3 8 times per shift, Period: 5 minute(s).
Spitzenbegrenzung: 2 ML/M3 8 times per shift, Period: 5 minute(s).
MAK: 1.4 mg/m3
MAK: 1 ML/M3
TRGS900 (Germany, 1999).
Spitzenbegrenzung: 1.4 mg/m3
Spitzenbegrenzung: 1 ML/M3
MAK: 1.4 mg/m3
MAK: 1 ML/M3
Arbejdstilsynet (Denmark, 1996).
GV: 1.4 mg/m3
GV: 1 ppm
Tyterveyslaitos (Finland, 1998).
STEL: 4.2 mg/m3
STEL: 3 ppm
TWA: 1.4 mg/m3
TWA: 1 ppm
INRS (France, 1999).
VME: 1.5 mg/m3
VME: 1 ppm
EH40-OES (United Kingdom (UK), 2000).
STEL: 2.8 mg/m3
STEL: 2 ppm
TWA: 1.4 mg/m3
TWA: 1 ppm
NAOSH (Ireland, 1999).
STEL: 3 mg/m3
STEL: 2 ppm
OEL: 1.5 mg/m3
OEL: 1 ppm
Ministry of Labour (KR, 1997).
TWA: 1.5 mg/m3
TWA: 1 ppm
Secretary of Work and Social security (MX, 1994).
CCT: 3 mg/m3 Period: 15 minute(s).
CCT: 2 ppm Period: 15 minute(s).
CPT: 1.5 mg/m3 Period: 8 hour(s).
CPT: 1 ppm Period: 8 hour(s).
Arbeidstilsynet (Norway, 1996).
AN: 1.4 mg/m3
AN: 1 ppm
NZ OSH (NZ, 1994).
TWA: 1.4 mg/m3
TWA: 1 ppm
AFS (Sweden, 1996).
KTV: 3 mg/m3
KTV: 2 ppm
NGV: 1.4 mg/m3
NGV: 1 ppm
ACGIH TLV (United States, 2000).
TWA: 1.4 mg/m3
TWA: 1 ppm
NIOSH REL (United States, 2000).
TWA: 1.4 mg/m3 Period: 10 hour(s).
TWA: 1 ppm Period: 10 hour(s).
OSHA Final Rule (United States, 1989).
TWA: 1.4 mg/m3
TWA: 1 ppm

Water — Not available.

+ Section 9. Physical and Chemical Properties

Odor — Sharp odor (Slight.)
Color — Clear, Colorless.

Physical State and Appearance	Liquid.
Molecular Weight	Not applicable.
Molecular Formula	Not applicable.
pH	2-4 Acidic.
Boiling/Condensation Point	106°C (222.8°F)
Melting/Freezing Point	-26°C (-14.8°F)
Specific Gravity	1.1 (Water = 1)
Vapor Pressure	The highest known value is 3.2 kPa (24 mmHg) (@ 20°C) (HYDROGEN PEROXIDE).
Vapor Density	Not available.
Volatility	70% (v/v). (HYDROGEN PEROXIDE.)
Odor Threshold	Not available.
Evaporation Rate	0.36 (Water) compared to (n-BUTYL ACETATE=1)
VOC	0 (%)
LogKow	Not available.
Solubility	Easily soluble in water.

+ Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Decomposes on eposure to light.
Incompatibility with Various Substances	Highly reactive with organic materials, metals.
Rem/Incompatibility	Avoid contact with combustible materials. Incompatibility with various materials. Phosphorus compounds , Carboxylic acid.
Hazardous Decomposition Products	O2
Hazardous Polymerization	Will not occur.

Section 11. Toxicological Information

RTECS Number:		
	Hydrogen Peroxide	Not available.
	Water	ZC0110000
Toxicity	LD50: Not available. LC50: Not available.	
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH [HYDROGEN PEROXIDE]. Contains material which may cause damage to the following organs: mucous membranes, upper respiratory tract, skin, eye, lens or cornea, nose/sinuses.	
Acute Effects on Humans	Hazardous in case of eye contact (corrosive). Causes eye burns. Hazardous in case of skin contact (corrosive). Skin contact produces burns. Non-permeator by skin. Hazardous in case of inhalation (lung corrosive). Hazardous in case of ingestion.	
Synergetic Products (Toxicologically)	Not available.	
Irritancy	Draize Test: Not available.	
Sensitization	Slightly hazardous in case of inhalation (lung sensitizer).	
Carcinogenic Effects	Classified A3 (Proven for animal.) by ACGIH [HYDROGEN PEROXIDE].	
Toxicity to Reproductive System	Not available.	
Teratogenic Effects	Not available.	
Mutagenic Effects	Not available.	

Section 12. Ecological Information

Ecotoxicity	Not available.
BOD5 and COD	Not available.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.

Section 13. Disposal Considerations

EPA Waste Number	D002
Treatment	*Specified technology- Neutralize to pH 6-9. Contact your local permitted waste disposal site (TSD) for permissible treatments sites.* ALWAYS CONTACT PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

Section 14. Transport Information

DOT Classification	Not available.
TDG Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

U.S. Federal Regulations	TSCA 8(b) inventory: HYDROGEN PEROXIDE; Water SARA 302/304/311/312 extremely hazardous substances: HYDROGEN PEROXIDE SARA 302/304 emergency planning and notification: HYDROGEN PEROXIDE SARA 302/304/311/312 hazardous chemicals: HYDROGEN PEROXIDE SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found. SARA 313 toxic chemical notification and release reporting: No products were found. Clean Water Act (CWA) 307: No products were found. Clean Water Act (CWA) 311: No products were found. Clean air act (CAA) 112 accidental release prevention: No products were found. Clean air act (CAA) 112 regulated flammable substances: No products were found. Clean air act (CAA) 112 regulated toxic substances: No products were found.
WHMIS (Canada)	CLASS C: Oxidizing material. Class D-2B: Material causing other toxic effects (TOXIC). CLASS E: Corrosive liquid. CEPA DSL: HYDROGEN PEROXIDE; Water This product has been classifed in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all required information.
International Regulations	
EINECS	HYDROGEN PEROXIDE 231-765-0 Water 231-791-2
DSCL (EEC)	R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes.
International Lists	Australia (NICNAS): HYDROGEN PEROXIDE; Water Germany water class: HYDROGEN PEROXIDE Japan (MITI): HYDROGEN PEROXIDE; Water Korea (TCCL): HYDROGEN PEROXIDE; Water Philippines (RA6969): HYDROGEN PEROXIDE; Water China: No products were found.
State Regulations	Pennsylvania RTK: HYDROGEN PEROXIDE: (environmental hazard, generic environmental hazard) Massachusetts RTK: HYDROGEN PEROXIDE New Jersey: Hydrogen Peroxide 30% California prop. 65: No products were found.

Section 16. Other Information

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

	0	**Fire Hazard**
Health	OXY 2 1	**Reactivity**
		Specific Hazard

Changed Since Last Revision +

Notice to Reader

The statements contained herein are based upon technical data that EMD Chemicals Inc. believes to be reliable, are offered for information purposes only and as a guide to the appropriate precautionary and emergency handling of the material by a properly trained person having the necessary technical skills. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use, storage and disposal of these materials and the safety and health of employees and customers and the protection of the environment. EMD CHEMICALS INC. MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, WITH RESPECT TO THE INFORMATION HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

Continued on Next Page

Material Safety Data Sheet

Distributor Name and Address:	Product Name:	Prepared by:	Date:
Univar, Inc. 34200 VW & R Lane Geismar, Louisiana 70737	Framatome Iron Solvent Concentrate	Barry Hugghins	9/26/2003

Distributor Emergency Phone:	Product Code:
225-473-1100	FTI #1

HMIS CODE INFORMATION:	Health:	Flammability:	Reactivity:	Personal Protection:
	2	1	0	D

Section 1 - Hazardous Ingredients and Sara Title III Information

Reportable Components: Ingredient:	% wt:	CAS #:	OSHA PEL / STEL:	ACGIH TLV:
Diammonium Ethylene Diamine Tetraacetate	33.62	020824-56-0	None Established	None Established
Sulfur-containing Polyamide	4.46	Trade Secret	None Established	None Established
Hydrazine	2.5	302-01-2	1ppm TWA 1.3 mg/m3 TWA	0.01 ppm TWA

DOT Shipping Name:
Corrosive liquid, N.O.S. (contains hydrazine, aqueous solution), 6, UN-3293, PGII, Guide 152

Notes:
TWA = Threshold Weighted Average

N/A = Not Applicable

Section 2 - Physical and Chemical Characteristics

Boiling Point:	> 212 F	**Vapor Density:**	Heavier Than Air
Evaporation Rate:	Slower Than Water	**Solubility In Water:**	Complete
Appearance and Odor:	Clear Liquid With Odor of Ammonia	**Specific Gravity:**	1.15

Section 3 - Fire and Explosion Data

Flash Point:	> 212 F	**Method Used:**	Closed Cup

Flammable Limits In Air, by Volume — Lower: Not Established; Upper: Not Established

Extinguishing Media: Use CO_2, or dry chemical extinguishing media

Special Firefighting Procedures: Use water to cool containers exposed to fire. Firefighters should be edquipped with self-contained breathing apparatus and turn-out gear

Unusual Fire and Explosion Hazards: There are no known unusual fire or explosion hazards

Section 4 - Physical Hazards and Reactivity Data

Stability:	Hydrazine may be come unstable at temperatures above 270 C.
Conditions and Materials to Avoid:	Concentration of solution by evaporation of water. Avoid contact with aluminum. Avoid contact with oxidizing materials. Hydrazine decomposes at temperatures above 250 C.
Hazardous Decomposition Products:	Ammonia, Hydrogen
Hazardous Polymerization:	Will not occur.

Section 5 - Health Hazards Data

Signs and Symptoms of Exposure:

Eye and Skin Contact and Absorption:	Skin contact may cause moderate irritation. Eye contact may cause moderate irritaiton consisting of redness, swelling, and mucous membrane discharge. Hydrazine is rapidly absorbed through the skin, and is toxic when absorbed, causing damage to the liver, kidneys, and blood.
Ingestion:	Ingestion may cause severe irritation of the digestive tract; nausea, vomiting, lethargy, or diarrhea.
Inhalation:	Inhalation is unlikely, but may lead to vomiting diarrhea, nausea, headache, dizziness, difficulty in breathing, and respiratory irritation.

Medical Conditions Generally Aggravated by Exposure:

Skin Contact:	Prolonged or repeated exposure to hydrazine may cause more severe irritation, defatting of the skin, and allergic skin sensitization in some individuals.
Inhalation:	Prolonged or repeated exposure to hydrazine may cause continous bronchitis.

Carcinogen Information:

IARC Monographs?	Hydrazine is listed by the IARC as Group 2B, possible human carcinogen.
NTP?	Hydrazine is listed as a Substance Reasonably Anticipasted to be Carcinogenic.
OSHA?	Hydrazine is not regulated by OSHA as a carcinogen

Emergency and First Aid Procedures:

Eyes:	Immediately flush with large amounts of water for 15 minutes. Call a physician at once.
Skin:	Immediately flush with water for 15 minutes. If irritation develops, consult physician.
Ingestion:	*Get medical attention immediately. Do not induce vomiting unless directed to do so by a physician.* Never give anything by mouth to an unconscious person.
Inhalation:	Move to fresh air; administer oxygen is necessary. If not breathing, administer CPR. Get immediate medical attention.

Section 6 - Precautions and Spill Procedures

Handling and Storage Precautions:	Store away from heat, sparks, open flame, and osidants. Transport and store only in plastic or stainless steel. Store only in a well ventilated areas. All containers, lines, and piping should be electrically grounded.
Steps to be taken if material is Released or Spilled:	Evacuate and isolate the spill area. Prevent spill from entering natural waterways. Responders should wear self-contained breathing apparatus (SCBA) due to the presence of hydrazine.
Waste Disposal Method:	Dispose of spilled material in accordance with all local, state, and federal regulations.

Section 7 - Special Protection Information and Control Measures

Respiratory Protection:	Wear a NIOSH approved full face, positive pressure, supplied air respirator if any exposure occurs.
Ventilation:	Use a NIOSH approved full face, positive pressure, supplied air respirator
Eye Protection:	Use chemical goggles and a faceshield.
Protective Gloves:	Butyl Rubber
Work and Hygienic Practices:	An eye wash and safety shower should be provided in the immediate work area.
Other protective equipment:	A full impervious suit is recommended if exposure is possible to a large portion of the body. In other cases, wear impervious gloves, boots and apron, at a minimum.

Disclaimer

This safety information is provided to assist customers in assessing measures necessary for compliance with health, safety, and environmental regulations. Individuals handling this product should be informed of the recommended safety precautions, and should have access to this information. The information contained herein is based on available data, and is believed to be accurate. No guarantee or warranty is provided, since the use of this product is within the exclusive control of the user, and it is the user's responsibility to satisfy itself that this information is suitable and complete for its particular use. Customers are responsible for compliance with local, state, and federal regulations that may be pertinent in the storage, application, and disposal of this product.

ONDEO Nalco

MATERIAL SAFETY DATA SHEET

PRODUCT

LCS-1200

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **LCS-1200**

APPLICATION : CLOSED SYSTEM CORROSION INHIBITOR

COMPANY IDENTIFICATION : Ondeo Nalco Company
Ondeo Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 2 FLAMMABILITY : 1 / 1 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Molybdate Dihydrate	10102-40-6	5.0 - 10.0
Sodium Tetraborate Pentahydrate	12045-88-4	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Irritating to eyes.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing, gloves and eye/face protection.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause moderate irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
If irritation persists, repeat flushing. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :
If symptoms persist, call a physician. Immediately flush with plenty of water for at least 15 minutes.

INGESTION :
If conscious, washout mouth and give water to drink. Get medical attention. Do not induce vomiting without medical advice.

INHALATION :
Get medical attention. Remove to fresh air, treat symptomatically.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : > 200 °F / > 93 °C (Closed Cup)

EXTINGUISHING MEDIA :
Keep containers cool by spraying with water. Use extinguishing media appropriate for surrounding fire. This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities. Restrict access to area as appropriate until clean-up operations are complete.

METHODS FOR CLEANING UP :
Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. SMALL SPILLS: Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labelled. Keep the containers closed when not in use. Do not take internally. Use with adequate ventilation.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Molybdenum (as Mo), Soluble Compounds	TWA: 5 mg/m3
Borates, Tetra, Sodium Salts -- Anhydrous	TWA: 1 mg/m3

OSHA/PEL :

Substance(s)	
Molybdenum (as Mo), Soluble Compounds	TWA: 5 mg/m3

Borates, Tetra, Sodium Salts -- Anhydrous TWA: 10 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Nitrile gloves, Butyl gloves, PVC gloves, Neoprene gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Light yellow
ODOR	None

SPECIFIC GRAVITY	1.06 - 1.08 @ 77 °F / 25 °C
DENSITY	8.8 - 9.0 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	9.0 - 9.2
FREEZING POINT	30.7 °F / -0.72 °C
BOILING POINT	212.4 °F / 100.2 °C
VAPOR PRESSURE	Same as water

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	> 5,000 mg/l	Product
Bluegill Sunfish	96 hrs	> 5,000 mg/l	Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	> 5,000 mg/l		Product
Ceriodaphnia dubia	48 hrs	> 5,000 mg/l		Product

Rating : Essentially non-toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Molybdate Dihydrate : Exposure Limit - Compound Class
Sodium Tetraborate Pentahydrate : Irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
D2B - Materials Causing Other Toxic Effects - Toxic Material

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 05/22/2000
Replaces : 06/14/1999

SECTION 5 - HANDLING PRECAUTIONS:

Ventilation: General and local ventilation are required.

Respiratory Protection:

Use NIOSH approved respirator with organic vapor/acid gas protection (color coded yellow). Use SCBA (self contained breathing apparatus) in confined areas and for emergencies.

Protective Clothing:

Face shield, boots, slicker (rain) suit, impervious gloves.

Eye Protection:

Chemical goggles required and an eye wash in work area.

Exposure Guidelines:

TLVs are TWA 1 ppm and STEL 2 ppm for hydrogen peroxide (ACGIH 84-85 PEL is 1 ppm for hydrogen peroxide (OSHA 84).

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Contain with dikes. Put in plastic drum. Flush residual with plenty of water.
Disposal Method	
Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for chemical deactivation and solidification prior to land filling.
Container:	Leave label on drum and sell drum to an approved drum reconditioner or triple rinse, crush, and ship to sanitary landfill unless prohibited by local regulations.
Degradability:	Not biodegradable.
Fish Toxicity:	Not available.

CERCLA Reportable Quantity: Not established.

RCRA Hazardous Waste Number: D001

SECTION 7 - TOXICOLOGY:

Eye Contact:	Corrosive. Rapidly causes pain, burns, corneal injury. May cause permanent damage and blindness.
Skin Contact:	Corrosive. Rapidly causes pain, burns, redness, swelling and damage to tissue. Not likely to be absorbed in toxic amounts. Causes blisters.
Swallowing:	Corrosive. Causes pain and severe burns to mouth, throat and stomach.
Inhalation:	Irritant. May cause pain and coughing.
Carcinogens:	Not listed by IARC, USA NTP, or USA OSHA.
Other:	None.

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.

Physical Hazard: oxidizer

Handling and Storage Precautions:

Avoid contact with clothing, organics, or other combustible materials Do not store or transport with corrosive materials or combustible materials.

Packaging Requirements:

Plastic (all poly) drum (DOT 34) or plastic can.

Additional Information: Q5,Q7 (Protective Equipment Code)

CHEMICAL CODE: M240
PRODUCT NAME: LIQUID PASSIVATING AGENT M240

EFFECTIVE DATE: 04 SEP 92 PREPARED BY: W. W. SHEPHERD

HMIS RATING:
Health 2 Flammability 0 Reactivity 0

HAZARDOUS INGREDIENTS:	CAS NUMBER
HYDROGEN PEROXIDE	007722-84-1
WATER	007732-18-5

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Oxidizer	Form: Liquid
Color: Clear colorless	Odor: Pungent
Vap.Density: Not determined	%Sol. In Water: 100
pH: 2-3	Sp. Gravity: 1.13
Pour Point: -27 F (-33 C)	Boiling Pt.: 226 F (108 C)
Vap.Pressure:23.3 mmHg at 30 C	% Volatile: 100
Viscosity: Not determined	Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C) Method Used: Not applicable
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: None Upper: None
Extinguishing Media: H2O, Water Fog. (Do not use organic chem, exting.
Special Fire Fighting Equipment and Hazards:
This material does not burn, but as an oxidizer it will support combustion of other materials.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Decomposes with heat.
Incompatibility: Organics, reducing agents, metals.
Hazardous Decomposition:Oxygen, hydrogen peroxide.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Immediately flush eyes with water for 30 minutes while holding eyelids open. See a doctor at once.
Skin Contact:	Immediately wash with soap and water for 30 minutes. See a doctor at once. Destroy contaminated shoes and clothing.
Swallowing:	DO NOT induce vomiting. Give 2 glasses of milk (preferred) or water and take to hospital at once.
Inhalation:	Remove to fresh air. See a doctor at once. If breathing has stopped, begin artificial respiration.
Notes:	None

SECTION 9 - REGULATORY INFORMATION:

NFPA Rating:
Health 2 ; Flammability 0 ; Reactivity 0 ; Other: Oxidizer
WHMIS Classification (Canada): Not determined
TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

6,8

SHIPPING INFORMATION:

ICC Tariff Classification:
Compound, Boiler Cleaning, Scale Removing, Liquid
ICC Item Number: ICC Class: 55 LTL TL
Department of Transporation - (DOT):
Description: Hazardous Material
Hazard Class: 5.1 (oxidizer)
Shipping Name: Hydrogen peroxide, 35% aqueous solution, 5.1, UN 2014, PG II
DOT Label: Oxidizer 5.1 and Corrosive
Comment:
Tank Exempt.#: N/A
CERCLA RQ: Not established.

US Foreign Trade Schedule B# (Export):

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:
ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

MATERIAL SAFETY DATA SHEET

EAGLE PICHER

Lithium Hydroxide Monohydrate	[7Li(OH)]
CAS#: 72255-97-1	(p.1)

EMERGENCY TELEPHONE: 800-535-5053 INFOTRAC *(24 hours)*

DATE PREPARED: February 4, 1998 DATE REVISED: February 11, 1998

SECTION I

MANUFACTURER'S NAME ..... EAGLE-PICHER INDUSTRIES, INC., TECHNOLOGIES DIVISION
ENVIRONMENTAL SCIENCE AND TECHNOLOGY DEPARTMENT
ADDRESS ..... 200 B. J. TUNNELL BLVD. EAST, MIAMI, OKLAHOMA 74354
EMERGENCY TELEPHONE NUMBER ..... (800) 535-5053 INFOTRAC (24 HOURS)
INFORMATION TELEPHONE NUMBER ..... (918) 540-1507
FAX NUMBER ..... (918) 542-3223
CHEMICAL NAME AND SYNONYMS ..... LITHIUM HYDROXIDE [7Li(OH)]
TRADE NAME AND SYNONYMS ..... LITHIUM HYDROXIDE, LITHIUM HYDROXIDE MONOHYDRATE
CAS# 72255-97-1
CHEMICAL FAMILY ..... ALKALI METAL HYDROXIDE
FORMULA ..... 7Li(OH)

SECTION II - HAZARDOUS INGREDIENTS/TOXICITY DATA

COMPONENTS	CAS#	ACGIH TLV	OSHA PEL	% (optional)
LITHIUM HYDROXIDE [7Li(OH)]	72255-97-1	N/A	N/A	

TOXICITY DATA: Unknown

SECTION III - PHYSICAL DATA

BOILING PT. ..... Decomposes
MELTING PT ..... 471 °C
VAPOR PRESSURE (mmHg) ..... N/A
VAPOR DENSITY (air=1) ..... N/A
SOLUBILITY IN WATER: 11 to 13%
APPEARANCE & ODOR. White to off-white crystal.

SPECIFIC GRAVITY 1.50
FORMULA WT 24.02
% VOLATILE BY VOLUME ..... N/A
EVAPORATION RATE ..... N/A

SECTION IV - FIRE AND EXPLOSION HAZARD DATA.

FLASH POINT ..... Noncombustible
FLAMMABLE LIMITS ..... N/A LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Carbon dioxide, dry chemical powder, alcohol or polymer foam.
SPECIAL FIRE FIGHTING PROCEDURES. None. Nonflammable.
UNUSUAL FIRE AND EXPLOSION HAZARDS None.

MATERIAL SAFETY DATA SHEET

EAGLE PICHER

Lithium Hydroxide [7Li(OH)] Monohydrate

CAS#: 72255-97-1 (p.2)

EMERGENCY TELEPHONE: 800-535-5053 INFOTRAC *(24 hours)*

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV): Compare to NaOH(Caustic Soda) ACGIH, OSHA TWA: 2mg/m³
EFFECTS OF OVEREXPOSURE: Irritating to throat and lungs; burning sensation on skin, aqueous solutions of $LiOH\text{-}H_2O$ make the skin feel slippery; possible ulceration and scarring; eye loss, headache, nausea, and vomiting. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes and skin. Inhalation may be fatal.
PRIMARY ROUTE(S) OF EXPOSURE: [X] DERMAL [X] INHALATION [X] INGESTION

EMERGENCY FIRST AID PROCEDURES

SEEK IMMEDIATE MEDICAL ATTENTION.
INHALATION: Contact physician immediately. Remove to fresh air. If difficulty breathing, give oxygen. If not breathing, give artificial respiration.
EYE CONTACT: Contact physician. Flush eyes with copious amounts of water for at least 15 minutes.
SKIN CONTACT: Immediately wash skin and clothing with soap and copious amounts of water for at least 15 minutes.
INGESTION: Do not induce vomiting. Contact physician immediately.

SECTION VI - REACTIVITY DATA

STABILITY: [X] STABLE [ ] UNSTABLE
CONDITIONS TO AVOID: Reacts with CO_2 in air to form Li_2CO_3 (Lithium Carbonate)
INCOMPATIBILITY: Strong mineral acids, steam, generates heat when dissolved in water.
HAZARDOUS DECOMPOSITION PRODUCTS. None
HAZARDOUS POLYMERIZATION: [ ] MAY OCCUR [X] WILL NOT OCCUR

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep up spill, seal in plastic (bag, bottle, etc., Rinse area of spill with water.
WASTE DISPOSAL METHOD: For small quantities, cautiously add to a large stirred excess of water. Adjust pH to neutral, and separate any insoluble solids or liquids and package for hazardous waste disposal. Flush aqueous solution down the drain with plenty of water. The hydrolysis and neutralization reactions may generate heat and fumes. Follow all federal, state, and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NIOSH/MSHA approved respirator.
PROTECTIVE GLOVES: Rubber (latex or neoprene) EYE PROTECTION: Safety goggles/goggles, face shield.
OTHER PROTECTIVE EQUIPMENT: Apron, lab coat, rubber boots, safety shower and eye bath.
VENTILATION
LOCAL EXHAUST: Laboratory fume hood MECHANICAL EXHAUST: N/A
SPECIAL: None OTHER: Stainless steel/ plastic equipment.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS: Store in air and moisture proof container, such as sealed plastic bag (doubled) in steel drum with gasket.
OTHER PRECAUTIONS: Reacts with water or steam to produce heat, attacks living tissue. Material is very caustic/corrosive. Do not breath dust. Avoid all contact. Wash thoroughly after handling. Hygroscopic. Avoid repeated or prolonged exposure.

MC-140

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone (412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: MC-140

CHEMICAL DESCRIPTION: Dithiocarbamate solution
PRODUCT CLASS: Chelant
MSDS CODE: 0895-02-23-95

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium dimethyldithiocarbamate (SDDC)	128-04-1	40	None established	None established

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

Clear, greenish yellow liquid with ammonia-sulfide odor.
DANGER!
May cause severe eye damage.
May cause severe digestive tract burns if swallowed.
May cause skin and respiratory tract irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, skin absorption, inhalation, ingestion

TARGET ORGANS: Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Unknown

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause irreversible eye damage upon contact depending on the length of exposure, solution concentration and first aid measures.

SKIN CONTACT: This product may produce moderate to severe irritation upon contact with the skin. The product can be absorbed through intact skin. No instances of human allergic reaction are known.

Continued on Page 2

MC-140

INGESTION: This product can cause irritation of the gastrointestinal tract by releasing carbon disulfide in the acid environment of the stomach. Swallowing the product may cause irritation or burns of the mouth, throat, and esophagus.

INHALATION: Prolonged breathing of vapors may cause dizziness and/or nausea. Inhalation of high levels of mist can cause irritation of the respiratory tract.

SUBCHRONIC, CHRONIC:
The effects from chronic exposure to this product have not been fully evaluated.

Some dimethyldithiocarbamates are reported to be teratogenic in animals, and they can be nitrosated to form suspected cancer-causing nitrosamines in the test tube and in the body. Prolonged human inhalation exposure to a similar dithiocarbamate is said to have produced neural and visual disturbances, dermatitis, and irritation of the upper respiratory tract.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, flush skin with plenty of water. Remove contaminated clothing. Seek medical aid if irritation persists. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: > 200°F (PMCC)
This product is not by definition a "flammable liquid" or a "combustible liquid".

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

Continued on Page 3

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FIRE & EXPLOSION HAZARDS: May form flammable by-products on contact with strong acids and/or extreme heat.

DECOMPOSITION PRODUCTS: Hydrogen sulfide may be produced if heated to high temperatures. Carbon disulfide and dimethylamine may be produced on contact with strong acids. Dimethylnitrosamines may be produced on contact with a combination of strong acids and nitrosating compounds. Hazardous decomposition products may also include oxides of nitrogen, sulfur, and carbon.

NFPA RATINGS: Health = 3 Flammability = 1 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0-Minimal 1-Slight 2-Moderate 3-Serious 4-Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container. Do not flush directly to waste treatment facility or water courses.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes.
Avoid contact with skin and clothing.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Store in a cool place away from acids.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing.
RESPIRATORY PROTECTION: If airborne concentrations become irritating, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local exhaust ventilation where mist or vapor may be generated.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

UNSATISFACTORY MATERIALS OF CONSTRUCTION: Product is somewhat corrosive to aluminum.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: > 212°F (> 100°C) SOLUBILITY IN WATER: Complete

Continued on Page 4

MC-140

VAPOR PRESSURE: 19 mmHg @ 25°C

SPECIFIC GRAVITY: 1.16 - 1.18 @ 25 °C

VAPOR DENSITY (air=1): Not available

pH: 11.8 @ 25°C

%VOLATILE BY WEIGHT: Not available

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, greenish-yellow liquid with ammonia-sulfide odor.

VISCOSITY: 23 cps @ 72°F, 31 cps @ 41°F

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Do not expose to extreme temperatures.

INCOMPATIBILITY: Strong oxidizers and acids

DECOMPOSITION PRODUCTS: Hydrogen sulfide may be produced if heated to high temperatures. Carbon disulfide and dimethylamine may be produced on contact with strong acids. Dimethylnitrosamines may be produced on contact with a combination of strong acids and nitrosating compounds. Hazardous decomposition products may also include oxides of nitrogen, sulfur, and carbon.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:

Toxicological data on chronic effects: By analogy to potassium dimethyldithiocarbamate, sodium dimethyldithiocarbamate can reasonably be anticipated to cause fetotoxicity, postimplantation loss and malformations. New Zealand white rabbits given potassium dimethyldithiocarbamate at dose of 38 mg/kg/day by gavage on days 8 to 18 of gestation exhibited malalignment of sternebrae, total postimplantation loss, and fetal weight decrement. Also at this dose level, various possible malformations including adactyly (condition characterized by the absence of fingers or toes), gastroschisis (a congenital defect in the abdominal wall, usually with protrusion of the viscera), short tail, anal atresia (congenital absence of an anal opening), spina bifida, atelectasis (stricoseness of the lungs), costal cartilage anomaly, vertebral anomaly with/without rib, caudal vertebrae anomaly, and severe sternebrae malalignment in 8 of 52 fetuses from 5 of 11 litters. At 77 mg/kg/day dose level, there was severe fetal/embryo lethality. The NOEL was 12.8 mg/kg/day.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Sodium dimethyldithiocarbamate (SDDC)	1000 mg/kg	1.15 g/kg (40%)	Not available

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

See the following information on ingredients.

Continued on Page 5

MC-140

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
SDDC (40% solution)	48 hr LC_{50} (Daphnia magna): 1.5 ppm 96 hr LC_{50} (bluegill sunfish): 3.3 ppm 96 hr LC_{50} (rainbow trout): 0.85 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: The EPA Hazardous Waste Number for Sodium dimethyldithiocarbamate is U382.

DISPOSAL: Dispose of in accordance with local, state and federal regulations. Avoid disposal into croplands, fish-bearing waters and sources of potable water.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: Not restricted
Proper Shipping Name: Not applicable
Label: None
Packing Group: Not applicable
ID Number: Not applicable

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
Sodium dimethyldithiocarbamate (SDDC)	128-04-1	40

Continued on Page 6

MC-140

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3 Flammability = 1 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Supersedes MSDS issued on 04/16/97. The MSDS has been changed in Sections 14 & 16. Effective on 5/29/97, EPA amended its regulations to conform with the federal appeals court ruling in Dithiocarbamate Task Force v. EPA. As of this date, these carbamates no longer have a reportable quantity under CERCLA.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALCOM CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: MORPHOLINE
FORMULA: C4H9NO
FORMULA WT: 87.12
CAS NO.: 00110-91-8
NIOSH/RTECS NO.: QD6475000
COMMON SYNONYMS: TETRAHYDRO-2H-1,4-OXAZINE; DIETHYLENE OXIMIDE
PRODUCT CODES: R357
EFFECTIVE: 09/03/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	3	SEVERE (FLAMMABLE)
REACTIVITY	-	1	SLIGHT
CONTACT	-	3	SEVERE (LIFE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

PRECAUTIONARY LABEL STATEMENTS

WARNING
FLAMMABLE
CAUSES IRRITATION
EXCEPTIONAL CONTACT HAZARD - READ MATERIAL SAFETY DATA SHEET
KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
MORPHOLINE	90-100	110-91-8

3 - PHYSICAL DATA

BOILING POINT: 129 C (264 F) VAPOR PRESSURE(MM HG): 10

MELTING POINT: -5 C (23 F) VAPOR DENSITY(AIR=1): 3.0

SPECIFIC GRAVITY: 1.00 (H2O=1)

EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): COMPLETE (IN ALL PROPORTIONS) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: COLORLESS LIQUID WITH AMINE ODOR.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP 39 C (102 F) NFPA 704M RATING: 2-3-0

FLAMMABLE LIMITS: UPPER - 11 % LOWER - 1.8 %

FIRE EXTINGUISHING MEDIA
USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK.
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.
CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE OR EXPLOSION.

---

5 - HEALTH HAZARD DATA

TLV AND PEL LISTED DENOTE (SKIN).

THRESHOLD LIMIT VALUE (TLV/TWA): 70 MG/M3 (20 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 105 MG/M3 (30 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 70 MG/M3 (20 PPM)

TOXICITY:
LD50 (ORAL-RAT) (MG/KG) - 1050
LD50 (SKIN-RABBIT) (MG/KG) - 500
LC50 (INHL-MOUSE) (PPM) - 1320

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
VAPORS MAY BE IRRITATING TO SKIN, EYES, NOSE AND THROAT.
INHALATION OF VAPORS MAY CAUSE SEVERE IRRITATION OF THE RESPIRATORY SYSTEM.
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS.
LIQUID IS READILY ABSORBED THROUGH THE SKIN.
INGESTION IS HARMFUL AND MAY BE FATAL.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.

TARGET ORGANS
RESPIRATORY SYSTEM, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, INGESTION, ABSORPTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNT OF MILK, MILK OF MAGNESIA, OR WHITES OF EGGS BEATEN WITH WATER. INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS

DECOMPOSITION PRODUCTS: OXIDES OF NITROGEN

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001 (IGNITABLE WASTE)

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 20 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, NITRILE GLOVES ARE RECOMMENDED.

---

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: RED (FLAMMABLE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA OR CABINET.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	MORPHOLINE
HAZARD CLASS	FLAMMABLE LIQUID
UN/NA	UN2054
LABELS	FLAMMABLE LIQUID

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	MORPHOLINE
HAZARD CLASS	3.3
UN/NA	UN2054
LABELS	FLAMMABLE LIQUID

MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 7330

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : NALCO 7330

APPLICATION :

COMPANY IDENTIFICATION : Ondeo Nalco Energy Services, L.P.
P.O. Box 87
Sugar Land, Texas
77487-0087

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
5-Chloro-2-Methyl-4-Isothiazolin-3-one	26172-55-4	1.1
2-Methyl-4-Isothiazolin-3-one	2682-20-4	0.4

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
CORROSIVE. CAUSES EYE DAMAGE AND SKIN BURNS. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED. MAY BE FATAL IF SWALLOWED OR ABSORBED THROUGH THE SKIN.
Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Avoid breathing vapor or mist. Avoid contamination of food. Do not take internally. Wash thoroughly after handling.
May evolve oxides of carbon (COx) under fire conditions. May evolve HCl under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Repeated or prolonged contact may cause skin sensitization.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach.

INHALATION :
Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

IF SWALLOWED: Do not induce vomiting. Drink promptly a large quantity of egg whites, gelatin solution or, if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately. Never give anything by mouth to an unconscious person.

IF INHALED: Remove immediately to fresh air. If not breathing, apply artificial respiration. If breathing is difficult, give oxygen, and call a physician.

IF ON SKIN: Wash thoroughly with soap and water. Remove and wash contaminated clothing before reuse.

IF IN EYES: Flush with plenty of water for at least 15 minutes. Call a physician.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve HCl under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Dike and absorb with inert material (e.g. dry earth, sand), shovel all contaminated solids into a pail or drum and then treat with enough deactivation solution to wet the solids thoroughly. Let these containers stand open for 48 hours to prevent pressure build up and then seal for disposal. Equipment containing residues should be decontaminated before carrying out maintenance or repair work or using for other service. Contaminated surfaces should be swabbed with deactivation solution, wait for the reaction to subside and rinse thoroughly with clean water. DEACTIVATION SOLUTION - Estimate volume of remaining spilled material on the floor and prepare 10 times as much deactivation solution as follows. Prepare fresh by mixing 5% sodium hypochlorite (household bleach) and 5% sodium bicarbonate or potassium bicarbonate away from the immediate area of the spill. The solution can be prepared by adding household bleach to the 3-quart fill mark on the 1 gallon plastic container containing 1/3 of a lb. (150 grams) of sodium bicarbonate. Put on the appropriate personal protection equipment and close the container securely and shake well for 1 minute. The materials and equipment for preparing solutions should be kept available for use in areas where spills may occur. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish and wildlife. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Do not contaminate water by cleaning of equipment or disposal of waste. Apply this pesticide only as specified on this label.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store the containers tightly closed. Store separately from oxidizers. Store in suitable labelled containers.

SUITABLE CONSTRUCTION MATERIAL :
PVC, EPDM, Alfax, Teflon, HDPE (high density polyethylene), Polyethylene, Stainless Steel 304, Stainless Steel 316L, Hastelloy C-276, Plexiglass, Kalrez

UNSUITABLE CONSTRUCTION MATERIAL :
Copper, Mild steel, Polypropylene, Brass, Buna-N, Polyurethane, Hypalon, Viton, Neoprene, Aluminum, Ethylene propylene

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product contains the following component(s) with a recognised or recommended OEL value:

Manufacturer's Recommendation : Substance(s)	
5-Chloro-2-Methyl-4-Isothiazolin-3-one	TWA: 0.1000 mg/m3 STEL: 0.30000 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Particulate filter - HEPA (Purple) In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Impervious gloves, PVC gloves, Neoprene gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Moderate

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light green Light yellow
ODOR	Mild

SPECIFIC GRAVITY	1.026
DENSITY	8.5 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	3.0 - 5.0
FREEZING POINT	25 °F / -4 °C
VOC CONTENT	0.80 %

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

The following results are for the product along with results on the active substances.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	3,810 mg/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	> 5,000 mg/kg	Product

Rating : Non-Hazardous

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	13.7 mg/l (4 hrs)	1% Active Ingredient

Rating : Toxic

PRIMARY SKIN IRRITATION : A 1.5% active solution is corrosive to skin, a 0.6% active solution is a severe skin irritant, a 0.3% active solution is a moderate skin irritant and a 0.06% active solution is a non-irritant.

PRIMARY EYE IRRITATION : A 1.5% active solution is corrosive to the eyes, a 0.3% active solution is an eye irritant and 0.06% active solution is a non-irritant.

SENSITIZATION :
Repeated or prolonged contact may cause sensitization in some individuals. A Guinea pig (Buehler Technique) sensitization study with an induction dosage of 90 ppm of active ingredients followed by an insult of 429 ppm of active ingredients was positive. A human repeated insult patch study of 28 ppm active ingredients followed by an insult of 56 ppm of active ingredients resulted in no effect to the subjects tested.

CHRONIC TOXICITY DATA :
A 90-day dietary study in dogs of 840 ppm of isothiazolinone resulted in no mortalities or pathological findings. A 90-day dermal study in rabbits of 0.4 mg/kg/day of isothiazolinone resulted in irritation but no pathological effects. A 30-month skin painting study with mice using 400 ppm isothiazolinone three times per week showed no increased tumor frequency over control. A teratology study with rabbits and rats was negative using dosages of 1.5 to 15 mg/kg isothiazolinone. Mutagenicity results have been equivocal.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product along with results on the active substances.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Sheepshead Minnow	96.00 hrs	32.000 mg/l	Product
Bluegill Sunfish	96 hrs	18.67 mg/l	Product
Fathead Minnow	144 hrs	8 mg/l	Product
Rainbow Trout	96 hrs	12.67 mg/l	Product
Inland Silverside	96 hrs	16.62 mg/l	Product

Rating : Slightly toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Mysid Shrimp (Mysidopsis bahia)	96.00 hrs	18.000 mg/l		Product
Ceriodaphnia dubia	48 hrs	15 mg/l		Product
Daphnia magna	48 hrs	8.7 - 12 mg/l		Product

Rating : Slightly toxic

AVIAN RESULTS :

Species	Exposure	LC50	Test Descriptor
Bobwhite Quail		97.00000 mg/kg	Product
Pekin Duck	8.00 Days	560.00000 mg/kg	Active Substance

PERSISTENCY AND DEGRADATION :

Total Organic Carbon (TOC) : 7,850 mg/l

Chemical Oxygen Demand (COD) : 20,000 mg/l

The degradation of the major active substance begins with ring opening and elimination of chloride ion. Degradation leads to the formation of a variety of small organic acids, methylamine, carbon dioxide and elemental sulfur. The half life of each active substance is dependent upon the initial concentration.

MOBILITY AND BIOACCUMULATION POTENTIAL
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM , provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages; <5% 30 - 50% 50 - 70% The portion in water is expected to be soluble or dispersible.
This preparation or material is not expected to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Metal Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by state and local authorities. Plastic Containers: ^PLASTIC CONTAINERS: Do not reuse empty container. Triple rinse (or equivalent). Then puncture and dispose of in a sanitary landfill, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	ISOTHIAZOLINONE MICROBIOCIDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	ISOTHIAZOLINONE MICROBIOCIDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Technical Name(s) :	ISOTHIAZOLINONE MICROBIOCIDE
UN/ID No :	UN 3265
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

5-Chloro-2-Methyl-4-Isothiazolin-3-one : Corrosive, Sensitizer
2-Methyl-4-Isothiazolin-3-one : Corrosive, Sensitizer

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Magnesium Nitrate	10377-60-3	1.0 - 5.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
This product is exempted under TSCA and regulated under FIFRA. The inerts are on the Inventory List.

FOOD AND DRUG ADMINISTRATION (FDA) Federal Food, Drug and Cosmetic Act :
When use situations necessitate compliance with FDA regulations, this product is acceptable under : 21 CFR 176.170 Components of paper and paperboard in contact with aqueous and fatty foods and 21 CFR 176.180 Components of paper and paperboard in contact with dry foods., 21 CFR 176.180 Components of paper and paperboard in contact with dry foods, 21 CFR 176.300 - Slimicides

U.S. DEPARTMENT OF AGRICULTURE (USDA) :
USDA Inspection and Grading Programs - Food Safety and Inspection Service:
This product is authorized by USDA for use in federally inspected meat and poultry plants. Authorized use is under category : G7

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
Cupric Nitrate :	Sec. 311, Sec. 307

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
This product contains the following substances listed in the regulation:

Copper

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Copper	7440-50-8
Magnesium Nitrate	10377-60-3

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
Pesticide controlled products are not regulated under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

INTERNATIONAL CHEMICAL CONTROL LAWS

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS) and are listed on the Australian Inventory of Chemical Substances (AICS).

EUROPE
The substances in this preparation are included in or exempted from the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & Industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

THE PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippine Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Moderate

* The environmental risk is: Moderate

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An Integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 11/05/2002
Replaces : 09/19/2002

"Oust" Herbicide
M0000028 Revised 19-NOV-1994 Printed 18-MAR-1996

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"Oust" is a registered trademark of DuPont.

Corporate MSDS Number : DU003048

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-441-7515
Transport Emergency : CHEMTREC 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
SULFOMETURON METHYL (METHYL 2-[[[[(4,6-DIMETHYL-2-PYRIMIDINYL)-AMINO]CARBONYL]AMINO]SULFONYL]BENZOATE)	74222-97-2	75
INERT INGREDIENTS		25

HAZARDS IDENTIFICATION

Potential Health Effects

CAUTION! May irritate eyes, nose, throat and skin.

ROUTES OF EXPOSURE AND EFFECTS

Acute Oral LD50: >5,000 mg/kg (rat)
Very low order of toxicity.

Acute Dermal LD50: > 8,000 mg/kg (rabbit) males
> 2,000 mg/kg (rabbit) females
Slight to moderate order of toxicity.

SKIN IRRITATION AND SENSITIZATION

Not a primary skin irritant; not a sensitizer

(HAZARDS IDENTIFICATION - Continued)

EYE IRRITATION

Mild transient conjunctival irritation with slight corneal cloudiness and no irritic effects. Eyes were normal within 3-4 days.

INHALATION

4 hour LC50 (rat): 5mg/L
Moderate order of toxicity.

CHRONIC STUDIES - SULFOMETURON METHYL

The effects in animals from single exposure by ingestion include nonspecific clinical changes. Repeated exposures of high doses resulted in decreased body weight gain, liver changes, and red blood cell hemolysis. Long term exposure caused mild hemolytic anemia, decreased body weight, alteration of clinical chemical parameters, and changes in the bile duct.

Animal testing indicates that this compound does not have carcinogenic effects. Developmental toxicity was observed but only at maternally toxic dose levels. In a two generation rat reproduction study, decreased numbers of pups were observed at the 5,000 ppm level, a dose that was also maternally toxic. There were no effects on fertility and no reproductive effects were observed at 500 ppm.

The compound does not produce genetic damage in any of four tests conducted in bacterial and mammalian cell cultures.

HUMAN HEALTH EFFECTS

Overexposure by skin contact may initially include: skin irritation with discomfort or rash. Eye contact may initially include: eye irritation with discomfort, tearing, or blurring of vision.

Based on data from animal studies higher exposures may lead to these effects: red blood cell destruction.

Significant skin permeation, and systemic toxicity, after contact appears unlikely. There are no reports of human sensitization.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush skin with water after excessive contact.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

No specific intervention is indicated as compound is not likely to be hazardous by ingestion. Consult a physician if necessary.

FIRE FIGHTING MEASURES

Flammable Properties

Flammable limits in Air, % by Volume
LEL : 0.092 g/L

Not a fire or explosion hazard.

Like most organic powders or crystals, under severe dusting conditions, this material may form explosive mixtures in air.

Extinguishing Media

Water Spray, Foam, Dry Chemical, CO_2.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Wear full protective equipment. Use water spray. Runoff from fire control may be a pollution hazard.

If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the contamination hazard.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Shovel or sweep up.

Accidental Release Measures

If spill area is on ground used to produce crops or other valuble vegetation, or if area is adjacent to water used for irrigation, remove soil to depth of spill wetting.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing vapors or mist. Avoid breathing dust. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material.

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Handling (Physical Aspects)

Keep away from heat, sparks and flames.

Storage

Store in a well ventilated place.

Do not contaminate water, other pesticides, fertilizers, food or feed in storage.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation. Keep container tightly closed.

Personal Protective Equipment

Always follow label instructions when using this product.

Applicators and other handlers must wear:
- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks

Follow manufacturer's instructions for cleaning. maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

PPE required for early entry into treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:
- Coveralls
- Waterproof gloves
- Shoes plus socks

Exposure Guidelines

Applicable Exposure Limits

SULFOMETURON METHYL

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: 5 mg/m3, 8 Hr. TWA, A4
AEL *	(DuPont)	: 10 mg/m3, 8 & 12 Hr. TWA total dust

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Solubility in Water	: Dispersible
Odor	: None
Form	: Solid, dry flowable
Color	: Off-white
Bulk Density (Loose)	: 33 lb/cu ft
Bulk Density (Packed)	: 39 lb/cu ft

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

None reasonably foreseeable.

Decomposition

Decomposition will not occur.

Polymerization

Polymerization will not occur.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

Sulfometuron Methyl

96 hour LC50, rainbow trout: >12.5 ppm

Environmental Toxicity

Oral LC50, mallard ducks: >5,000 ppm
Oral LC50, bobwhite quail: >5,620 ppm

DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

Do not contaminate water, food or feed by disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal

Triple rinse (or equivalent) the container. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : NOT REGULATED

REGULATORY INFORMATION

U.S. Federal Regulations

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : No

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating
Health : 1
Flammability : 1
Reactivity : 0

NPCA-HMIS Rating
Health : 1
Flammability : 1
Reactivity : 0

Personal Protection rating to be supplied by user depending on use conditions.

Additional Information

This product is registered under EPA/FIFRA regulations.
The EPA Reg. No. is 352-401

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : DuPont
Address : Agricultural Products
Wilmington, DE 19898
Telephone : 800-441-7515

# Indicates updated section.

MSDS

Stockcode (Product ID) : NWC00145 Page number 1 of 3

MSDS Part 1 of 1 Kit? y Hazardous? y Product from MMIS? n

MSDS's Date: 4/25/1997 Trade Secret? n Product CAS:

Product Name: Chemical, Wate treatment, Calgon PCL-16M

Special Handling Instructions:

Warning! May cause eye, skin and respiratory tract irritation.

General Short Name: Water treatment Chemical

Synonym 1 :

2 :

3 :

4 :

5 :

HEADER INFORMATION

n/a

Manufacturer: Calgon

Catalog # PCL-16M **FORMULA:** n/a

PRODUCT ID TEXT

Calgon, PO Box 1346, Pitsburgh, PA 1530-1346, Phone--412-494-8000

SECTION II -- HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	PCT	FORMULA	PEL
Sodium molybdate dihydrate	7631-95-0	30		5 mg/m3*
Sodium tetraborate pentahydrate		0		

HAZARDOUS INGREDIENTS TEXT

* solulable Mo cmpds, as Mo

SECTION III - PHYSICAL DATA

Appearance: Colorless viscous liquid

Odor: none

Boiling Point: 218 F **Specific Gravity (H2O=1) :** 1.38

Melting Point: n/a **Vapor Pressure (mm Hg) :** =H2O

Solubility in Water: Complete **Vapor Density (air=1) :** =H2O

Evaporation Rate (butyl acetate=1) : n/a

PHYSICAL DATA TEXT

n/a

SECTION IV -- FIRE/EXPLOSION HAZARD

Flash Point : n/a

Flash Point Method Used: n/a

Lower Explosion Limit: n/a **Upper Explosion Limit:** n/a

Extinguishing Media:

Use estinguishing media appropriate for the surrounding fire.

Special Fire Fighting Procedures:

Excerise caution when fighting any chemical fire. A SCBA and protective clothing are essential.

Unusual Fire & Explosion Hazard:

none

NFPA Labeling : 2 Health Hazard -- Blue Label (0-4)

0 Flammability -- Red Label (0-4)

MSDS

Stockcode (Product ID) : NWC00145 Page number 2 of 3

MSDS Part 1 of 1 Kit? y Hazardous? y Product from MMIS? n

MSDS's Date: 4/25/1997 Trade Secret? n Product CAS:

Product Name: Chemical, Wate treatment, Calgon PCL-16M

0 Reactivity -- Yellow Label (0-4)

Special Note -- White Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

N/A

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N) : IARC Monographs N OSHA Regulated N NTP N

Route of Entry (Y or N) : Inhalation N Ingestion Y Skin Y

Signs & Symptoms of Exposure:

May be eye and skin irritant. Miderately toxic by ingestion. Swollowing this product may irritate the gastrointestinal tract and cause nausea and vomiting. Inhalation of this product mist may be irritating to the respiratory tract.

Medical Conditions Aggravated by Exposure:

none

Emergency & First Aid Procedures:

Eye and skin contact - Flush with water for at least 15 minutes. Seek medical attention for eyes and also if skin irritation persists. If swollowed, seek medical advice. Do not induce vomiting unless directed by medical personnel. If inhaled and irritation or difficulty in breeathing occurs, remove to fresh air. Seek medical aid if irritation or discomfort persists.

HEALTH HAZARDS TEXT

Signs of Mo poisoning are loss of appetite, listlessness, diarrhea, and reduced growth rate. Anemia is charateristic of Mo poisoning, with low hemoglobin concentration and reduced red cell counts. Cattle, rabbits and chicks on high dietary levels of Mo showed deformities of joints of the extremities. Histopathologically, livers and kidneys of severly poisoned animals showed fatty degeneration.

SECTION VI -- REACTIVITY DATA

Stable (Y or N) : y Hazardous Polymerization (Y or N): n

Stability Conditions to Avoid:

No specific information.

Hazardous Polymerization Conditions to Avoid:

Will not occur.

Incompatibility (Materials to Avoid):

No significant incompatibilities known.

Hazardous Decomposition or By Products:

none

REACTIVITY DATA TEXT

n/a

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

Wearing appropriate personal protective equipment, contain spill, collect into inert absorbent and place in suitable container.

Waste Disposal Method:

Not a RCRA Hazardous Waste. Dispose of in accordance with local, state and federal guidelines.

SAFE HANDLING PROCEDURES TEXT

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash throughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area . Toxicological information: Sodium molybdate LD50 RAT = 245mg/kg Oral, >2080 mg/m3/4H Inhalation. Ecological information: 96 hr LC50 (Rainbow trout) = 7340 ppm, 48n hr LC50 (Daphnia) = 3220 ppm.

SECTION VIII -- SPECIAL PROTECTION

MSDS

Stockcode (Product ID) :	NWC00145				Page number	3	of 3
MSDS Part	1	of 1	Kit?	y	Hazardous?	y	Product from MMIS? n
MSDS's Date:	4/25/1997				Trade Secret?	n	Product CAS:
Product Name:	Chemical, Wate treatment, Calgon PCL-16M						

Protective Gloves: Chemical resostant gloves

Eye Protection: Chemical splash goggles

Respiratory Protection (specific type):

If airborne concentrations exceed limits follow 29CFR1910.134 requirements.

Ventilation Instructions:

Local or general adequate.

Other Protective Clothing or Equipment:

n/a

Work/Hygenic Practices:

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash throughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area . Toxicological information: Sodium molybdate LD50 RAT = 245mg/kg Oral, >2080 mg/m3/4H Inhalation. Ecological information: 96 hr LC50 (Rainbow trout) = 7340 ppm, 48n hr LC50 (Daphnia) = 3220 ppm.

SPECIAL PROTECTION TEXT

n/a

SECTION IX -- SPECIAL PRECAUTIONS

Handling/Storage Precautions:

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash throughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area . Toxicological information: Sodium molybdate LD50 RAT = 245mg/kg Oral, >2080 mg/m3/4H Inhalation. Ecological information: 96 hr LC50 (Rainbow trout) = 7340 ppm, 48n hr LC50 (Daphnia) = 3220 ppm.

SPECIAL PRECAUTIONS TEXT

n/a

TRAILER TEXT

1st SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

CALGON CORPORATION

P O Box 1346
Pittsburgh, PA 15230-1346
24-Hour Emergency Telephone
Phone--(412)494-8000
CHEMTREC® 1-800-424-9300

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME **PCL-50**

CHEMICAL DESCRIPTION Aqueous alkaline solution
PRODUCT CLASS Copper corrosion inhibitor
MSDS CODE 0643-08-05-91

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium tolyltriazole	64665-57-2	~ 50	None established	None established
Sodium hydroxide	1310-73-2	< 0 5	Ceiling 2 mg/m3	Ceiling 2 mg/m3

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

Clear, reddish-brown to yellow liquid with characteristic odor
DANGER!
May cause severe eye and skin damage
May cause severe digestive tract burns if swallowed
May cause respiratory tract irritation

****

PRIMARY ROUTES OF ENTRY Eye and skin contact, inhalation, ingestion

TARGET ORGANS Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Persons with pre-existing skin or lung disorders may be more susceptible to irritation

POTENTIAL HEALTH EFFECTS

EYE CONTACT This product may cause irreversible eye damage upon contact depending on the length of exposure, solution concentration and first aid measures

SKIN CONTACT Exposure to this product may cause severe irritation of the skin If not removed promptly, burns may result The extent of injury depends on the duration of contact This product is not expected to be absorbed through the skin in harmful amounts or to produce an allergic skin reaction

INGESTION Ingestion of this product may cause severe irritation or burns of the mucous membranes of the mouth, throat, esophagus and stomach

INHALATION Inhalation of mists or vapor of this product may produce respiratory tract irritation

SUBCHRONIC, CHRONIC No applicable information was found concerning any potential health effects resulting from subchronic or chronic exposure to the product

CARCINOGENICITY
NTP No ingredients listed in this section
IARC No ingredients listed in this section
OSHA No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT In case of contact, immediately flush eyes with plenty of water for at least 15 minutes Seek medical aid immediately

SKIN CONTACT In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes Seek medical aid immediately Wash clothing before reuse

INGESTION If swallowed, do NOT induce vomiting Give one or two glasses of water Seek medical aid immediately Never give anything by mouth to an unconscious person

INHALATION If inhaled, remove to fresh air If not breathing, give artificial respiration If breathing is difficult, give oxygen Seek medical aid

Section 5. FIRE-FIGHTING MEASURES

FLASHPOINT > 200°F (> 93°C)
This product is not by definition a "flammable liquid" or a "combustible liquid"

LOWER FLAMMABLE LIMIT Not available

UPPER FLAMMABLE LIMIT Not available

AUTO-IGNITION TEMPERATURE >932°F (>500°C)

EXTINGUISHING MEDIA Use extinguishing media appropriate for the surrounding fire

FIRE-FIGHTING INSTRUCTIONS
Exercise caution when fighting any chemical fire A self-contained breathing apparatus and protective clothing are essential Use water to keep fire-exposed containers cool

FIRE & EXPLOSION HAZARDS Product emits toxic gases under fire conditions Closed containers may rupture or explode due to steam pressure buildup when exposed to extreme heat

DECOMPOSITION PRODUCTS Thermal decomposition or combustion may produce carbon dioxide, carbon monoxide, and nitrogen oxides Hydrogen cyanide possible in reducing atmospheres

NFPA CODES Health = 3 Flammability = 1 Reactivity = 0 Special Hazard = None

Hazard rating scale 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container

Section 7. HANDLING AND STORAGE

HANDLING Do not get in eyes, on skin or clothing
Avoid breathing vapor or mist
Use with adequate ventilation
Wash thoroughly after handling
Keep container closed when not in use

STORAGE Store in a cool, dry, well-ventilated location
Store away from acids

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION Chemical splash goggles and face shield
SKIN PROTECTION Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION If airborne concentrations exceed published exposure limits or become irritating, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910 134)

ENGINEERING CONTROLS Use local exhaust ventilation where mist or vapor may be generated

WORK PRACTICES Eye wash station and safety shower should be accessible in the immediate area of use

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT 219°F (104°C)

SOLUBILITY IN WATER Complete

VAPOR PRESSURE 0 04 mmHg @ 20°C (for sodium tolyltriazole)

SPECIFIC GRAVITY 1 190 - 1 220 @ 25°C

VAPOR DENSITY (air = 1) Similar to water

pH 11 5 - 12 5 (10% solution)

%VOLATILE BY WEIGHT ~50

FREEZING POINT 18°F (-8°C)

APPEARANCE AND ODOR Clear, reddish-brown to yellow liquid with characteristic odor

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY Stable

HAZARDOUS POLYMERIZATION Will not occur

CONDITIONS TO AVOID Avoid use with carbon steel equipment

INCOMPATIBILITY Strong oxidizers and acids

DECOMPOSITION PRODUCTS Thermal decomposition or combustion may produce carbon dioxide, carbon monoxide, and nitrogen oxides Hydrogen cyanide possible in reducing atmospheres

Section 11. TOXICOLOGICAL INFORMATION

Test material	Oral LD50(rat)	Dermal LD50(rabbit)	Inhalation LC50(rat)
Sodium tolyltriazole	640-920 mg/kg (50% soln)	> 2 g/kg	Not available
Sodium hydroxide	140-340 mg/kg	1350 mg/kg	Not available

Section 12. ECOLOGICAL INFORMATION

Test Material	Aquatic Toxicity Data
Sodium tolyltriazole (50% solution)	96 hr LC50 (bluegill sunfish) 191 2 ppm 96 hr LC50 (rainbow trout) 23 7 ppm 48 hr LC50 (Daphnia magna) 245 7 ppm 14 day LC50 (Daphnia magna) 13 2 ppm 21 day LC50 (Daphnia magna) 5 8 ppm
Sodium hydroxide	96 hr LC50 (bluegill sunfish) 43 3 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of corrosivity The EPA Hazardous Waste Number is D002

DISPOSAL Dispose of in accordance with local, state and federal regulations

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION
- Proper Shipping Name Corrosive liquid, n o s (contains Sodium tolyltriazole and Sodium hydroxide)
- Class/Division 8
- ID Number UN 1760
- Packing Group III
- Label Corrosive

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status Hazardous

TSCA The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory

CERCLA reportable quantity of EPA hazardous substances in product

Chemical Name	RQ
Sodium hydroxide	1000 lb

Product RQ 200,000 lb (Notify EPA of product spills exceeding this amount)

SARA TITLE III

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
None			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
None		

Section 16. OTHER INFORMATION

HMIS RATINGS Health = 3 Flammability = 1 Reactivity = 0

Personal Protective Equipment = X (to be specified by user depending on use conditions)

Hazard rating scale 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe

MSDS REVISION SUMMARY Supersedes MSDS issued on 9/14/94

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, THE MANUFACTURER MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON

PREPARED BY: **P.J. Maloney**

ONDEO Nalco

MATERIAL SAFETY DATA SHEET

PRODUCT

PCL-361

EMERGENCY TELEPHONE NUMBER
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **PCL-361**

APPLICATION : DEPOSIT CONTROL CHEMICAL

COMPANY IDENTIFICATION : ONDEO Nalco Company
ONDEO Nalco Center
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 REACTIVITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Ethoxylated Nonylphenol	9016-45-9	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
Irritating to eyes.
Do not get in eyes, on skin, on clothing. Do not take internally. Keep container tightly closed. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear suitable protective clothing, gloves and eye/face protection.
May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Do not touch spilled material. Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labelled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Colorless
ODOR	None

SPECIFIC GRAVITY	1.01 - 1.04 @ 77 °F / 25 °C
DENSITY	8.41 - 8.66 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	5.0 - 6.0
BOILING POINT	> 212 °F / > 100 °C
VAPOR PRESSURE	Same as water
EVAPORATION RATE	Same as water
VOC CONTENT	0.1 %

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Freezing temperatures.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) may generate heat, fires, explosions and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY :

Species	LD50	Tested Substance
Rat	> 3 ml/kg	Product

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	> 2 ml/kg	Product

Rating : Non-Hazardous

PRIMARY SKIN IRRITATION :

Draize Score	Tested Substance
2.0 / 8.0	Product

Rating : Slightly irritating

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Tested Substance
Rainbow Trout	96 hrs	> 1,000 mg/l	Product
Bluegill Sunfish	96 hrs	> 1,000 mg/l	Product

Rating : Essentially non-toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Tested Substance
Daphnia magna	48 hrs	> 1,000 mg/l		Product

Rating : Essentially non-toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Ethoxylated Nonylphenol : Eye irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

X Immediate (Acute) Health Hazard
Delayed (Chronic) Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard

Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Ethoxylated Nonylphenol	9016-45-9
Water	7732-18-5
Polyalkylene glycol	20507700000-5008P

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
All substances in this product are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, Co.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO

Prepared By : Product Safety Department
Date issued : 02/28/2000
Replaces : 06/10/1999

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

PCL-401

EMERGENCY TELEPHONE NUMBER
(800)462-5378 (24 Hours) (800) I-M-ALERT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	PCL-401
APPLICATION :	WATER TREATMENT
CHEMICAL DESCRIPTION	Water, Polymer
COMPANY IDENTIFICATION :	Nalco Chemical Company One Nalco Center Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER	(800)462-5378 (24 Hours) (800) I-M-ALERT

NFPA 704M/HMIS RATING
HEALTH : 0 / 0 FLAMMABILITY : 1 / 1 REACTIVITY : 0 / 0 OTHER
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Based on our hazard evaluation, none of the substances in this product are hazardous.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Wear suitable protective clothing. Keep container tightly closed. Flush affected area with water.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE

HUMAN HEALTH HAZARDS - ACUTE

EYE CONTACT :
May cause irritation with prolonged contact.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. No adverse effects expected.

INHALATION :
Not a likely route of exposure. No adverse effects expected.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If symptoms develop, seek medical advice.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT > 200 °F / > 93 °C

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Do not touch spilled material. Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by dyking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labelled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Respiratory protection is not normally needed.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow
ODOR	None

SPECIFIC GRAVITY	1.16 - 1.20
SOLUBILITY IN WATER	Complete
pH ()	4.2 - 5.0
VISCOSITY	20 - 160 cps
FREEZING POINT	25 °F /
VAPOR PRESSURE	Same as water

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Freezing temperatures

MATERIALS TO AVOID
Strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

ACUTE ORAL TOXICITY :

Species	LD50	Tested Substance
Rat	5 g/kg	Product

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	2 G/KG	Product

CARCINOGENICITY:
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS:

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

Proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT:

Proper Shipping Name: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA):

Proper Shipping Name: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO):

Proper Shipping Name: PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA:

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 31 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370)
Our hazard evaluation has found that this product is not hazardous under 29 CFR 1910.1200.

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :

MICHIGAN CRITICAL MATERIALS :

STATE RIGHT TO KNOW LAWS :
None of the substances are specifically listed in the regulation.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

WHMIS CLASSIFICATION :

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, Co.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO

Prepared By : Product Safety Department
Date Issued : 02/10/2000
Replaces : 06/18/1999

MATERIAL SAFETY DATA SHEET

1	HMIS HEALTH
0	HMIS FLAMMABILITY
0	HMIS REACTIVITY
B	HMIS PERSONAL PROTECTION

SECTION I - IDENTIFICATION

MANUFACTURER'S NAME..... PARAGON, INC.
P. O. BOX 128
BROUSSARD, LA 70518-0128
PHONE NUMBER..... (318) 268-4023
EMERGENCY PHONE NUMBER... (800) 255-3924
EFFECTIVE DATE..... September 26, 1997
TRADE NAME..... POLY ALUMINUM CHLORIDE
CHEMICAL FAMILY..... Flocculant
CAS NUMBER..... Blend
CHEMICAL FORMULA..... Proprietary

SECTION II - HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	%	TLV (Units)	PROD. CAS #
ALUMINUM CHLORHYDROXIDE COMPLEX	Conf.	None Established	1327-41-9

All ingredients in this product are on the Toxic Substances Control Act (TSCA) Inventory List.

SECTION III - PHYSICAL DATA

BOILING Point(F)..... > 100 deg. F.
FREEZING POINT (F)..... < 0 deg. F.
VAPOR PRESSURE (mm Hg)... NA
VAPOR DENSITY (Air=1).... NA
SOLUBILITY IN H20..... Complete
APPEARANCE/ODOR..... Clear Liquid/No Distinct Odor
SPECIFIC GRAVITY (H20=1). 1.255
PH..... 4.5

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT..... None
LOWER FLAME LIMIT..... NA
HIGHER FLAME LIMIT..... NA
EXTINGUISH MEDIA..... Water fog or spray, Foam, Dry Chemical, Carbon Dioxide (CO_2).
UNUSUAL FIRE HAZARD..... None

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE.... None Established

ROUTES OF ENTRY INHALATION? SKIN? INGESTION?

Irritant	Irritant	Irritant

HEALTH HAZARDS ..... Acute, Vapors or liquid may be irritating to skin, eyes, or mucous membranes.

CARCINOGENICITY	NTP?	IARC MONOGRAPHS?	OSHA REGULATED
	No	No	No

OVER EXPOSURE EFFECTS.... Skin irritation develops slowly after contact. Eye irritation develops immediately upon contact.

FIRST AID PROCEDURES..... In case of eye contact, flush immediately with plenty of water for at least 15 minutes and get medical attention; for skin, wash thoroughly with soap and water. If affected by inhalation of vapor or spray mist, remove to fresh air. If swallowed, do not induce vomiting, get immediate medical attention.

SECTION VI - REACTIVITY DATA

CHEMICAL STABILITY..... Stable
CONDITIONS TO AVOID..... None Known
INCOMPATIBLE MATERIALS... Alkaline Materials.
DECOMPOSITION PRODUCTS... At temperatures > 500 deg. F., hydrogen chloride gas will be liberated.
HAZARDOUS POLYMERIZATION. Will Not Occur
POLYMERIZATION AVOID..... None

SECTION VII - SPILL OR LEAK PROCEDURE

FOR SPILL ..... In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations.

WASTE DISPOSAL METHOD.... Industrial Waste. Follow State Regulations.

SECTION VIII - SPECIAL PROTECTION

RESPIRATORY PROTECTION... None Needed
VENTILATION..... Local Exhaust
MECHANICAL EXHAUST..... Desired in Closed Places
LOCAL EXHAUST..... Recommended
PROTECTIVE GLOVES..... Wear impervious gloves
EYE PROTECTION..... Use goggles and/or face shield if splashing is likely

OTHER PROTECTIVE
EQUIPMENT..... HMIS PERSONAL PROTECTION; B: Safety Glasses, Gloves

SECTION IX - SPECIAL HANDLING

HANDLING AND STORAGE..... No special storage requirements.
PRECAUTIONARY MEASURES... Use with adequate ventilation. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling.
HAZARD CLASS..... NON REGULATED
DOT SHIPPING NAME..... D.O.T. NON REGULATED - POLY ALUMINUM CHLORIDE

REPORTABLE QUANTITY (RQ). None
UN NUMBER..... None
NA #..... None
PACKAGING SIZE..... 55 gallon drums

FOOT NOTES ND - No Data Available NA - Not Applicable
< = Less Than > = Greater Than

PREPARED BY:..... TechniKos, Inc.
P.O. BOX 159
BROUSSARD, LA 70518
(318) 837-4604
REVISED DATE..... September 26, 1997

THIS PRODUCT'S SAFETY INFORMATION IS PROVIDED TO ASSIST OUR CUSTOMERS IN ASSESSING COMPLIANCE WITH HEALTH, SAFETY AND ENVIRONMENTAL REGULATIONS. THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US AND IS BELIEVED TO BE ACCURATE, ALTHOUGH NO GUARANTEE OR WARRANTY IS PROVIDED BY THE COMPANY IN THIS RESPECT. SINCE THE USE OF THIS PRODUCT IS WITHIN THE EXCLUSIVE CONTROL OF THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THIS PRODUCT. SUCH CONDITIONS SHOULD COMPLY WITH ALL FEDERAL REGULATIONS CONCERNING THE PRODUCT. ALL MATERIALS IN THIS PRODUCT ARE PRODUCED IN COMPLIANCE WITH PUBLIC LAW 94-469 (ALSO KNOWN AS THE "TOXIC SUBSTANCES CONTROL ACT" OF 1976).

REGULATORY INFORMATION

SECTION I - IDENTIFICATION

MANUFACTURER'S NAME..... PARAGON, INC.
P. O. BOX 128
BROUSSARD, LA 70518-0128
PHONE NUMBER..... (318) 268-4023
EMERGENCY PHONE NUMBER... (800) 255-3924
EFFECTIVE DATE..... September 26, 1997
TRADE NAME..... POLY ALUMINUM CHLORIDE
CHEMICAL FAMILY..... Flocculant

SECTION X - REGULATORY

EPA ACUTE..... Yes
EPA CHRONIC..... No
EPA IGNITABILITY..... No
EPA REACTIVITY..... No
EPA SUDDEN RELEASE OF
PRESSURE..... No

CERCLA RQ VALUE..... None

SARA TPQ..... None
SARA RQ..... None
SECTION 313..... None

THE CHEMICALS LISTED ABOVE IN SECTION 313 CAN BE FOUND WITH THEIR C.A.S. NUMBERS AND PERCENTAGES IN SECTION II OF THIS MATERIAL SAFETY DATA SHEET.

EPA HAZARD WASTE #..... None
CLEANAIR..... NA
CLEAN WATER..... NA

CALGON CORPORATION

BOILER PRODUCTS & SERVICES

Bulletin No. 10-265c

PRE-TECT® 2000
NEUTRALIZING AMINE YIELDS EXCEPTIONAL IRON AND COPPER CONTROL IN UTILITY SYSTEMS

DESCRIPTION

PRE-TECT 2000 is highly effective in reducing the levels of iron and copper throughout a pre-boiler system. Based on methoxypropylamine, it has proven to be superior to both cyclohexylamine and morpholine.

ADVANTAGES

- At pressures up to 2800 psig, generates little or no ammonia
- Particularly effective in peaking and cycling stations
- Blended with demineralized water, therefore contributes no dissolved solids to the cycle
- No harmful impact on ion exchange resins
- Provides effective standby protection when used in combination with a reducing agent
- A distribution ratio of 1.0 assures uniform protection throughout the pre-boiler system

FEED REQUIREMENTS

PRE-TECT 2000 feed requirements are based on the pH control that provides the lowest pre-boiler iron and copper levels. Your Calgon representative will be able to recommend a feed rate specific to your system.

PRE-TECT 2000 can be injected into any part of the pre-boiler system. The turbine crossover or condenser hotwell are both preferred points of injection.

CONTROL

Determination of trace iron and copper levels in the feedwater is the best approach to selecting the product feed rate to achieve the optimum pH in the system.

TYPICAL PROPERTIES

Refer to the Material Safety Data Sheet.

PACKAGING

PRE-TECT 2000 is available in 55-gallon plastic drums, 275-gallon disposable bins, returnable bins, or delivered to on-site storage facilities via bulk or **Calgon Bulk Liquid Service-Plus.**

FREIGHT CLASSIFICATION

Compounds, iron or steel rust preventing or removing compounds, O/T petroleum NOI, in bulk or barrels.

SAFETY PRECAUTIONS

A Material Safety Data Sheet is available from your local representative.

The information and recommendations contained in this document are presented in good faith and believed to be reliable, but shall not be part of the terms and conditions of sale of any Calgon product. Because many factors affect product application and performance, each Calgon customer must determine for itself, by conducting appropriate tests or other methods, whether a Calgon product is suitable for that customer's needs. **CALGON MAKES NO WRITTEN, ORAL, EXPRESSED OR IMPLIED WARRANTY REGARDING THE CALGON PRODUCTS DESCRIBED HEREIN, THE RESULTS TO BE OBTAINED FROM THEIR USE, OR THE ACCURACY OR USE OF THE INFORMATION AND RECOMMENDATIONS CONTAINED HEREIN. CALGON SPECIFICALLY DISCLAIMS THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE** 10/96

Information concerning human and environmental exposure may be reviewed on the Material Safety Data Sheet for the product. For additional information regarding incidents involving human and environmental exposure call 1-800-955-0090 and ask for the Health and Environmental Affairs Department.

All names in boldface are trademarks or service marks of Calgon Corporation.

For more information, contact your local Calgon Representative, call 1-800-955-0090, or write: Calgon Corporation, P.O. Box 1346, Pittsburgh, PA 15230.

Internet: http://www.calgon.com

CALGON CORPORATION

INNOVATIVE TECHNOLOGIES, CREATIVE SOLUTIONS...SINCE 1918

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone--(412)494-8000

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **Pre-Tect 2000**

CHEMICAL DESCRIPTION: Aqueous amine solution
PRODUCT CLASS: Corrosion inhibitor
MSDS CODE: 0747-02-21-95

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Methoxypropylamine (MPA)	5332-73-0	60	None established	None established

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May cause severe eye and skin damage.
May cause severe digestive tract burns if swallowed.
May cause allergic skin reaction.
May cause respiratory tract irritation.
Flammable/Combustible liquid and vapor.
Flash point: 130 °F (54.4 °C)

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, ingestion, skin absorption

TARGET ORGANS: Eye, skin, mucous membranes

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing skin or lung disorders may be more susceptible to irritation.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product would be expected to cause severe eye irritation on contact and possibly permanent injury.

Continued on Page 2

SKIN CONTACT: This product would be expected to cause severe skin irritation on contact and possibly skin burns. The vapors may also be irritating to the skin. Allergic dermatitis has been known to occur in some cases after repeated exposure to methoxypropylamine. Methoxypropylamine can be absorbed through the skin but is not expected to be acutely toxic by this route.

INGESTION: Ingestion may cause moderate to severe gastric irritation including nausea, vomiting, and severe pain. Ulceration or perforation of the gastrointestinal tract may also occur.

INHALATION: Inhalation overexposure to mist or vapor may cause nasal and bronchial irritation and nausea, dizziness, and lightheadedness. Repeated inhalation can result in lung injury.

SUBCHRONIC, CHRONIC:
Repeated skin contact with methoxypropylamine may cause a persistent irritation or dermatitis. Repeated inhalation of methoxypropylamine may cause lung damage.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical aid immediately. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: 130°F
This product is a fire hazard.

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use dry chemical, "alcohol" foam, carbon dioxide, or water spray.

Continued on Page 3

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.
Use water to keep fire-exposed containers cool.

FIRE & EXPLOSION HAZARDS: Product vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Product emits toxic gases under fire conditions.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide, carbon monoxide, ammonia, and/or nitrogen oxides.

NFPA RATINGS: Health = 3 Flammability = 2 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Ventilate area of spill. Remove all sources of ignition. Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes, on skin or clothing.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Keep away from heat and flame.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: If airborne concentrations become irritating, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Local exhaust ventilation may be required in addition to general room ventilation to maintain airborne concentrations below irritation levels.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

Continued on Page 4

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 241°F (for MPA)

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: 20 mmHg @ 86°F (for MPA)

SPECIFIC GRAVITY: 0.950 - 0.970 @ 25 °C

VAPOR DENSITY (air=1): 3.07 (for MPA)

pH: 10.2 - 11.8 (1% solution)

%VOLATILE BY WEIGHT: 100

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, colorless to slightly amber, non-viscous liquid with amine odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep away from heat and flame.

INCOMPATIBILITY: Strong oxidizers and acids

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon dioxide, carbon monoxide, ammonia, and/or nitrogen oxides.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
See the following information on the main ingredient.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Methoxypropylamine (MPA)	750 mg/kg	2600 mg/kg	9.8 mg/l/4H

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
Aquatic toxicity data:
96 hr LC_{50} (fathead minnow): > 1000 ppm
96 hr LC_{50} (bluegill sunfish): > 1000 ppm
48 hr LC_{50} (Daphnia magna): 694 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste because it exhibits tr characteristics of ignitability and corrosivity. The EPA Hazardous Waste Numbers are D001 and D002.

Continued on Page 5

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 3
Proper Shipping Name: Amines, flammable, corrosive, n.o.s. (contains Methoxypropylamine)
Label: Flammable liquid, Corrosive
Packing Group: III
ID Number: UN 2733

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[no]	[yes]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
There are no reportable SARA 313 Toxic Chemicals in this product.		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3 Flammability = 2 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Continued on Page 6

MSDS REVISION SUMMARY: Supersedes MSDS issued on 10/24/95. The MSDS has been changed in Section 14.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALCOM CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone--(412)494-8000

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **Pre-Tect 7000**

CHEMICAL DESCRIPTION: Monoethanolamine in water
PRODUCT CLASS: Water treatment
MSDS CODE: 0E37-01-06-94

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Monoethanolamine (MEA)	141-43-5	40	TWA 3 ppm, 8 mg/m^3; STEL 6 ppm, 15 mg/m^3	TWA 3 ppm, 7.5 mg/m^3; STEL 6 ppm 15 mg/m^3

(Synonyms: Ethanolamine and 2-Aminoethanol.)

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May cause severe eye damage.
May cause severe digestive tract burns if swallowed.
May cause skin and respiratory tract irritation.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, skin absorption, inhalation, ingestion

TARGET ORGANS: Eye, skin, lung, liver, kidney, central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Because of its irritating properties, this material may aggravate an existing dermatitis.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause severe irritation and damage upon contact with the eye.

Continued on Page 2

SKIN CONTACT: This product could cause skin irritation, especially upon prolonged or repeated exposure. By OSHA definition, pure monoethanolamine is toxic by skin absorption. Prolonged or widespread skin contact may result in the absorption of harmful amounts of material. There is no evidence that the ethanolamines can cause allergic contact dermatitis.

INGESTION: Based on the acute oral LD_{50} of MEA, this product would be considered to be slightly toxic by ingestion. Swallowing the product may cause chemical burns of the mouth, throat, esophagus, and stomach. Other symptoms could include nausea, vomiting, diarrhea, dizziness and drowsiness.

INHALATION: Breathing product mist or vapor may cause irritation with coughing and discomfort in the nose, throat and chest. Prolonged exposure to moderately high vapor concentrations may cause local injury to the respiratory tract. However, the sensory irritant properties of monoethanolamine vapors should give adequate warning of a potential acute inhalation overexposure situation. In animal experiments, subacute high level exposures to monoethanolamine vapor and mist produced pulmonary damage, lethargy, and some non-specific degenerative changes in the liver and kidneys. Lab tests have found monoethanolamine to be a central nervous system (CNS) stimulant at low doses, and a CNS depressant at lethal doses.

SUBCHRONIC, CHRONIC:
Prolonged or repeated exposure to monoethanolamine may cause liver and kidney damage. Long-term inhalation of monoethanolamine vapors has caused nerve damage in laboratory animals. Oral intake of monoethanolamine during pregnancy has caused embryotoxicity and maternal toxicity in rats. Exposures having no effect on the mother should have no effect on the fetus.

There is evidence that no embryofetotoxicity or teratogenicity was produced in rats or rabbits when MEA was administered by skin contact. In spite of the widespread use of monoethanolamine in industry, no reports of injury to workers have been found.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, flush skin with plenty of water. Remove contaminated clothing. Seek medical aid if irritation persists. Wash clothing before reuse.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Continued on Page 3

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: >200°F (TCC)
This product is not by definition a "flammable liquid" or a "combustible liquid".

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use alcohol-type or all-purpose-type foam, applied by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.
Use water to keep fire-exposed containers cool.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, and nitrogen oxides.

NFPA RATINGS: Health = 3 Flammability = 1 Reactivity = 0 Special Hazard = None

Hazard rating scale. 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Remove all sources of ignition. Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes.
Avoid contact with skin and clothing.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: Store in well-ventilated area free of sources of ignition. Separate from oxidizing materials.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles

Continued on Page 4

SKIN PROTECTION: Chemical resistant gloves
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Use local and/or general exhaust ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: An eye wash station should be accessible in the immediate area of use.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 338°F for MEA

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: 0.28 - 0.35 mmHg @ 20°C for MEA

SPECIFIC GRAVITY: 0.96 - 0.98 @ 25°C

VAPOR DENSITY (air=1): 2.1 for MEA

pH: 12.5 - 13.5 @ 25°C

%VOLATILE BY WEIGHT: 60 (water)

FREEZING POINT: -17 °F

APPEARANCE AND ODOR: Clear, colorless, low viscosity liquid with mild ammoniacal odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep away from heat and flame. This product may undergo a self-sustaining thermal decomposition when heated to temperatures above 250°C (482°F).

INCOMPATIBILITY: Strong oxidizers and acids, aluminum, copper, aldehydes, ketones, acrylates, organic anhydrides, and organic halides.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, and nitrogen oxides.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
See the following information on ingredients.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Monoethanolamine (MEA)	1720 mg/kg	1000 mg/kg	Not available

Continued on Page 5

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
See the following information on ingredients.

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Monoethanolamine	96 hr LC_{50} (fathead minnow): 125 ppm 24 hr LC_{50} (Daphnia magna): 140 ppm 96 hr LC_{50} (bluegill sunfish): 75 ppm 96 hr LC_{50} (rainbow trout): 150 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristic of corrosivity. The EPA Hazardous Waste Number is D002.

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 8
Proper Shipping Name: Ethanolamine solution
Label: Corrosive
Packing Group: III
ID Number: UN 2491

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Continued on Page 6

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
There are no reportable SARA 313 Toxic Chemicals in this product.		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 1 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale. 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Reason for reissue: Update to new format.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

MATERIAL SAFETY DATA SHEET

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346

24 Hour Emergency Telephone—(412)777-8000

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: Pre-Tect 9002

CHEMICAL DESCRIPTION: Aqueous amine solution
PRODUCT CLASS: Boiler water treatment
MSDS CODE: 0F04

Section 2. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Dimethylamine (DMA)	124-40-3	2	TWA 10 ppm, 18 mg/m^3	TWA 5 ppm, 9.2 mg/m^3; STEL 15 ppm, 27.6 mg/m^3

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May cause severe eye and skin damage.
May be harmful if swallowed.
May cause allergic skin reaction.
May cause respiratory tract irritation.
Combustible liquid and vapor.
May form suspected cancer-causing nitrosamines if mixed with nitrites.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, skin absorption, ingestion

TARGET ORGANS: Eye, skin, lung, mucous membranes, liver

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
- Asthma
- Skin disorders and allergies
- Chronic respiratory disease, e.g., bronchitis, emphysema
- Eye disease

Continued on Page 2

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause irreversible eye damage upon contact depending on the length of exposure, solution concentration and first aid measures. Product vapor in low concentrations can cause tearing, conjunctivitis and corneal edema when absorbed into the tissue of the eye from the atmosphere. Corneal edema may give rise to a perception of "blue haze" or "fog" around lights. The condition is transien and has no known residual effect.

SKIN CONTACT: This product may produce burns upon contact with the skin. The severity of the burn is generally determined by the concentration of the solution and the duration of the exposure. The vapors may also be irritating to the skin. DMA may cause an allergic skin reaction and may be absorbed through the skin causing nausea, headache, and general discomfort.

INGESTION: Ingestion of this product may cause severe irritation or burns of the mucous membranes of the mouth, throat, esophagus and stomach.

INHALATION: DMA vapors are irritating to the respiratory tract. Inhalation of vapors may produce chemical pneumonitis, pulmonary edema, and delayed scarring of the airway and other affected organs. Repeated and/or prolonged exposure to vapors may cause chronic irritation of the respiratory tract, bronchopneumonia, and other adverse respiratory effects such as cough, tightness of chest, or shortness of breath.

SUBCHRONIC, CHRONIC:
DMA added to the diet of rats at 150 mg/kg for 3.5 months increased liver demethylase activity even in the presence of the enzyme inducer casein. In a subchronic study, 15 rats, 15 guinea pigs, 3 rabbits, 2 dogs, and 3 monkeys were exposed continuously by inhalation at approximately 5 ppm of DMA for 90 days. There were no deaths or signs of toxicity and all hematologic values were normal. On histopathologic examination, interstitial inflammatory changes were noted in the lungs of each species. Further, the 3 rabbits and 2 monkeys showed dilatation of the bronchi.

In a 2-year inhalation study, groups of 95 male and 95 female rats and mice were exposed 6 hours/day, 5 days/week at 10, 50, or 175 ppm of DMA. Concentration-dependent toxicity was characterized by decreased body weight (175 ppm only) and progressive inflammatory, degenerative, and hyperplastic lesions of the nasal passages. Nasal toxicity was similar in both rats and mice (no sex differences) affecting respiratory and olfactory epithelia. Lesions were severe at 175 ppm, moderate at 50 ppm, and focal and mild at 10 ppm.

CARCINOGENICITY:
NTP:
"No ingredients listed in this section"
IARC:
"No ingredients listed in this section"
OSHA:
"No ingredients listed in this section"

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

Continued on Page 3

SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical aid immediately. Wash clothing before reuse. Destroy contaminated leather apparel. Victims with major skin contact should be maintained under medical observation for at least 24 hours due to the possibility of delayed reaction.

INGESTION: If swallowed, do NOT induce vomiting. Give large quantities of water. Seek medical aid immediately. Never give anything by mouth to an unconscious person.

Note to Physicians: This product is highly injurious to all tissues, similar to that of ammonia or ammonia gas. Chemical pneumonitis, pulmonary edema, laryngeal edema and delayed scarring of the airway or other affected tissues may occur following exposure. There is no specific treatment. Clinical management is based on supportive treatment, which is similar to that for thermal burns.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.
Prevent aspiration of vomit. Turn victim's head to the side. Assure mucous does not obstruct airway.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: 127°F (COC)
This product is a combustible liquid.

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use CO_2, dry chemical, alcohol foam.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.
Use water to keep fire-exposed containers cool.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions. Product vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapors may collect in closed spaces such as sewers, caves or closed structures.

DECOMPOSITION PRODUCTS: Upon decomposition, ammonia vapors are liberated. Upon combustion in the presence of sufficient oxygen, product generates harmful carbon monoxide, carbon dioxide, and nitrogen oxide gases. Nitrogen oxide can react with water vapor to yield nitric acid. Combustion of product under oxygen-starved conditions can be expected to produce numerous toxic products including: nitriles, cyanic acid, isocyanates, cyanogens, nitrosamines, amides, carbamates.

NFPA RATINGS: Health = 3 Flammability = 2 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Continued on Page 4

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Ventilate area of spill. Eliminate all ignition sources. Approach release from upwind. Use water spray to cool and disperse vapors, protect personnel, and dilute spills to form nonflammable mixtures. Five percent sulfuric acid may be used to neutralize diluted pools. Wearing appropriate personal protective equipment, contain spill, collect onto noncombustible absorbent like sand or earth and place into suitable container. Vapors tend to remain close to the ground and collect in out-of-the-way places. Use non-sparking blowers or ventilation facilities to remove potential explosive or toxic accumulations.

Section 7. HANDLING AND STORAGE

HANDLING: Do not get in eyes, on skin or clothing.
Avoid breathing vapor or mist.
Keep away from heat and flame.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep container closed when not in use.
Remove all equipment which may be a source of ignition from vicinity while handling.
Empty containers may contain explosive vapors. Flush empty containers with water to remove residual flammable liquid and vapors.

STORAGE: Keep away from oxidizers, heat or flames. Store away from ignition sources. Ground all containers during transfer. Store in steel containers preferably located outdoors, above ground, and surrounded by dikes to contain spills or leaks. Electrical installations should be in accordance with Article 501 of the National Electrical Code for Class I Division 2 locations.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

ENGINEERING CONTROLS: Local exhaust ventilation may be required in addition to general room ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

UNSATISFACTORY MATERIALS OF CONSTRUCTION: DMA corrodes copper, aluminum, zinc, and galvanized surfaces.

Continued on Page 5

MATERIAL SAFETY DATA SHEET

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not available

SOLUBILITY IN WATER: Complete

VAPOR PRESSURE: 2 torr @ 10°C (for DMA)

SPECIFIC GRAVITY: Not available

VAPOR DENSITY (air = 1): 1.55 (for DMA)

pH: Basic

% VOLATILE BY WEIGHT: 100

FREEZING POINT: Not available

APPEARANCE AND ODOR: Clear, colorless liquid with ammoniacal/fishy odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep away from heat and flame.

INCOMPATIBILITY: Strong oxidizers, acids, copper, aluminum, zinc and galvanized surfaces.

DECOMPOSITION PRODUCTS: Upon decomposition, ammonia vapors are liberated. Upon combustion in the presence of sufficient oxygen, product generates harmful carbon monoxide, carbon dioxide, and nitrogen oxide gases. Nitrogen oxide can react with water vapor to yield nitric acid.
Combustion of product under oxygen-starved conditions can be expected to produce numerous toxic products including: nitriles, cyanic acid, isocyanates, cyanogens, nitrosamines, amides, carbamates.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
See the following information on active ingredient.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Dimethylamine (DMA)	698 mg/kg	Not available	4540 ppm/6H

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
Aquatic toxicity data on a 10% solution of DMA:
48 hr LC_{50} (Daphnia magna): 675 ppm
96 hr LC_{50} (fathead minnow): > 1000 ppm
96 hr LC_{50} (bluegill sunfish): > 1000 ppm

Continued on Page 6

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: The EPA Hazardous Waste Number is U092.

DISPOSAL: Dispose of in accordance with local, state and federal regulations. Incineration is acceptable and the preferred method of disposal. However, nitrogen oxide emission controls may be required to meet specifications. Chemical and/or biological degradation is feasible. A suitable industrial or municipal waste treatment system can be used depending on the quality and quantity of waste to be treated, the treatment plant capability, and discharge water quality standards. Incinerate in an open container. Do not dump into municipal sewers or enclosed drains that present a fire or explosion hazard.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 3
Proper Shipping Name: Flammable liquid, corrosive, n.o.s. (Dimethylamine)
Label: Flammable liquid, Corrosive
Packing Group: III
ID Number: UN 2924

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
Dimethylamine (DMA)	1000 lb

Product RQ: 50,000 lb (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
"No ingredients listed in this section"			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[yes]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
"No ingredients listed in this section"		

Continued on Page 7

MATERIAL SAFETY DATA SHEET

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 2 Reactivity = 0
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Not applicable

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

MATERIAL SAFETY DATA SHEET

HydroChem INDUSTRIAL SERVICES, INC.

DATE PREPARED: 12/22/2000
MSDS No: M003
Soda Ash, light

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Soda Ash, light
Product Code: M003
Product Name: Sodium Carbonate
Chemical Family: Alkaline
Molecular Formula: Na_2CO_3
Generic Name: Soda Ash

MANUFACTURER:
HydroChem Industrial Services, Inc.
900 Georgia Ave.
Deer Park, TX 77536
Customer Service: (800) 934-9376

24 HR. EMERGENCY TELEPHONE NUMBERS:
Emergency Contact: HydroChem ER
Emergency Phone (800) 569-4889

2. COMPOSITION/INFORMATION ON INGREDIENTS

	wt.%	CAS Registry #
Sodium carbonate	100	497-19-8

COMMENTS:
Exposure limits for this product are not established. A TLV of 10 mg/m3 is recommended for dust.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
PHYSICAL APPEARANCE:
White powder

IMMEDIATE CONCERNS:
No hazard in normal industrial use.
Dust may be irritating to eyes and respiratory tracts.

MEDICAL CONDITIONS AGGRAVATED:
Persons with pre-existing skin disorders, eye problems or impaired pulmonary function may be at increased risk from exposure.

ROUTES OF ENTRY:
Inhalation

TARGET ORGANS:
No Data

4. FIRST AID MEASURES

EYES:
Immediately flush eyes with water for 30 minutes while holding eyelids open. Seek medical attention.

SKIN:
Immediately wash with soap and water. Rinse thoroughly. Seek medical attention if effects occur. Launder contaminated shoes and clothing before reuse.

INGESTION:
If swallowed, give 2 glasses of milk (preferred) or water and consult physician.

INHALATION:
Remove to fresh air. See a doctor if effects occur.

5. FIRE FIGHTING MEASURES

Flashpoint and Method: Not Applicable
Flammable Limits: Not Applicable
Autoignition Temperature: Not Determined

EXTINGUISHING MEDIA:
Use alcohol foam, carbon dioxide, dry chemical or water spray when fighting fires involving this material.

HAZARDOUS COMBUSTION PRODUCTS:
Sodium oxide, oxides of carbon

FIRE FIGHTING EQUIPMENT:
As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective clothing to prevent contact with skin and eyes.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES:
Scoop into appropriate containers.
Flush residual with plenty of water.

7. HANDLING AND STORAGE

GENERAL PROCEDURES:
Refer to Section 8.

STORAGE:
No special precautions required.
Avoid wetting.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Ventilation - General and local ventilation are required.

PERSONAL PROTECTION
EYES AND FACE:
Chemical goggles required and an eye wash in work area.

RESPIRATORY:
None normally needed. For protection from dust, use NIOSH approved respirator with dust protection.

PROTECTIVE CLOTHING:
Clean body covering and chemical resistant gloves.

OTHER USE PRECAUTIONS:
Safety shower and eye wash in the work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Powder
Color: White
pH: 10.3
Percent Volatile: None
Vapor Pressure: Not Determined
Boiling Point: Decomposes
Solubility in Water: 17 at 68°F
Specific Gravity: 2.509 (water=1)

COMMENTS:
pH: for a 1% solution
Water Solubility: Solubility listed above is grams per 100 grams of water.

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

HAZARDOUS DECOMPOSITION:
Sodium oxide

INCOMPATIBLE MATERIALS:
Strong acids

11. TOXICOLOGICAL INFORMATION

ACUTE
Eyes: Irritant. May cause pain, redness, discomfort.
Skin: No effect expected. Prolonged or repeated contact may cause mild irritation.
Ingestion: No effect expected. Swallowing large amounts may cause illness.
Inhalation: No effect expected. Prolonged or repeated exposure may cause mild irritation. Dust is irritating.

GENERAL COMMENTS:
Carcinogens: Not listed by IARC, USA NTP, or USA OSHA.

COMMENTS:
Only selected Registry of Toxic Effects of Chemical Substances (RTECS) data is presented in this document. See the actual entry in RTECS for complete information.

RTECS Number: VZ4050000 – sodium carbonate

LD50 (rats) = 4090 mg/kg (sodium carbonate)

12. ECOLOGICAL INFORMATION

GENERAL COMMENTS:
Degradability: Not biodegradable.
Fish Toxicity: Low toxicity to fish.

COMMENTS:
LC50 (P. promelas) = 400 mg/L

13. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL:
Dispose of in accordance with ALL applicable federal, state and local regulations.

EMPTY CONTAINER:
Send empty bags to sanitary landfill. Render other types of containers unuseable by puncturing or crushing and sending to a sanitary landfill unless prohibited by local regulations.

RCRA/USEPA WASTE INFORMATION:
This material is not a RCRA regulated material.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)
Proper Shipping Name: Sodium Carbonate - Not Regulated
Reportable Quantity (RQ) Under CERCLA: None
Placards: None
Label: None

15. REGULATORY INFORMATION

UNITED STATES
SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

Fire: No Pressure Generating: No Reactivity: No Acute: Yes Chronic: No

Title III Notes: This product contains no substances which are defined as toxic chemicals under the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (40 CFR Part 372).

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)
Reportable Spill Quantity: Not established

TSCA (TOXIC SUBSTANCE CONTROL ACT)
TSCA Status: All components of this material are on the TSCA inventory.

STATE REGULATIONS
PROPOSITION 65 STATEMENT:
This product does not contain any substance(s) which are defined by the state of California to cause cancer, birth defects, or other reproductive effects.

16. OTHER INFORMATION

REASON FOR ISSUE:
Biannual review

Approved by: Charles M. Maddin, PhD, FAIC
Approval date: 10/19/2000

REVISION SUMMARY
Revision #: 3

This MSDS replaces the November 09, 1998 MSDS. Any changes in information are as follows:
In Section 1
Reason for Issue Date Prepared

In Section 3
Physical Appearance Medical Conditions Aggravated Routes of Entry Target Organs

In Section 9
(pH) (from) (Group Field) for Water Solubility Water Solubility (from) (%) Water Solubility Temperature °F Water Solubility Comments

In Section 15
SARA Title III Notes

NFPA CODES
Fire: 0 Health: 1 Reactivity: 0

HMIS CODES
Fire: 0 Health: 1 Reactivity: 0

MANUFACTURER DISCLAIMER:
[™] Indicates a trade or service mark of HydroChem Industrial Services, Inc.

The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem Industrial Services, Inc. regarding the accuracy or completeness of the information.

HydroChem Industrial Services, Inc. shall not be held liable for any damage resulting from the handling, or from contact with the above product.

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM BISULFITE
FORMULA: NAHSO3
FORMULA WT: 104.06
CAS NO.: 07631-90-5
NIOSH/RTECS NO.: VZ2000000
COMMON SYNONYMS: HYDROGEN SULFITE SODIUM; SODIUM ACID SULFITE; SODIUM HYDROGEN SULFITE
PRODUCT CODES: 3556,3557
EFFECTIVE: 08/18/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED OR INHALED
MAY CAUSE IRRITATION
MAY CAUSE ALLERGIC REACTION.

AVOID CONTACT WITH EYES, SKIN, CLOTHING.
AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM BISULFITE	90-100	7631-90-5

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A
MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 1.48 (H2O=1)

EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: WHITE POWDER WITH SO2 ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE WATER SPRAY.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED (POSITIVE PRESSURE IF AVAILABLE) BREATHING APPARATUS WITH FULL FACEPIECE. MOVE EXPOSED CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS
CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED
SULFUR DIOXIDE

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (PPM)

TOXICITY:		
LD50 (ORAL-RAT)(MG/KG)	-	2000
LD50 (IPR-RAT)(MG/KG)	-	650
LD50 (IV-RAT) (MG/KG)	-	115

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
CONTACT WITH SKIN OR EYES MAY CAUSE SEVERE IRRITATION OR BURNS. ALLERGIC REACTION MAY DEVELOP. EXPOSURES TO SMALL AMOUNTS OF SULFITES HAVE BEEN REPORTED TO CAUSE HYPERSENSITIVITY REACTIONS IN CERTAIN INDIVIDUALS, ESPECIALLY ASTHMATICS. A SEVERE ALLERGIC REATION MAY BE FATAL.

TARGET ORGANS
BRAIN, GI TRACT, RESPIRATORY SYSTEM, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
ASTHMA

ROUTES OF ENTRY
INHALATION, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. FLUSH SKIN WITH WATER.

---

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: STRONG ACIDS, STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: OXIDES OF SULFUR, OXIDES

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, A DUST/MIST RESPIRATOR IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

---

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	SODIUM HYDROGEN SULFITE, SOLID
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CHEMICALS, N.O.S. (NON-REGULATED)

MSDS

Stockcode (Product ID) :	LP93007020			Page number	1 of 4
MSDS Part	1 of 1	Kit? N	Hazardous?	Y	Product from MMIS? N
MSDS's Date:	6/30/94		Trade Secret?	N	Product CAS: 1310-73-2
Product Name:	SODIUM HYDROXIDE				

Special Handling Instructions:

DO NOT GET INTO EYES, ON SKIN, ON CLOTHING. AVOID BREATHING DUSTS, MISTS, OR SPRAY. DO NOT TAKE INTERNALLY. USE WITH ADEQUATE VENTILATION AND WEAR RESPIRATORY PROTECTION WHEN EXPOSURE TO DUST, MIST OR SPRAY IS POSSIBLE. WHEN HANDLING WEAR CHEMICAL SPLASH GOGGLES, FACE SHIELD, RUBBER GLOVES AND PROTECTIVE CLOTHING. WASH THOROUGHLY AFTER HANDLING OR CONTACT - EXPOSURE CAN CAUSE BURNS WHICH ARE NOT IMMEDIATELY PAINFUL OR VISIBLE. KEEP CONTAINER CLOSED. PRODUCT CAN REACT VIOLENTLY WITH WATER ACIDS, AND OTHER SUBSTANCES - READ SPECIAL MIXING AND HANDLING INSTRUCTIONS ON LABELS CAREFULLY BEFORE USING. PRODUCT IS CORROSIVE TO TIN, ALUMINUM, ZINC,AND ALLOYS CONTAINING THESE METALS, AND WILL REACT VIOLENTLY WITH THESE METALS IN POWDER FORM. HAZARDOUS CARBON MONOXIDE GAS CAN FORM UPON CONTACT WITH FOOD AND BEVERAGE PRODUCTS IN ENCLOSED SPACES AND CAN CAUSE DEATH. FOLLOW APPROPRIATE TANK ENTRY PROCEDURES(ANSI Z117.1).

General Short Name: CAUSTIC SODA LIQUID (ALL GRADES)

Synonym 1 :
2 :
3 :
4 :
5 :

HEADER INFORMATION

Manufacturer: FISHER SCIENTIFIC

Catalog # S318100 **FORMULA:** NaOH

PRODUCT ID TEXT

FISHER SCIENTIFIC, CHEMICAL DIVISION, 1 REAGENT LANE, FAIR LAWN, NJ 07410, PHONE: 201-796-7100 OR CHEMTREC-800-424-9300

SECTION II -- HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	PCT	FORMULA	PEL	TLV
SODIUM HYDROXIDE	1310-73-2	100	NaOH	2 MG/M3	2 MG/M2

HAZARDOUS INGREDIENTS TEXT

SECTION III - PHYSICAL DATA

Appearance: WHITE, DELQUESCENT PELLETS, FLAKES OR GRANULES

Odor: ODORLESS

Boiling Point: 1390 C **Specific Gravity (H2O=1) :** 1.54

Melting Point: 318.4 **Vapor Pressure (mm Hg) :** NA

Solubility in Water: SOLUBLE **Vapor Density (air=1) :** NA

Evaporation Rate (butyl acetate=1) : NA

PHYSICAL DATA TEXT

NA

SECTION IV -- FIRE/EXPLOSION HAZARD

Flash Point : NONCOMBUST.

Flash Point Method Used: NA

Lower Explosion Limit: N/A **Upper Explosion Limit:** N/A

Extinguishing Media:

NON-COMBUSTIBLE. FOAM, CARBON DIOXIDE OR DRY CHECMICAL MAY BE USED.

MSDS

Stockcode (Product ID) :	LP93007020				Page number	2	of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y	Product from MMIS?	N
MSDS's Date:	6/30/94			Trade Secret?	N	Product CAS:	1310-73-2
Product Name:	SODIUM HYDROXIDE						

Special Fire Fighting Procedures:

WEAR FULL PROTECTIVE CLOTHING. AVOID DIRECT CONTACT OF THIS PRODUCT WITH WATER AS THIS CAN CAUSE A VIOLENT EXOTHERMIC REACTION. .

Unusual Fire & Explosion Hazard:

CAN REACT WITH CERTAIN METALS (AL, SN, MG, CU, ETC.) DIRECT CONTACT WITH WATER CAN CAUSE A VIOLENT EXOTHERMIC REACTION. SEE REACTIVITY SECTION.

NFPA Labeling :

3	Health Hazard -- Blue	Label (0-4)
0	Flammability -- Red	Label (0-4)
2	Reactivity -- Yellow	Label (0-4)
	Special Note -- White	Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N) : IARC Monographs	N	OSHA Regulated	N	NTP	N
Route of Entry (Y or N) : Inhalation	Y	Ingestion	Y	Skin	Y

Signs & Symptoms of Exposure:

CORROSIVE TO ALL BODY TISSUES BY ALL ROUTES OF EXPOSURE. THE EFFECT OF LOCAL DERMAL EXPOSURE MAY CONSIST OF MULTIPLE AREAS OF SUPERFICIAL DESTRUCTION OF THE SKIN OR OF PRIMARY IRRITANT DERMITITIS. SIMILARLY, INHALATION OF DUST, SPRAY OR MIST MAY RESULT IN VARYING DEGREES OF IRRITATION OR DAMAGE TO THE RESPIRATORY TRACT TISSUES AND AN INCREASED SUSCEPTIBILITY TO RESPIRATORY ILLNESS.

Medical Conditions Aggravated by Exposure:

Emergency & First Aid Procedures:

GET MEDICAL ATTENTION FOR ALL CASES OF OVEREXPOSURE. SKIN: IMMEDIATELY FLUSH THOROUGHLY WITH LARGE AMOUNTS OF WATER. REMOVE CONTAMINATED CLOTHING AND FOOTWEAR. WASH CLOTHING BEFORE REUSE AND DICARD FOOTWEAR WHICH CAN NOT BE DECONTAMINATED.
EYES: IMMEDIATELY FLUSH THOROUGHLY WITH WATER FOR AT LEAST 15 MINUTES HOLDING LIDS APART TO ENSURE FLUSHING OF ENTIRE SURFACE.
INHALATION: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF BREATHING HAS STOPPED.
INGESTION: DO NOT INDUSE VOMITTING. GIVE LARGE QUANTITES OF WATER AND IF AVAILABLE GIVE SEVERAL GLASSES OF MILK. IF VOMITTING OCCURS SPONTANEOUSLY, KEEP AIRWAY CLEAR. GET MEDICAL ATTENTION IMMEDIATELY.

HEALTH HAZARDS TEXT

SECTION VI -- REACTIVITY DATA

Stable (Y or N) : Y Hazardous Polymerization (Y or N): N

Stability Conditions to Avoid:

CONTACT WITH MOISTURE MAY GENERATE SUFFICIENT HEAT TO IGNITE SURROUNDING COMBUSTIBLE MATERIAL.

Hazardous Polymerization Conditions to Avoid:

NOT REPORTED UNDER NORMAL TEMPERATURES AND PRESSURES

Incompatibility (Materials to Avoid):

AVOID CONTACT WITH WATER.

Hazardous Decomposition or By Products:

TOXIC FUMES OF SODIUM OXIDE

REACTIVITY DATA TEXT

MSDS

Stockcode (Product ID) :	LP93007020				Page number	3	of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y	Product from MMIS?	N
MSDS's Date:	6/30/94			Trade Secret?	N	Product CAS:	1310-73-2
Product Name:	SODIUM HYDROXIDE						

SEE SPECIAL HANDING INSTRUCTIONS. AVOID CONTACT WITH WATER. THIS PRODUCT MAY BE ADDED SLOWLY TO WATER OR ACIDS WITH DILUTION AND AGITATION TO AVOID A VIOLENT EXOTHERMIC REACTION. WHEN HANDLING THIS PRODUCT AVOID CONTACT WITH ALUMINUM, TIN,ZINC, AND ALLOYS CONTAINING THESE METALS. DO NOT MIX WITH STRONG ACIDS WITHOUT DILUTION AND AGITATION TO PREVENT VIOLENT EXPLOSIVE REACTION. AVOID CONTACT WITH LEATHER, WOOL, ACIDS, ORGANIC HALOGEN COMPOUNDS AND ORGANIC NITRO COMPOUNDS.

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

LEAKS SHOULD BE STOPPED. SPILLS SHOULD BE CONTAINED AND CLEANED UP IMMEDIATELY. SPILLS SHOULD BE REMOVED BY USING A VACUUM TRUCK. NEUTRALIZE REMAINING TRACES OF MATERIAL WITH ANY DILUTE INORGANIC ACID SUCH AS HYDROCHLOIC, SULFURIC, NITRIC, PHOSPHORIC, AND ACETIC ACID. THE SPILL AREA SHOULD THEN BE FLUSHED WITH WATER FOLLOWED BY LIBERALCOVERING OF SODIUM BICARBONATE. ALL CLEAN-UP MATERIAL SHOULD BE REMOVED AND PLACED IN APPROVED CONTAINERS, LABELED AND STROED IN A SAFE PLACE TO AWAIT PROPER TREATMENT OR DISPOSAL. SPILLS ON AREAS OTHER THAN PAVEMENT,(EG, DIRT OR SAND) MAY BE HANDLED BY REMOVING THE AFFECTED SOILS AND PLACING IN APPROVED CONTAINERS. PERSONS PERFORMING CLEAN-UP WORK SHOULD WEAR ADEQUATE PERSONAL PROTECTIVE EPUIPMENT AND CLOTHING. SPILLS OR RELEASES SHOULD BE REPORTED, IF REQUIRED, TO THE APPROPRIATE LOCAL, STATE AND FEDERAL REGULATORY AGENCIES.

Waste Disposal Method:

TO BE PERFORMED IN COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

SAFE HANDLING PROCEDURES TEXT

SECTION VIII -- SPECIAL PROTECTION

Protective Gloves: CHEMICAL RESISTANT GLOVES SUCH AS NATURAL OR BUTYL RUBBER

Eye Protection: SHEMICAL SAFETY GOGGLES PLUS FULL FACE SHIELD

Respiratory Protection (specific type):

NIOSH-APPROVED RESPIRATOR WHERE DUST, MIST OR SPRAY MAY BE GENERATED

Ventilation Instructions:

SPECIAL VENTILATION IS NOT REQUIRED UNDER NORMAL USE. USE EXHAUST VENTILATION WHERE DUST, MIST OR SPRAY MAY BE GENERATED. NOTE: WHERE CARBON MONOXIDE OR OTHER REACTION PRODUCTS MAY BE GENERATED, SPECIAL VENTILATION MAY BE REQUIRED.

Other Protective Clothing or Equipment:

IMPERVIOUS CLOTHING AND CHEMICALLY RESISTANT SAFETY SHOES SHOULD BE WORN TO MINIMIZE CONTACT.WASH CONTAMINATED CLOTHING WITH SOAP AND WATER AND DRY BEFORE REUSE. EMERGENCY SHOWER AND EYEWASH FACILITY SHOULD BE IN CLOSE PROXIMITY.

Work/Hygenic Practices:

WASH THOROUGHLY AFTER HANDLING. DO NOT TAKE INTERNALLY.

SPECIAL PROTECTION TEXT

SECTION IX -- SPECIAL PRECAUTIONS

Handling/Storage Precautions:

KEEP CONTAINER TIGHTLY CLOSED. DO NOT BREATHE DUST OR VAPOR. STORE IN A DRY, WELL-VENTILATED AREA AWAY FROM ACIDS, METALS, EXPLOSIVES, ORGANIC PEROXIDES AND EASILY IGNITABLE MATERIALS. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING.

SPECIAL PRECAUTIONS TEXT

DO NOT TAKE INTERNALLY. WASH THOROUGHLY AFTER HANDLING. WHILE MAKING SOLUTION ADD SLOWLY TO SURFACE OF SOLUTION TO AVOID VIOLENT SPLATTERING. RETAINED RESIDUE MAY MAKE EMPTY CONTAINERS HAZARDOUS. USE CAUTION.

TRAILER TEXT

MSDS

Stockcode (Product ID) :	LP93007020				Page number	4	of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y	Product from MMIS?	N
MSDS's Date:	6/30/94			Trade Secret?	N	Product CAS:	1310-73-2
Product Name:	SODIUM HYDROXIDE						

1st SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

MSDS

Stockcode (Product ID): LP150-A69278 Page number 1 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 12/5/94 Trade Secret? N Product CAS:

Product Name: SOLUTION: SODIUM HYPOCHLORITE, 15% CONCENTRATION, 15 GALL

Special Handling Instructions:

DANGER!! CORROSIVE!! THIS PRODUCT MAY CAUSE SEVERE SKIN IRRITATION OR CHEMICAL BURNS TO BROKEN SKIN. CAUSES EYE DAMAGE. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. WEAR GOGGLES AND FACE SHIELD AND CHEMICAL RESISTANT GLOVES WHEN HANDLING PRODUCT. WASH AFTER HANDLING. AVOID BREATHING VAPORS. VACATE POORLY VENTILATED AREAS AS SOON AS POSSIBLE. DO NOT RETURN UNTIL ODORS HAVE DISSIPATED.

General Short Name: SODIUM

Synonym 1: SUNNY SOL "150"

2:

3:

4:

5:

HEADER INFORMATION

NA

Manufacturer: JONES CHEMICALS, INC.

Catalog # NA FORMULA: NAOCL

PRODUCT ID TEXT

JONES CHEMICALS, INC. 80 MUNSON STREET LEROY, NEW YORK 14423 PHONE: (504) 536-1171 (716) 538-2311 (CALDONIA, NEW YORK). CHEMTREC: (800) 424-9300

SECTION II – HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO.	PCT	FORMULA	PEL	TLV
SODIUM HYPOCHLORITE	7681-52-9	15	NACLO.XH2		
SODIUM HYDROXIDE	1310-73-2	2	NAOH	2 MG/M3	2 MG/M3

HAZARDOUS INGREDIENTS TEXT

NA

SECTION III - PHYSICAL DATA

Appearance: YELLOW-GREEN LIQUID

Odor: CHLORINE

Boiling Point: 219 F Specific Gravity (H2O=1): 1.224

Melting Point: NA Vapor Pressure (mm Hg): NA

Solubility in Water: COMPLETE Vapor Density (air=1): N/A

Evaporation Rate (butyl acetate=1): NA

PHYSICAL DATA TEXT

pH 12.5 - 13.5 Ss.u. @ 25 C

SECTION IV – FIRE/EXPLOSION HAZARD

Flash Point: N/A

Flash Point Method Used: N/A

Lower Explosion Limit: N/A Upper Explosion Limit: N/A

Extinguishing Media:

FLOOD WITH WATER OR CARBON DIOXIDE

Special Fire Fighting Procedures:

USE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY & HEALTH (NIOSH) CERTIFIED GAS MASK WITH CANISTER FOR CHLORINE OR USE SELF-CONTAINED BREATHING APPARATUS.

Unusual Fire & Explosion Hazard:

MSDS

Stockcode (Product ID): LP150-A69278 Page number 2 of 4

MSDS Part 1 of 1 Kit? N Hazardous? Y Product from MMIS? Y

MSDS's Date: 12/5/94 Trade Secret? N Product CAS:

Product Name: SOLUTION: SODIUM HYPOCHLORITE, 15% CONCENTRATION, 15 GALL

MATERIAL IS A STRONG OXIDIZER. CONTACT WITH COMBUSTIBLES MAY INITIATE OR PROM- OTE COMBUSTION. ACID AND HEAT ACCELERATE DECOMPOSITION.

NFPA Labeling:

3	Health Hazard	-- Blue	Label (0-4)
0	Flammability	-- Red	Label (0-4)
0	Reactivity	-- Yellow	Label (0-4)
	Special Note	-- White	Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

DECOMPOSITON PRODUCTS MAY INCLUDE CHLORINE.

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N): IARC Monographs N OSHA Regulated N NTP N

Route of Entry (Y or N): Inhalation Y Ingestion Y Skin Y

Signs & Symptoms of Exposure:

INHALATION: FUMES FROM SPILLS ARE VERY IRRITATING TO MUCOUS MEMBRANES. VERY LITTLE HAZARD FROM PROPERLY STORED SOLUTION. SKIN CONTACT: CORROSIVE, SEVERE IRRITANT, REDDENING OF SKIN, CHEMICAL BURNS TO SKIN. SKIN ABSORPTION: SAME AS SKIN CONTACT. EYE CONTACT: SEVERE IRRITANT; CORROSIVE. INGESTION: CAUSES IRRITATION OF MEMBRANES OF THE MOUTH, THROAT, AND STOMACH PAIN AND POSSIBLE ULCERATION. SWALLOWING: CAUSES IRRITATION OF MEMBRANES OF THE MOUTH, THROAT, AND STOMACH PAIN AND POSSIBLE ULCERATION. LD50(ORAL RAT) FOR 12.5% NaOCL IS APPROXIMATELY 5 g/kg BODY WEIGHT. INHALATION: FUMES FROM SPILLS ARE VERY IRRITATING TO MUCOUS MEMBRANES. EYE CONTACT: EXTREME IRRITANT, CORROSIVE.CHRONIC: EYE: CAN CAUSE DAMAGE. SKIN: CAN CAUSE DAMAGE, CHEMCIAL BURN.

Medical Conditions Aggravated by Exposure:

NO AGGRAVATION OF A MEDICAL CONDITION HAS BEEN FOUND TO BE CAUSED BY SODIUM HYPOCHLORITE.

Emergency & First Aid Procedures:

EYES: IMMEDATELY FLUSH WITH WATER FOR AT LEAST FIFTEEN (15) MINUTES. GET MEDICAL ATTENTION. SKIN: REMOVE SOAKED CLOTHES. WASH WITH PLENTY OF SOAP AND WATER AT LEAST FIFTEEN (15) MINUTES. INHALATION: REMOVE TO FRESH AIR. CALL A PHYSICIAN, IF EXPOSURE IS SEVERE. INGESTION: IF CONSCIOUS, DRINK LARGE QUANTITIES WATER. DO NOT INDUCE VOMITING. CALL A PHYSICIAN OR POSION CONTROL CENTER IMMEDIATELY.

HEALTH HAZARDS TEXT

NA

SECTION VI -- REACTIVITY DATA

Stable (Y or N): Y Hazardous Polymerization (Y or N): N

Stability Conditions to Avoid:

LIGHT, HEAT, FIRE, PH, METALLIC IMPRITIES. NATURALLY DECOMPOSES WITH AGE. MATERIAL IS GENERALLY STABLE. SOLUTIONS ARE FAIRLY STABLE IN CONCENTRATIONS BELOW 10%. STABILITY DECREASES WITH CONCENTRATION, HEAT, LIGHT, EXPOSURE, OXIDIZABLE MATERIALS, REDUCING AGENTS. CORROSIVE TO MOST METALS.

Hazardous Polymerization Conditions to Avoid:

WILL NOT OCCUR.

Incompatibility (Materials to Avoid):

ACIDS, ALCOHOLS, AMINES, AMMONIA, CHLORINATED ISOCYANURATES, COMBUSTIBLES, CYNAIDES, DETERGENTS, ETHERS, HYDROCARBONS, OXIDIZABLE MATERIALS, REDUCING AGENTS. CORROSIVETO MOST METALS.

Hazardous Decomposition or By Products:

HYPOCHLOROUS ACID(HOCl), CHLORINE, HYDROCHLORIC ACID DEPENDING ON TEMPERATURE AND pH. OTHER DECOMPOSITION PRODUCTS ARE SODIUM CHLORIDE, SODIUM CHLORATE AND OXYGEN.

REACTIVITY DATA TEXT

MSDS

Stockcode (Product ID) :	LP150-A69278			Page number	3 of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y
Product from MMIS?	Y				
MSDS's Date:	12/5/94			Trade Secret?	N
Product CAS:					
Product Name:	SOLUTION: SODIUM HYPOCHLORITE, 15% CONCENTRATION, 15 GALL				

NA

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

CLEANUP PERSONNEL MUST EWAR PROPER PROTECTIVE EQUIPMENT. CONTAIN IN DIKED AREA. NEUTRALIZE WITH SODIUM BISULFITE OR FERROUS SALT SOLUTIONS. PLACE NEUTRALIZED MATERIAL IN DOT SPECIFICATION APPROVED CONTAINER(S). FLUSH AREA WITH LOTS OF WATER.

Waste Disposal Method:

NEUTRALIZE AS ABOVE. CONTACT FEDERAL, STATE, COUNTY, AND LOCAL ENVIRONMENTAL REGULATIONS FOR GUIDANCE REGARDING PROPER DISPOSAL.

SAFE HANDLING PROCEDURES TEXT

NA

SECTION VIII -- SPECIAL PROTECTION

Protective Gloves: USE RUBBER GLOVES.

Eye Protection: USE CHEMCIAL GOGGLES OF FACE SHIELD.

Respiratory Protection (specific type):

USE NIOSH CERFIFIED GAS MASK WITH CANISTER FOR CHLORINE.

Ventilation Instructions:

LOCAL EXHAUST IS RECOMMENDED.

Other Protective Clothing or Equipment:

USE RUBBER SPLASH APRON. SAFETY SHOWER AND EYE WASH FOUNTAIN SHOULD BE LOCATED NEARBY.

Work/Hygenic Practices:

DANGER!! CORROSIVE!! THIS PRODUCT MAY CAUSE SEVERE SKIN IRRITATION OR CHEMICAL BURNS TO BROKEN SKIN. CAUSES EYE DAMAGE. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. WEAR GOGGLES AND FACE SHIELD AND CHEMICAL RESISTANT GLOVES WHEN HANDLING PRODUCT. WASH AFTER HANDLING. AVOID BREATHING VAPORS. VACATE POORLY VENTILATED AREAS AS SOON AS POSSIBLE. DO NOT RETURN UNTIL ODORS HAVE DISSIPATED.

SPECIAL PROTECTION TEXT

NA

SECTION IX -- SPECIAL PRECAUTIONS

Handling/Storage Precautions:

THIS PRODUCT IS CORROSIVE AND MAY CAUSE SEVERE SKIN IRRITATION OR CHEMICAL BURNS TO BROKEN SKIN. CAUSES EYE DAMAGE. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. WEAR GOGGLES OR FACE SHIELD AND RUBBER GLOVES WHEN HANDLING PRODUCT

SPECIAL PRECAUTIONS TEXT

WASH AFTER HANDLING. AVOID BREATHING VAPORS. VACATE POORLY VENTILATED AREAS AS SOON AS POSSIBLE. DO NOT RETURN UNTIL ODORS HAVE DISSIPATED. STORE IN A COOL, DRY AREA AWAY FROM DIRECT SUNLIGHT. IN CASE OF SPILL, FLOOD AREA WITH LARGE QUANTITIES OF WATER. RINSE EMPTY CONTAINER THOROUGHLY WITH WATER AND EITHER RETURN TO MANUFACTURER OR DISCARD BY PLACING IN TRASH COLLECTION OR BURYING IN AN APPROVED LANDFILL. PRODUCT OR RINSEATE THAT CANNOT BE USED, SHOULD BE DILUTED WITH WATER AND DISPOSED OF IN A SANITARY SEWER. DO NOT CONTAMINATE FOOD, OR FEED BY STORAGE, DISPOSAL OR CLEANING OF EQUIPMENT. STRONG OXIDIZING AGENT. MIX ONLY WITH WATER ACCORDING TO LABEL DIRECTIONS. MIXING THIS PRODUCT WITH GROSS FILTH SUCH AS FECES, URINE, ETC., OR WITH AMMONIA, ACIDS, DETERGENTS OR OTHER CHEMICALS MAY RELEASE HAZARDOUS GASES IRRITATING TO EYES, LUNGS AND MUCOUS MEMBRANES.

TRAILER TEXT

1st SECTION EXTRA TEXT

MSDS

Stockcode (Product ID) :	LP150-A69278				Page number	4	of 4
MSDS Part	1 of 1	Kit?	N	Hazardous?	Y	Product from MMIS?	Y
MSDS's Date:	12/5/94			Trade Secret?	N	Product CAS:	
Product Name:	SOLUTION: SODIUM HYPOCHLORITE, 15% CONCENTRATION, 15 GALL						

Which Section Needs This Additional Text? : (1-9)

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM MOLYBDATE, DIHYDRATE
FORMULA: NA2MOO4 2H2O
FORMULA WT: 241.95
CAS NO.: 7631-95-0
NIOSH/RTECS NO.: QA5075000
COMMON SYNONYMS: MOLYBDIC ACID, DISODIUM SALT; DISODIUM MOLYBDATE
PRODUCT CODES: 3764
EFFECTIVE: 03/24/86
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION

DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM MOLYBDATE, DIHYDRATE	90-100	7631-95-0

3 - PHYSICAL DATA

BOILING POINT: N/A
MELTING POINT: 687 C (1269 F)
SPECIFIC GRAVITY: 3.28 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: ODORLESS, WHITE OR COLORLESS CRYSTALS.

---

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 5 MG/M3 (PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (PPM)

TOXICITY: LD50 (IPR-MOUSE)(MG/KG) - 344
LD50 (SCU-MOUSE)(MG/KG) - 570

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY BE IRRITATING TO EYES, NOSE, THROAT, OR LUNGS.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

Material Safety Data Sheet
Sodium Nitrite

ACC# 21410

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium Nitrite
Catalog Numbers: S80187, NC9757363, S338-3, S347-10, S347-250, S347-3, S347-500, WESS347500
Synonyms: Nitrous acid, sodium salt.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7632-00-0	Sodium nitrite	>97	231-555-9

Hazard Symbols: T O N
Risk Phrases: 25 8 50

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white to light yellow crystals. May cause methemoglobinemia. **Danger!** May be fatal if inhaled. Strong oxidizer. Contact with other material may cause a fire. Hygroscopic. Harmful if swallowed. Causes eye and skin irritation. This substance has caused adverse reproductive and fetal effects in animals. Air sensitive. Causes respiratory tract irritation.
Target Organs: Blood, cardiovascular system, smooth muscle.

Potential Health Effects
Eye: Causes eye irritation. May cause conjunctivitis. May cause permanent corneal opacification.
Skin: Causes skin irritation. May be absorbed through the skin.
Ingestion: Harmful if swallowed. May cause methemoglobinemia, cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood), convulsions, and death. Causes digestive tract irritation. Ingestion may cause weakness, muscular incoordination, fine tremors, loss of reflexes, convulsions and possible death from circulatory collapse. Ingestion may cause a decrease in blood pressure, rapid pulse and visual disturbances.
Inhalation: May be fatal if inhaled. May cause methemoglobinemia, cyanosis, convulsions, tachycardia, dyspnea (labored breathing), and death. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema.

Chronic: May cause reproductive and fetal effects. Laboratory experiments have resulted in mutagenic effects. Animal studies have reported the development of tumors. Sodium nitrate may react with secondary or tertiary amines to form nitrosamines (certain nitrosamines are cancer suspect agents).

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion: Call a poison control center. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

Inhalation: Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask. SPEED IS ESSENTIAL, OBTAIN MEDICAL AID IMMEDIATELY.
Notes to Physician: Absorption of this product into the body may cause cyanosis (bluish discoloration of skin due to deficient oxygenation of the blood). Moderate degrees of cyanosis need to be treated only by supportive measures: bed rest and oxygen inhalation. If cyanosis is severe, intravenous injection of Methylene blue, 1mg/kg of body weight may be of value.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with combustible materials may cause a fire. Use water with caution and in flooding amounts. May explode from heat or contamination. May accelerate burning if involved in a fire.
Extinguishing Media: Use water only! Contact professional fire-fighters immediately. Cool containers with flooding quantities of water until well after fire is out. For large fires, flood fire area with water from a distance. Do NOT use dry chemicals, CO_2, Halon or foams.
Flash Point: Not applicable.
Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 1; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Do not ingest or inhale. Handle under an inert atmosphere. Store protected from air. Use only in a chemical fume hood.
Storage: Do not store near combustible materials. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Do not expose to air. Store protected from moisture. Store under an inert atmosphere.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium nitrite	none listed	none listed	none listed

OSHA Vacated PELs: Sodium nitrite: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Crystals
Appearance: white to light yellow
Odor: odorless
pH: ~ 9
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 320 deg C
Freezing/Melting Point:271 deg C
Decomposition Temperature:320 deg C
Solubility: Soluble.
Specific Gravity/Density:2.168
Molecular Formula: NaNO2
Molecular Weight:69.00

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Unstable if heated, may explode at temperatures greater than 533°C.
Conditions to Avoid: Unstable if heated, may explode at temperatures greater than 533°C., incompatible materials, ignition sources, dust generation, exposure to air, combustible materials, reducing agents, exposure to moist air or water, temperatures above 320°C.
Incompatibilities with Other Materials: Reducing agents, acids, amines, chlorates, permanganates, cyanides (e.g. potassium cyanide, sodium cyanide), metals as powders (e.g. hafnium, raney nickel), hypophosphites, sulfites, tannic acid, organic matter, antipyrine, ammonium salts, acetanilide, iodides, mercury salts, moisture, air, activated carbon, vegetable astringents.
Hazardous Decomposition Products: Oxides of nitrogen, irritating and toxic fumes and gases.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 7632-00-0: RA1225000
LD50/LC50:
CAS# 7632-00-0:
Draize test, rabbit, eye: 500 mg/24H Mild;
Inhalation, rat: LC50 = 5500 ug/m3/4H;
Oral, mouse: LD50 = 175 mg/kg;
Oral, rabbit: LD50 = 186 mg/kg;
Oral, rat: LD50 = 180 mg/kg;
Carcinogenicity:
CAS# 7632-00-0: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: Oral, rat: TDLo = 2190 gm/kg/2Y-C (Tumorigenic - Carcinogeni c by RTECS criteria - Gastrointestinal - tumors).; Ora l, rat: TD = 91 gm/kg/2Y-C (Tumorigenic - equivocal tumo rigenic agent by RTECS criteria - Skin and Appendage s - tumors and Reproductive - Tumorigenic effects - testicular tumors).; Oral, rat: TD = 40 gm/kg/56W- C - (Tumorigenic - neoplastic by RTECS criteria - Liver - tumors).
Teratogenicity: Oral, rat: TDLo = 660 mg/kg (female 1-22 day(s) after conception) Effects on Embryo or Fetus - fetal death and Effects on Newborn - growth statistics (e.g.%, reduced weight gain).; Oral, rat: TDLo = 10280 mg/kg (female 1-22 day(s) after conception and lactating female 20 day(s) post-birth) Effects on Newborn - weaning or lactation index (e.g., # alive at weaning per # alive at day 4).; Oral,mouse: TDLo = 280 mg/kg (female 1-14 day(s) after conception) Specific Developmental Abnormalities - blood and lymphatic systems (including spleen and marrow).
Reproductive Effects: Oral, mouse: TDLo = 1200 mg/kg (female 6-15 day(s) after conception) Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea).; Oral, mouse: TDLo = 1680 mg/kg (male 14 day(s) pre-mating) Fertility - male fertility index (e.g. # males impregnating females per # males exposed to fertile nonpregnant females).; Oral, mouse: TDLo = 840 mg/kg (male 14 day(s) pre-mating) Paternal Effects - spermatogenesis (incl. genetic material, sperm morphology, motility, and count).
Neurotoxicity: No information available.
Mutagenicity: Unscheduled DNA Synthesis: Human, HeLa cell = 6 mmol/L.; DNA Inhibition: Human, Fibroblast = 2000 ppm.; DNA Inhibition: Human Cells - not otherwise specified = 725 umol/L.
Other Studies: Standard Draize Test: Administration into the eye (rabbit) = 500 mg/24H (Mild).

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 0.19-0.39 mg/L; 96 Hr; Flow-through bioassay Mosquito Fish: TLm =8.1 ppm; 24 Hr; Highly turbid water Creek chub: Critical range = 400-2000 ppm; 24 Hr; Detroit River No data available.
Environmental: In water sodium nitrite dissociates completely and under aerobic conditions the nitrite ions are oxidized to nitrates.
Physical: No information available.
Other: Harmful to aquatic life in very low concentrations.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	SODIUM NITRITE				SODIUM NITRITE
Hazard Class:	5.1				5.1(6.1)
UN Number:	UN1500				UN1500
Packing Group:	III				III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7632-00-0 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
CAS# 7632-00-0: 5a2/12b
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

CERCLA Hazardous Substances and corresponding RQs
CAS# 7632-00-0: 100 lb final RQ; 45.4 kg final RQ

SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7632-00-0: acute, chronic, flammable.
Section 313
This material contains Sodium nitrite (CAS# 7632-00-0, 97%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7632-00-0 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7632-00-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
T O N
Risk Phrases:
R 25 Toxic if swallowed.
R 8 Contact with combustible material may cause fire.
R 50 Very toxic to aquatic organisms.

Safety Phrases:
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S 61 Avoid release to the environment. Refer to special instructions/Safety data sheets.

WGK (Water Danger/Protection)
CAS# 7632-00-0: 2
Canada - DSL/NDSL
CAS# 7632-00-0 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of C, D1B, D2B.
Canadian Ingredient Disclosure List
CAS# 7632-00-0 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 7632-00-0: OEL-CZECHOSLOVAKIA:TWA 1 mg/m3;STEL 5 mg/m3 OEL-HUNGARY:STEL 1 mg/m3;Skin

Section 16 - Additional Information

MSDS Creation Date: 7/02/1999
Revision #5 Date: 12/03/2002

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: SODIUM PHOSPHATE, MONOBASIC, MONOHYDRATE
FORMULA: NAH2PO4 H2O
FORMULA WT: 137.99
CAS NO.: 10049-21-5
COMMON SYNONYMS: SODIUM DIHYDROGEN PHOSPHATE, MONOHYDRATE; SODIUM BIPHOSPHATE
PRODUCT CODES: 3818,3820
EFFECTIVE: 10/11/85
REVISION #01

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

STORAGE: KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
SODIUM PHOSPHATE, MONOBASIC, MONOHYDRATE	90-100	10049-21-5
FOR INFORMATION ONLY; ANHYDROUS FORM		7558-80-7

3 - PHYSICAL DATA

BOILING POINT: N/A
VAPOR PRESSURE(MM HG): N/A

MELTING POINT: N/A
VAPOR DENSITY(AIR=1): N/A

SPECIFIC GRAVITY: 2.04 (H2O=1)
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): APPRECIABLE (MORE THAN 10 %) % VOLATILES BY VOLUME: N/A

APPEARANCE & ODOR: WHITE ODORLESS CRYSTALS.

4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE 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.

TOXIC GASES PRODUCED
PHOSPHORUS OXIDE

5 - HEALTH HAZARD DATA

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY IRRITATE NOSE AND THROAT.
INGESTION MAY RESULT IN SEVERE INTESTINAL IRRITATION WITH BURNS TO MOUTH.
INGESTION MAY CAUSE NAUSEA AND VOMITING.
CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

INCOMPATIBLES: IRON AND OTHER HEAVY METALS

DECOMPOSITION PRODUCTS: OXIDES OF PHOSPHORUS, OXIDES

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

8 - PROTECTIVE EQUIPMENT

VENTILATION:	USE ADEQUATE GENERAL OR LOCAL EXHAUST VENTILATION TO KEEP FUME OR DUST LEVELS AS LOW AS POSSIBLE.
RESPIRATORY PROTECTION:	NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, USE AN APPROPRIATE RESPIRATOR OR DUST MASK.
EYE/SKIN PROTECTION:	SAFETY GLASSES WITH SIDESHIELDS, UNIFORM, PROPER GLOVES ARE RECOMMENDED.

9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME CHEMICALS, N.O.S. (NON-REGULATED)

Material Safety Data Sheet
Sodium Tetraborate Decahydrate

ACC# 21010

Section 1 - Chemical Product and Company Identification

MSDS Name: Sodium Tetraborate Decahydrate
Catalog Numbers: S80172, B80, BP175 500, BP175-500, BP175500, S246-12, S246-212, S246-250LB, S246-500, S248-10, S248-3, S248-500, S249-500
Synonyms: Buffer Salt pH 9.18; Borax, Sodium Borate Decahydrate
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
1303-96-4	Sodium Tetraborate Decahydrate	100	unlisted

Hazard Symbols: None listed.
Risk Phrases: None listed.

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white. May cause irritation. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause adverse reproductive effects based upon animal studies.
Caution!
Target Organs: None.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: May cause irritation of the digestive tract. Human fatalities have been reported from acute poisoning.
Inhalation: May cause respiratory tract irritation.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Ingestion: Get medical aid. Do NOT induce vomiting. If conscious and alert, rinse mouth and drink 2-4 cupfuls of milk or water. Wash mouth out with water.
Inhalation: Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Runoff from fire control or dilution water may cause pollution.
Extinguishing Media: Use agent most appropriate to extinguish fire. Use water spray, dry chemical, carbon dioxide, or appropriate foam.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not breathe dust, vapor, mist, or gas. Keep container tightly closed. Avoid ingestion and inhalation.
Storage: Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs

Sodium Tetraborate Decahydrate	1 mg/m3 TWA (anhydrous); 5 mg/m3 TWA (decahydrate); 1 mg/m3 TWA (pentahydrate)	5 mg/m3 TWA	none listed

OSHA Vacated PELs: Sodium Tetraborate Decahydrate: 10 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: A respiratory protection program that meets OSHA's 29 CFR §1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Section 9 - Physical and Chemical Properties

Physical State: Solid
Appearance: white
Odor: Not available.
pH: Not available.
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 1575 deg C @ 760.00mm Hg
Freezing/Melting Point:320 deg C
Autoignition Temperature: Not available.
Flash Point: Not available.
Decomposition Temperature: Not available.
NFPA Rating: (estimated) Health: 2; Flammability: 0; Reactivity: 0
Explosion Limits, Lower: Not available.
Upper: Not available.
Solubility: soluble
Specific Gravity/Density:1.7300g/cm3
Molecular Formula:B4Na2O7.10H2O
Molecular Weight:381.36

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Incompatible materials, dust generation, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids.
Hazardous Decomposition Products: Irritating and toxic fumes and gases, oxides of boron.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 1303-96-4: VZ2275000
LD50/LC50:
CAS# 1303-96-4:
Oral, mouse: LD50 = 2 gm/kg;
Oral, rat: LD50 = 2660 mg/kg;
Carcinogenicity:
CAS# 1303-96-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: No information available.
Other Studies: See actual entry in RTECS for complete information.

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	No information available.				No information available.
Hazard Class:					
UN Number:					
Packing Group:					

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 1303-96-4 is listed on the TSCA inventory.
Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 1303-96-4: chronic.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 1303-96-4 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
Not available.
Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)
CAS# 1303-96-4: 1
Canada
CAS# 1303-96-4 is listed on Canada's DSL List. CAS# 1303-96-4 is listed on Canada's DSL List.
This product has a WHMIS classification of D2A, D2B.
CAS# 1303-96-4 is listed on Canada's Ingredient Disclosure List.
Exposure Limits
CAS# 1303-96-4: OEL-AUSTRALIA:TWA 5 mg/m3 OEL-BELGIUM:TWA 5 mg/m3 OEL-DENMARK:TWA 5 mg/m3 OEL-FRANCE:TWA 5 mg/m3 OEL-THE NETHERLANDS:TWA 5 mg/m3 OEL-SWEDEN:TWA 2 mg/m3;STEL 5 mg/m3;Skin OEL-SWITZERLAND: TWA 5 mg/m3 OEL-UNITED KINGDOM:TWA 5 mg/m3 OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 7/06/1999
Revision #4 Date: 7/20/2001

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

**** MATERIAL SAFETY DATA SHEET ****

Sodium Tripolyphosphate
21730

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Sodium Tripolyphosphate
Catalog Numbers:
Synonyms: Sodium triphosphate, sodium tripolyphosphate
Company Identification: Fisher Scientific
1 Reagent Lane
Fairlawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
7758-29-4	PENTASODIUM TRIPHOSPHATE	100	231-838-7

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: White, slightly hygroscopic granules or powder.
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation.
Target Organs: None.

Potential Health Effects
Eye: May cause eye irritation.
Skin: May cause skin irritation.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation.
Inhalation: May cause respiratory tract irritation.
Chronic: Not available.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid.
Skin: Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Get medical aid.
Inhalation: Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.
Notes to Physician: Treat symptomatically and supportively. None reported.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.
Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam.
Autoignition Temperature: Not applicable.
Flash Point: Not applicable.
NFPA Rating: Not published.
Explosion Limits, Lower: Not available.
Upper: Not available.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Avoid generating dusty conditions.

**** SECTION 7 - HANDLING and STORAGE ****

Handling: Wash thoroughly after handling. Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with skin and eyes. Avoid ingestion and inhalation.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls: Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
PENTASODIUM TRIPHOSPHATE	none listed	none listed	none listed

OSHA Vacated PELs:
PENTASODIUM TRIPHOSPHATE:
No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.
Skin: Wear appropriate gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to minimize contact with skin.
Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134. Always use a NIOSH-approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Solid
Appearance: White, slightly hygroscopic granules or powder.
Odor: Odorless.
pH: 9.7-9.8 @ 1% soln.
Vapor Pressure: Not applicable.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not applicable.
Boiling Point: Not applicable.
Freezing/Melting Point: 1152F decomposes.
Decomposition Temperature: 1152°F
Solubility: 20% @ 25C
Specific Gravity/Density: >1.5
Molecular Formula: Na5P3O10
Molecular Weight: 367.8644

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, moisture, exposure to air.
Incompatibilities with Other Materials: Strong oxidizers.
Hazardous Decomposition Products: Oxides of phosphorus, toxic fumes of sodium oxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 7758-29-4: YK4570000
LD50/LC50: CAS# 7758-29-4: Oral, mouse: LD50 = 3100 mg/kg; Oral, rat: LD50 = 3900 mg/kg.
Carcinogenicity: PENTASODIUM TRIPHOSPHATE - Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Neurotoxicity: No information available.
Mutagenicity: Please refer to RTECS# WA1900000 for specific information.
Other Studies: None.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity: No information found.
Environmental Fate: No information reported.
Physical/Chemical: No information found.
Other: No information found.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.
RCRA D-Series Maximum Concentration of Contaminants: Not listed.
RCRA D-Series Chronic Toxicity Reference Levels: Not listed.
RCRA F-Series: Not listed.
RCRA P-Series: Not listed.
RCRA U-Series: Not listed.
Not listed as a material banned from land disposal according to RCRA.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT
No information available
IMO
No information available.
IATA
No information available.
RID/ADR
No information available.
Canadian TDG
No information available.

**** SECTION 15 - REGULATORY INFORMATION ****

A. Federal
TSCA
CAS# 7758-29-4 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA
Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 7758-29-4: acute.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7758-29-4 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

B. State

PENTASODIUM TRIPHOSPHATE can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Massachusetts.

California No Significant Risk Level:

None of the chemicals in this product are listed.

C. International

Canada

CAS# 7758-29-4 is listed on Canada's DSL/NDSL List.

CAS# 7758-29-4 is not listed on Canada's Ingredient Disclosure List.

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available.

Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

Exposure Limits:

OEL-AUSTRALIA:TWA 200 ppm (590 mg/m3);STEL 250 ppm (735 mg/m3). OEL-BELGIUM:TWA 200 ppm (590 mg/m3);STEL 250 ppm (738 mg/m3). OEL-DENMARK:TWA 200 ppm (590 mg/m3). OEL-FINLAND:TWA 100 ppm (290 mg/m3);STEL 150 ppm (440 mg/m3). OEL-FRANCE:TWA 200 ppm (590 mg/m3). OEL-GERMANY:TWA 200

ppm (590 mg/m3). OEL-HUNGARY:TWA 200 mg/m3;STEL 400 mg/m3. OEL-JAPAN: TWA 200 ppm (590 mg/m3). OEL-THE NETHERLANDS:TWA 200 ppm (590 mg/m3). OEL-THE PHILIPPINES:TWA 200 ppm (590 mg/m3). OEL-RUSSIA:TWA 200 ppm;STEL 100 mg/m3. OEL-SWEDEN:TWA 100 ppm (300 mg/m3);STEL 150 ppm (450 mg/m3). OEL-SWITZERLAND:TWA 200 ppm (590 mg/m3);STEL 1000 ppm. OEL-TURKEY

:TWA 200 ppm (590 mg/m3). OEL-UNITED KINGDOM:TWA 200 ppm (590 mg/m3);STEL 250 ppm. OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****

Additional Information:

Added NFPA codes to Section 5. Added SARA classifications to Section 15.

Section 3, Emer Overview, added "CAUTION!..".

Section 3, Emer Overview, added "MAY CAUSE EYE AND SKIN IRRITATION...".

Section 3, Emer Overview, added "MAY CAUSE RESPIRATORY AND DIGESTIVE..".

Section 3, Eye Effects, added "May cause eye irritation...".

Section 3, Skin Effects, added "May cause skin irritation...".

Section 3, Inhalation Effects, added "May cause respiratory tract irritat..".

Section 3, Ingestion Effects, added "Ingestion of large amounts may caus..".

Section 4, Eye First Aid, added "Flush eyes with plenty of water for..".

Section 4, Eye First Aid, added "Get medical aid...".

Section 4, Skin First Aid, added "Flush skin with plenty of soap and..".
Section 4, Skin First Aid, added "Get medical aid...".
Section 4, Inhalation First Aid, added "Remove from exposure to fresh air i..".
Section 4, Inhalation First Aid, added "If not breathing, give artificial r..".
Section 4, Inhalation First Aid, added "If breathing is difficult, give oxy..".
Section 4, Inhalation First Aid, added "Get medical aid if cough or other s..".
Section 4, Ingestion First Aid, added "If victim is conscious and alert, g..".
Section 4, Ingestion First Aid, added "Get medical aid...".
Section 5, Extinguishing Media, added "For small fires, use dry chemical,..".
Section 5, General Firefighting, added "As in any fire, wear a self-contain..".
Section 6, Spills/Leaks, added "Vacuum or sweep up material and pla..".
Section 6, Spills/Leaks, added "Avoid generating dusty conditions...".
Section 7, Handling, added "Wash thoroughly after handling...".
Section 7, Handling, added "Use with adequate ventilation...".
Section 7, Handling, added "Minimize dust generation and accumu..".
Section 7, Handling, added "Avoid contact with skin and eyes...".
Section 7, Handling, added "Avoid ingestion and inhalation...".
Section 7, Storage, added "Store in a cool, dry, well-ventilat..".
Section 8, Engin. Controls, added "Use adequate ventilation to keep ai..".
Section 8, Eye Protection, added "Wear appropriate protective eyeglass"
Section 8, Skin Protection, added "Wear appropriate gloves to prevent"
Section 8, Clothing, added "Wear appropriate protective clothing"
Section 8, Respirators, added "Follow the OSHA respirator regulation"
Section 9, Physical Properties has changed.
Section 10, Stability, added "Stable under normal temperatures an"
Section 10, Condit. to Avoid, added "incompatible materials"
Section 10, Condit. to Avoid, added "moisture"
Section 10, Condit. to Avoid, added "exposure to air"
Section 10, Decomposition Prod., added "oxides of phosphorus"
Section 10, Decomposition Prod., added "toxic fumes of sodium oxide.
Section 10, Incompatibilities has changed.
Section 11, Epidemiology has changed.
Section 11, Neurotoxicity has changed.
Section 11, Teratogenicity has changed.
Section 11, Mutagenicity has changed.
Section 11, Reproductive has changed.
Section 11, Other Info has changed.
Section 12, Ecology Info has changed.
Section 12, Environ. Info has changed.
Section 12, Physical Info has changed.
Section 12, Other Info has changed.

MSDS Creation Date: 11/06/1995 Revision Date: 3/04/1996

Material Safety Data Sheet
Sulfuric Acid

ACC# 22350

Section 1 - Chemical Product and Company Identification

MSDS Name: Sulfuric Acid
Catalog Numbers: S71211SC, S71826, S79200, S80213, S80213-1, A298-212, A300-212, A300-225LB, A300-500, A300-612GAL, A300-700LB, A300C-212, A300C-212001, A300C-212002, A300C-212003, A300C-212LC, A300C212004, A300C212005, A300C212006, A300C212007, A300C212008, A300C212009, A300C212010, A300FP-500, A300J-500, A300P-500, A300S-212, A300S-212LC, A300S-500, A300SI-212, A468-1, A468-250, A468-500, A4682, A484-212, A510-212, A510-500, A510SK-212, AC3000S212002, MAR77018068, NC9466102, NC9499595, NC9755547, NC9825433, NC9826713, S71211, S71211MF, S71211MF*, S71211SCMF, S71211SCMF*, S79200MF, S79200MF* DHAZ, S79200MF*DHAZ, S79200SCMF, SA174-212, SA174-4, SA176-4, SA196-500
Synonyms: Hydrogen Sulfate; Oil of Vitriol; Vitriol Brown Oil; Matting Acid; Battery Acid; Sulphuric Acid.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7664-93-9	Sulfuric acid	95-98.0	231-639-5

Hazard Symbols: C
Risk Phrases: 35

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: oily liquid liquid. **Danger!** Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Cancer hazard. May cause fetal effects based upon animal studies. May cause kidney damage. May be fatal if inhaled. May cause lung damage. Hygroscopic. May cause severe eye, skin and respiratory tract irritation with possible burns.
Target Organs: Kidneys, heart, lungs, respiratory system, cardiovascular system, teeth, eyes.

Potential Health Effects
Eye: Causes severe eye burns. May cause irreversible eye injury. May cause conjunctivitis. May

cause permanent corneal opacification.
Skin: Causes skin burns. Continued contact can cause tissue necrosis. May cause skin rash (in milder cases), and cold and clammy skin with cyanosis or pale color.
Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause systemic toxicity with acidosis.
Inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Causes corrosive action on the mucous membranes.
Chronic: Prolonged or repeated inhalation may cause kidney and lung damage. Prolonged or repeated skin contact may cause dermatitis. Prolonged or repeated inhalation may cause nosebleeds, nasal congestion, erosion of the teeth, perforation of the nasal septum, chest pain and bronchitis. Prolonged or repeated eye contact may cause conjunctivitis. May cause fetal effects. May cause cancer in humans. Effects may be delayed. Laboratory experiments have resulted in mutagenic effects. May cause ischemic heart lesions.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Monitor arterial blood gases, chest x-ray, and pulmonary function tests if respiratory tract irritation or respiratory depression is evident. Treat dermal irritation or burns with standard topical therapy. Effects may be delayed. Do NOT use sodium bicarbonate in an attempt to neutralize the acid.
Antidote: Do NOT use oils or ointments in eye.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Wear appropriate protective clothing to prevent contact with skin and eyes. Wear a self-contained breathing apparatus (SCBA) to prevent contact with thermal decomposition products. Will react with water to form toxic and corrosive fumes. Contact with water can cause violent liberation of heat and splattering of the material. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated or if contaminated with water. Runoff from fire control or dilution water may cause pollution.
Extinguishing Media: Do NOT use water directly on fire. Use carbon dioxide or dry chemical. Do NOT get water inside containers. Cool containers with flooding quantities of water until well after fire is out.
Flash Point: Not available.
Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 2; Special Hazard: -W-

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Carefully scoop up and place into appropriate disposal container. Provide ventilation. Cover with dry earth, dry sand, or other non-combustible material followed with plastic sheet to minimize spreading and contact with water.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Do not ingest or inhale. Do not allow contact with water. Use only in a chemical fume hood. Discard contaminated shoes. Keep from contact with moist air and steam.
Storage: Do not store near combustible materials. Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from water. Corrosives area. Do not store near alkaline substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sulfuric acid	(1 mg/m3) TWA; (3 mg/m3) STEL	1 mg/m3 TWA 15 mg/m3 IDLH	1 mg/m3 TWA

OSHA Vacated PELs: Sulfuric acid: 1 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear colorless - oily liquid
Odor: odorless
pH: 0.3 (1N Solution)
Vapor Pressure: 1 mm Hg @ 145.8 C
Vapor Density: 3.38
Evaporation Rate: Slower than ether.
Viscosity: 21 mPas @ 25 C
Boiling Point: 340 deg C
Freezing/Melting Point:10.35 deg C
Decomposition Temperature:340 deg C
Solubility: Soluble.
Specific Gravity/Density:1.841
Molecular Formula:H_2SO_4
Molecular Weight:98.0716

Section 10 - Stability and Reactivity

Chemical Stability: Combines vigorously with water with the evolution of heat. Reported to have exploded when in a sealed container. This was most likely due to pressure of hydrogen by reduction of water.
Conditions to Avoid: Incompatible materials, ignition sources, metals, excess heat, combustible materials, organic materials, reducing agents, exposure to moist air or water, oxidizers, amines, bases.
Incompatibilities with Other Materials: Bases, strong dehydrating agents, organic materials, finely powdered metals, moisture, carbides, chlorates, cyanides (e.g. potassium cyanide, sodium cyanide), azides, fulminates, picrates, nitrates, alkali halides, zinc, iodides, permanganates, hydrogen peroxides, perchlorates, nitromethane, phosphorus, nitrites, cyclopentadiene, cyclpentanone oxime, nitroaryl amines, lithium silicides, iron, mercuric nitride, benzene, potassium chlorates, steel, cesium acetylene carbide, trihydroxydiamino phosphate, phosphorus trioxide, reducing agents.
Hazardous Decomposition Products: Oxides of sulfur, irritating and toxic fumes and gases.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7664-93-9: WS5600000
LD50/LC50:
CAS# 7664-93-9:
Draize test, rabbit, eye: 250 ug Severe;
Inhalation, mouse: LC50 = 320 mg/m3/2H;
Inhalation, rat: LC50 = 510 mg/m3/2H;
Oral, rat: LD50 = 2140 mg/kg;
Carcinogenicity:
CAS# 7664-93-9:
ACGIH: A2 - Suspected Human Carcinogen (contained in strong inorganic acid mists)
OSHA: Select carcinogen
IARC: Group 1 carcinogen
Epidemiology: No data available.
Teratogenicity: No data available.

Reproductive Effects: No data available.
Neurotoxicity: No data available.
Mutagenicity: No data available.
Other Studies: No data available.

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 49 mg/L; 48Hr; TLm (tap water @ 20C)
Fish: Bluegill/Sunfish: 24.5 ppm; 48Hr; TLm (fresh water)

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	SULFURIC ACID				SULFURIC ACID
Hazard Class:	8				8(9.2)
UN Number:	UN1830				UN1830
Packing Group:	II				II

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 7664-93-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA

Section 302 (RQ)
CAS# 7664-93-9: final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)
CAS# 7664-93-9: TPQ = 1000 pounds; RQ = 1000 pounds
SARA Codes
CAS # 7664-93-9: acute, chronic, reactive.
Section 313
This material contains Sulfuric acid (CAS# 7664-93-9, 95 98 0%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 7664-93-9 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 7664-93-9 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
C
Risk Phrases:
R 35 Causes severe burns.

Safety Phrases:
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 30 Never add water to this product.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)
CAS# 7664-93-9: 2
Canada - DSL/NDSL
CAS# 7664-93-9 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of E, D1A.
Canadian Ingredient Disclosure List
CAS# 7664-93-9 is listed on the Canadian Ingredient Disclosure List.
Exposure Limits
CAS# 7664-93-9: OEL-ARAB Republic of Egypt:TWA 1 mg/m3 OEL-AUSTRALI A:TWA 1 mg/m3 OEL-BELGIUM:TWA 1 mg/m3;STEL 3 mg/m3 OEL-CZECHOSLOVAKI A:TWA 1 mg/m3;STEL 2 mg/m3 OEL-DENMARK:TWA 1 mg/m3 OEL-FINLAND:TWA 1 mg/m3;STEL 3 mg/m3;Skin OEL-FRANCE:TWA 1 mg/m3;STEL 3 mg/m3 OEL-GER MANY:TWA 1 mg/m3 OEL-HUNGARY:STEL 1 mg/m3 OEL-JAPAN:TWA 1 mg/m3 OEL -THE NETHERLANDS:TWA 1 mg/m3 OEL-THE PHILIPPINES:TWA 1 mg/m3 OEL-POL AND:TWA 1 mg/m3 OEL-RUSSIA:STEL 1 mg/m3;Skin OEL-SWEDEN:TWA 1 mg/m3; STEL 3 mg/m3 OEL-SWITZERLAND:TWA 1 mg/m3;STEL 2 mg/m3 OEL-THAILAND:T WA 1 mg/m3 OEL-TURKEY:TWA 1 mg/m3 OEL-UNITED KINGDOM:TWA 1 mg/m3 OE L IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEA

LAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 4/22/1999
Revision #7 Date: 11/20/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Schlumberger

MATERIAL SAFETY DATA SHEET

(Complies with USA OSHA 29 CFR 1910.1200 and ANSI Z 400.1)

PRODUCT CODE: F057 Effective Date: 16-September-2002

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Identification of the substance or preparation:

SURFACTANT F57

Company/undertaking identification:	Schlumberger 110 Schlumberger Drive Sugar Land, Texas 77478, USA
Corporate Emergency Phone:	USA 1-281-595-3518
Corporate Non-Emergency Phone:	USA 1-281-285-7873

2. COMPOSITION/INFORMATION ON INGREDIENTS

PROPRIETARY MIXTURE CONTAINING:
SALT OF SULFONATED AROMATIC ACID; 10 - 30%
ALIPHATIC ALCOHOL GLYCOL ETHER; 10-30%
WATER; CAS 7732-18-5; 30 - 60%
SALT OF AROMATIC ACID; 3 - 7%

3. HAZARDS IDENTIFICATION

Emergency Overview

Form:	Liquid
Color:	Yellow
Odor:	Disinfectant

Main environmental hazards:

Harmful to aquatic organisms.

Main Physical Hazards

Special Precautions:	None.
Physical Hazard:	None.

Main Health Hazards:

HMIS RATING: Health 2 Flammability 1 Reactivity 0

Causes eye irritation.

See Section 11 for a complete discussion of health hazards.

4. FIRST AID MEASURES

Eye contact:	Immediately flush eyes with water for 15 minutes while holding eyelids open. Seek medical attention.
Skin contact:	Remove contaminated clothes and shoes. Wash thoroughly with soap and water. Seek medical attention if irritation occurs.
Inhalation:	Remove to fresh air.
Swallowing:	Rinse mouth with water. Seek medical attention if irritation occurs.
Notes:	None.

5. FIRE FIGHTING MEASURES

Extinguishing media:	Water Fog, Alcohol Foam, CO2, Dry Chemical
Further Information:	Wear protective fire fighting clothing and avoid breathing vapors. Use self-contained breathing apparatus in closed areas.
Flash point:	> 212°F
Method:	Tag closed cup

Flammability (explosion limits in air):

Lower:	Not determined	Upper:	Not determined

Autoflammability (auto-ignition temperature): Not determined

Explosive properties (thermal decomposition temperature): Not determined

NFPA Rating: Health 3 Flammability 1 Reactivity 0 Other: None

Combustion products: see Section 10.

6. ACCIDENTAL RELEASE MEASURES

After spillage/leakage:	Contain with dikes. Put in steel or plastic drum. Soak up residual on inert absorbant (sand).

See Section 8 for protective equipment information.

See Section 13 for disposal information.

7. HANDLING AND STORAGE

Special Precautions:	No special precautions required.
Packaging requirements:	Coated (epoxy phenolic) steel drum (DOT 17E) or high density polyethylene (HDPE) can.
Ventilation:	No special requirements.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection:	None normally needed. Use NIOSH approved respirator with organic vapor/acid gas protection (color coded yellow) if vapors are generated and for emergencies.
Eye protection:	Chemical splash goggles.
Hand protection:	Impervious gloves made of: Rubber
Skin protection:	Clean, body-covering clothing.

Exposure Limit Guidelines (mg/m3)

No components have established exposure limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Liquid
Color:	Yellow
Odor:	Disinfectant
pH value:	6.5 (68°F)
Boiling point:	Not determined
Pour point:	Not determined
Vapor pressure:	Not determined
Relative density (specific gravity):	1.07 (68°F)

Bulk Density (solids):	Not applicable
Solubility in water:	Soluble 68°F
Viscosity:	33 mPa.s (77°F)
Relative Vapor Density (air=1):	>1
% Volatile:	18
Nature:	Surfactant

10. STABILITY AND REACTIVITY

Stability:	Stable.
Conditions to avoid:	None.
Materials to avoid:	Oxidizers
Hazardous Polymerization:	Will not occur.
Dust explosion hazard (solids):	Not applicable.
Special hazards:	None.
Hazardous decomposition products:	When heated strongly or burned, oxides of carbon, sulfur oxides and harmful organic chemical fumes are released.

11. TOXICOLOGICAL INFORMATION

Eye contact:	Severe irritant. Causes pain and redness. Prolonged or repeated contact may cause mild burn.
Skin contact:	No effect expected. Prolonged or repeated contact may cause mild irritation.
Inhalation:	No effect expected. Prolonged or repeated exposure may cause mild irritation.
Ingestion:	No effect expected. Swallowing large amounts may cause illness.
Carcinogenicity:	Not listed by IARC, USA NTP, or USA OSHA.
Mutagenicity:	Not known to cause heritable genetic damage.
Teratogenicity:	Not known to cause birth defects.
Target organs which may be affected:	None known.
Sensitization:	Not known to cause allergic reaction.
Other:	None.

12. ECOLOGICAL INFORMATION

Information on product as a whole:

Main environmental hazards:	Harmful to aquatic organisms.
Degradability:	Partially biodegradable.
Acute Invertebrates toxicity:	EC50 (ABRA ALBA) = 27 MG/L

Information on components:

13. DISPOSAL CONSIDERATIONS

Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for incineration (preferred) or disposal well injection of all liquids and landfilling of solids.
Container:	Sell drum to an approved drum reconditioner or triple rinse, crush, and ship to sanitary landfill unless prohibited by local regulations.
USA EPA RCRA:	None.

14. TRANSPORT INFORMATION

CERCLA RQ: Not established.

Department of Transportation (DOT)

Designation: Not Regulated
Hazard Class: Not Regulated Sub Risk:
Shipping Name: Not Regulated
DOT Label:

Canadian Shipments
Shipping Name: Not Regulated
Label:
Classification: Sub Risk:
Package Group: PIN: none

15. REGULATORY INFORMATION

Notification/restrictions status:

USA:

All components of this material are on the USA TSCA inventory, or the components are exempt from inventory reporting.

CANADA:

All components of this material are on the Canada DSL, or the components are exempt from inventory reporting.

This product contains no chemicals subject to the USEPA reporting requirements of SARA 313.

The USEPA CERCLA Reportable Quantity (RQ) for this product as a whole is: Not established.

Canadian WHMIS classification: D2B

16. OTHER INFORMATION

Sections affected by last revision:

IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

TRANSPORT INFORMATION

*Mark of Schlumberger. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by Schlumberger regarding the accuracy or

completeness of the information.

CALGON CORPORATION

SUBSIDIARY OF MERCK & CO., INC.

WATER MANAGEMENT DIVISION

COOLING WATER PRODUCTS & SERVICES

THRUGUARD™ 710

TECHNOLOGY ADVANCE CONTROLS CALCIUM SCALE FORMATION AND DISPERSES SUSPENDED SOLIDS IN COOLING WATER SYSTEMS

DESCRIPTION

THRUGUARD 710 is a liquid polymeric product based on pHreeGUARD® technology which is formulated to control the deposition of calcium scales in both once-through and low cycle recirculating cooling water systems. The product contains the copolymer TRC-233® developed by Calgon research. THRUGUARD 710 is a dispersan for suspended material such as silt and metal oxides. This dispersant action main tains the insoluble material in suspension, facilitating its removal from the system. ■

ADVANTAGES

- **Inhibits Scale Formation**
  The inhibitors in THRUGUARD 710 are formulated to control potential scaling problems with calcium phosphate, calcium sulfate, and calcium carbonate. This product is highly effective in waters with a calcium sulfate scaling tendency.
- **Controls Iron Oxide Deposition**
  THRUGUARD 710 functions as a dispersant keeping metal oxides and silts fluidized, minimizing deposition in equipment and on heat exchanger surfaces.
- **Is Compatible with Biocides**
  THRUGUARD 710 is compatible with chlorine, bromine and other commonly used microbiocides.
- **Complements Good Corrosion and Biological Control**
  Deposits provide media for the propagation of biological growth and cause localized corrosion of metal surfaces. THRUGUARD 710 prevents the formati of deposits and disperses suspended solids. Cleaner surfaces deter further biological growth and assure better perf mance of corrosion inhibitors.
- **Is Environmentally Suitable**
  THRUGUARD 710 contains no zinc, ch mate or phosphorus. It can be used in systems where current discharge regula tions prohibit the use of heavy metals ar or phosphorus.
- **Is Convenient to Use**
  THRUGUARD 710 is supplied as a liqui and can be fed directly from the shipping container or bulk storage tank. The neec and associated costs, for premixing chemicals is eliminated.

PATENTS

U.S. Patents: 4,640,793, 4,936,987, 4,552,665 and 3,928,196. ■

METHOD OF FEED

THRUGUARD 710 should be fed at a point in the system where turbulent flow will assure good mixing. The product may be fed either neat or diluted and must not be mixed with other water treatment chemicals prior to feeding. Dosage rates will vary depending upon system parameters and water quality. Product application is an integral part of Calgon's THRUGUARD computer modeling technology. Your Calgon Representative will assist you in establishing a treatment program to fit your specific cost performance criteria. ■

CONTROL TESTING

Product performance is ultimately confirmed by periodic equipment inspection and/or by monitoring heat transfer. In once-through waters, product dosages are generally below detectable limits. Product feed rates are adjusted based on water quality and system flow. ■

TYPICAL PROPERTIES

Appearance	Clear to very pale yellow liquid
pH	4.8
Specific Gravity @ 77°F	1.15
Density, lbs./gal.	9.6
Flash Point, °F (TCC)	>200
Measured Freeze Point, °F	28-35
Brookfield Viscosity @ 40°F, cps	136

PACKAGING

THRUGUARD 710 is delivered to on-site storage facilities via bulk or Calgon **Bulk Liquid Service-Plus***. ■

SHIPPING

DOT Hazardous Class	Not Restricted
DOT Proper Shipping Name	Not Restricted
UN Number	Not Applicable

STORAGE AND HANDLING

The recommended minimum storage temperature for **THRUGUARD 710** is 40°F. Best if used within six (6) months from the time of receipt. If product freezes, it does not lose its integrity. Restore for use by warming slowly until product thaws and agitating. ■

MATERIALS COMPATIBILITY

Recommended materials for:

Bulk Storage Tanks

High density, low density, or cross-linked polyethylene, 304 or 316 stainless steel, epoxy phenolic lined steel, fiberglass with bisphenol, isophthalic polyester or vinyl ester liner resins.

Pump "Liquid Ends" and Piping

Polyethylene, polypropylene, PVC, 304 or 316 stainless steel, Viton*, and Teflon*. ■

*Trademarks of DuPont

Information concerning human and environmental exposure may be reviewed on the Material Safety Data Sheet and label for this product.

For additional information regarding incidents involving human and environmental exposure, call 412-777-8000 and ask for the Health & Environmental Affairs Department.

All names in boldface are trademarks or service marks of Merck & Co., Inc., Rahway, NJ.

For more information, contact your local Calgon representative or write:
Water Management Division, Calgon Corporation, P.O. Box 1346, Pittsburgh, PA 15230.
Or call (412) 777-8000.

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.

CALGON CORPORATION
SUBSIDIARY OF MERCK & CO., INC.
WATER MANAGEMENT DIVISION
TECHNICAL INFORMATION REPORT

Bulletin No. 11-5

SCALE CONTROL IN ONCE-THROUGH COOLING SYSTEMS WITH THRUGUARD

WHY THRUGUARD?

The potential for calcium salt scale and deposition is as much a concern to power plants using once-through cooling water as it is to those using recirculating cooling water systems. The **CALGUARD** program for recirculating cooling water uses thermodynamic calculations when evaluating treatment options for recirculating cooling water systems. Recirculating cooling systems can be controlled to maintain desired cycles of concentration; system water residence time can be measured in hours and days during which time equilibrium conditions are established. Chemical treatment objectives aimed : 100% scale inhibition in recirculating systems can easily be achieved on an economical basis due to controlled losses in these systems. However, consider scale inhibition of once-through cooling water systems with flow rates of many thousands of gallons per minute and residence times measured in seconds. A continuous supply of inhibitor is needed since there is no recycled chemical residual as ir recirculating systems; thus, cost effective treatment is a challenge.

The **THRUGUARD** program was developed specifically for such once-through cooling scale inhibition. It uses all of the same rigorous thermodynamic activity and solubility calculations as **CALGUAR** and in addition, it considers residence time as a function of nucleation and crystal growth. Thus, the degree of scaling potential and the inhibitor level necessary to inhibit scale are determined from kineti considerations, as well as from basic thermodynamic solubilities.

The recommended variation in chemical inhibitor dosage is calculated by **THRUGUARD** based on t known performance of each product as a function of pH, temperature, retention time in the system, ar the saturation level of the scaling ions in the water. In this manner, scale inhibitors are accurately applied to these large once-through systems in a cost-effective manner. Figure 1 displays the effect (residence time and calcite saturation on chemical feed requirements. Figure 2 shows the effect of calcite level, pH, and temperature on inhibitor dosage given a fixed residence time.

SETTING UP A SYSTEM IN THRUGUARD

THRUGUARD needs only a little more information than **CALGUARD** to establish a file. In addition to the data needed for **CALGUARD** (plant, i.d. circulation rate, water analysis, etc.), **THRUGUARD** needs to know:

1. Temperature to be used in calculations and whether this is an inlet or outlet value.
2. Total heat transfer surface area Ft^2) in condenser.
3. Residence time through the condenser (sec.). It may be necessary to calculate this from other plant data.)
4. Number of circulating pumps in use.

More detail on information needed and a handy form on which to record the data can be found in **THRUGUARD** operations manual.

When all the necessary information is provided, **THRUGUARD** will assign a Survey File I.D.#. As updated water analyses and temperatures are entered, asking for the File No. will restore the file. (At this time, **THRUGUARD** will offer an opportunity to change or edit the basic data, if needed.) Then, new analyses or operating conditions can be entered and calculations performed. (Be sure to activate "Historic Summary" each time the program is entered so the new data will be added to the survey file.) Note that dates are important to **THRUGUARD**. The Historic Summary, or data base, is sorted in order of increasing dates. In several places **THRUGUARD** will ask for verification of a date. It will also issue a warning if it encounters a duplication of a date previously entered.

ROUTINE SERVICE WITH THRUGUARD

Once the initial feed of treatment has begun based on recommendations obtained from **THRUGUARD**, it is necessary to continuously monitor the water quality for possible changes required.

With large lakes as the source of cooling water, the overall mineral content of the water generally does not change drastically. However, some changes do occur due to such factors as rainfall and runoff, biological activity, especially algae growth, and extended periods of dry weather such as was experienced nationwide during the summer of 1988.

Even with minor changes in mineral content, significant changes can occur between day and night with respect to temperature, and pH changes can occur with respect to biological activity. For these reasons, it is recommended that the feed of the selected scale inhibitor be controlled by a **CHEMONITOR DELTA** unit into which the expected variations in temperature and pH have been programmed. To do that, it is necessary to run a number of **THRUGUARD** runs to get an idea of the change in chemical treatment requirements for each degree Fahrenheit and each .05 pH unit. **CHEMONITOR DELTA** will accept a 10x10 matrix of pH and temperature values and their related dosages. This then is used to adjust the stroke of the chemical feed pump to maintain proper amounts of treatment. In this way, treatment is continuously adjusted based on conditions at any given moment. The result is the ultimate in economy of treatment cost along with assurance of performance.

With other once-through water sources such as flowing rivers, it is not quite so simple since the mineral content will change, at least seasonally. In these cases, it is generally wise to run at least a monthly complete analysis and enter it into **THRUGUARD**. Then develop the 10x10 matrix and install that into the **CHEMONITOR DELTA**. Of course, if the source water changes mineral content dramatically at a greater frequency than this, a greater frequency of adjustment will be necessary.

Since a once-through cooling system involves treating very large quantities of water with very small mg/L dosages of chemical, it is necessary to constantly adjust the treatment rate in order to avoid excessive costs of over-treating on the one hand and failure of the system to perform, resulting in scaling of the condenser, on the other. With **THRUGUARD** and **CHEMONITOR DELTA**, the tools are at hand to achieve this delicate balance on a continuous basis.

Figure 1
INHIBITOR DOSAGE VS. CALCIUM CARBONATE SATURATION

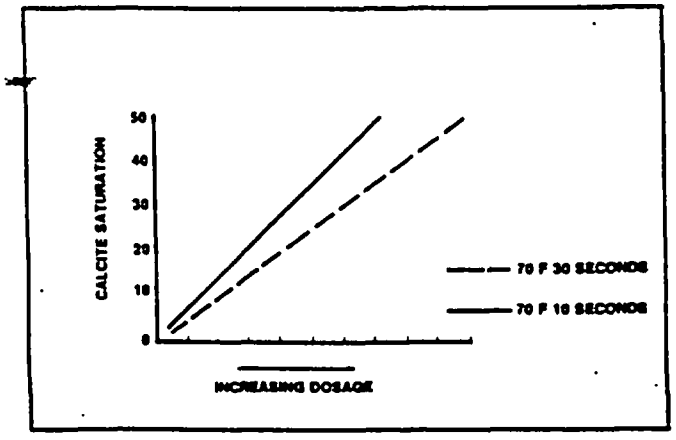
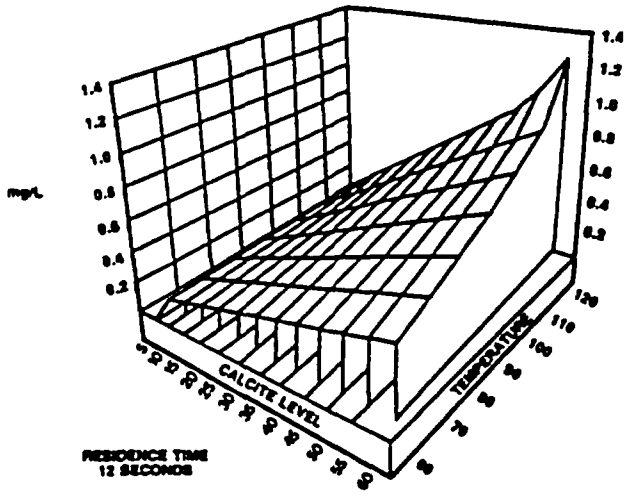


Figure 2
INHIBITOR DOSAGE TABLE



MATERIAL SAFETY DATA SHEET

Calgon Corporation
P.O. Box 1346
Pittsburgh, PA 15230-1346

24 Hour Emergency Telephone--(412)777-8000

CALGON CORPORATION
SUBSIDIARY OF MERCK &

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: THRUGUARD 710

CHEMICAL DESCRIPTION: Aqueous polymer solution
PRODUCT CLASS: Water treatment
MSDS CODE: 0516-07-30-90

Section 2. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV

No ingredients listed in this section

HAZARD COMMUNICATION STATUS: This product is not considered to be hazardous according to the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

This product poses little or no immediate hazard.

****

PRIMARY ROUTES OF ENTRY: None

TARGET ORGANS: None

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Unknown

Continued on Page 2

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product would not be expected to produce irritation upon contact with the e

SKIN CONTACT: The product is not expected to cause skin irritation upon contact. No data is available to suggest that this product may produce an allergic skin reaction or be absorbed through the skin in harmful amounts.

INGESTION: This product would be expected to be practically non-toxic by ingestion.

INHALATION: This product is not expected to present an inhalation hazard.

SUBCHRONIC, CHRONIC:
No applicable information was found concerning any potential health effects resulting from subchroni or chronic exposure to the product.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: Not expected to require first aid measures.

SKIN CONTACT: Not expected to require first aid measures.

INGESTION: Not an expected route of overexposure.

INHALATION: Not an expected route of overexposure.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: > 200°F (TCC) This product is not flammable or combustible.

LOWER FLAMMABLE LIMIT: Not available UPPER FLAMMABLE LIMIT: Not available

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use extinguishing media appropriate for the surrounding fire.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: Product emits toxic gases under fire conditions.

DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, sulfur oxides, nitrogen oxides.

Continued on Page

NFPA RATINGS: Health = 0 Flammability = 0 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent and place into suitable container. Spilled produ may make floor slippery; spills should be cleaned up immediately to prevent falls.

Section 7. HANDLING AND STORAGE

HANDLING: As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the product and ensure prompt removal from eyes, skin and clothing.
If product freezes, it does not lose its integrity. Restore for use by warming, slowly until product thaws, and agitating.
Wash thoroughly after handling.
Keep container closed when not in use.

STORAGE: The recommended minimum storage temperature is 40°F.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles recommended as a good industrial hygiene practic
SKIN PROTECTION: No special requirement.
RESPIRATORY PROTECTION: None required.

ENGINEERING CONTROLS: No specific recommendations.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not available

VAPOR PRESSURE: Similar to water

VAPOR DENSITY (air=1): Similar to water

% VOLATILE BY WEIGHT: ~ 68

SOLUBILITY IN WATER: Complete

SPECIFIC GRAVITY: 1.19 - 1.23 @ 25°C

pH: 4.5 - 5.5 @ 25°C

FREEZING POINT: 28 - 35°F

APPEARANCE AND ODOR: Clear, pale yellow liquid.

Continued on Page 4

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: No specific information.

INCOMPATIBILITY: Strong oxidizers and reducers

DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, sulfur oxides, nitrogen oxides.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
No information entered at this time.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC (rat)
No ingredients listed in this section			

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:
No information entered at this time.

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Anionic copolymer	48 hr LC_{50} (Daphnia magna): 2,800 ppm 96 hr LC_{50} (bluegill sunfish): > 10,000 ppm 96 hr LC_{50} (rainbow trout): 4,900 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

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

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Hazard Class: Not restricted
Proper Shipping Name: Not applicable
ID Number: Not applicable
Label: None

Continued on Page 5

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Nonhazardous
TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.
CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients listed in this section	

Product RQ: Not applicable (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
No ingredients listed in this section			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactiv
[no]	[no]	[no]	[no]	[no]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
No ingredients listed in this section		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 0 Flammability = 0 Reactivity = 0
Personal Protective Equipment = A

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Changes made in Section 15.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

PaceSetter®Plus™ Modular Control System

1. **Computerized data aquisition, product feed, data trending, program monitoring and control technology**

   Accurate control of a chemical treatment program is only as successful as the chemical feed equipment. The **PaceSetter Plus** is by far the best controller in the marketplace. Dyes have been used in the past but there are several interferences that affect the accuracy of the product determinations. The **PaceSetter Plus** is based on a true mass balance for feed control. This system incorporates a microprocessor-based comprehensive control system. The system not only verifies feed of up to four chemicals, it provides data acquisition and storage, custom program control algorithms, 24-hour communications capabilities and remote alarms. I/O capabilities would allow monitoring and alarming based on key variables, such as corrosion rate meters, pH, delta T, turbidities, flow rates, and others. The system offers many unique features that can provide lasting benefits, practicality, and reliability to Waterford 3.

   The following equipment is an integral part of the PaceSetter Plus:

   a. **Veri-Feed System** (equipped with LMI pump): The Veri-Feed assemblies are the liquid end of the PaceSetter Plus. The component contains the drawdown cylinder, sensors, and chemical metering pump to deliver the chemical into the system.

   b. **PaceSetter Plus Controller:** This component is the computer or "brains" of the smart pump system. The controller communicates with up to four drawdown assemblies, receiving actual chemical feedrate data, comparing with target rate data, and sending out an adjustment when required. The controller can also communicate with a software program, SmartScan, to track all pertinent data collected.

   c. **CPU with SmartScan Plus Software:** SmartScan Plus software is the data management software used to store all PaceSetter Plus system parameters, as well as manually entered data points. Communication links can be set up, via modem, with other computers within the plan as well as linking the PaceSetter Plus system to the 24-hour Betz Pro Care Service Monitoring Facility.

   d. **Action Alert:** This software package allows the SmartScan Plus data to be easily manipulated into Statistical Process Control (SPC) parameters.

   Correct chemical feed will be maintained and verified based on specific system parameters. No chemical overfeed or underfeed will occur. The data acquisition capabilities will provide valuable information for tracking the system's chemistry and operation.

PaceSetter Plus Facts

a. **Provides 24-hour Surveillance Service.** Via modem, the Betz ProCare Service Personnel can monitor the treatment program 24 hours a day, 7 days a week. Should a variance occur, proper plant personnel, as well as the Betz representative will be notified immediately.

b. **Uses comprehensive feed forward/feedback process control logic**
Feed forward: eliminates and compensates for disturbances before they affect the treatment program.
Feedback trim: for some systems, a process signal is fed back to the controller so that it can compensate for disturbances not eliminated by feed forward system.
Comprehensive control: encompasses multivariable feed forward control, verified feed, feedback trim, and process optimization.

c. **Directly verifies the feed of more than one product.** One Betz PaceSetter Plus System can verify the chemical feed of up to four chemicals. It continually measures the amount of each chemical fed against the amount required and makes adjustments to ensure feed accuracy to prevent overfeed and underfeed conditions. This is accomplished by use of volumetric verification through continuous drawdown measurements to prove the actual feed.

It is not sufficient to send a signal to the pump; the pump may lose prime or feed at an incorrect rate for a variety of the following reasons:

- Nonlinear stroke speed control
- Nonlinear motor speed control
- Changes in viscosity
- Changes in suction head pressure
- Changes in discharge head pressure
- Diaphragm fatigue
- Internal slippage

These can cause inaccuracies in chemical feed of up to 30%.

d. **Betz Action Alert (SPC).** The PaceSetter Plus can be directly integrated with Betz Action Alert Program, an interactive data management and Statistical Process Control (SPC) software package. With this capability, Waterford 3 will have data management capabilities that are second to none in the industry today.

Betz Action Alert software has two specific modules can be very beneficial.

- **Action Link**
This electronically ties Betz Action Alert with Betz SmartScan Plus (the software package driver for Betz PaceSetter Plus). This allows import of data from mainframe computers to LAN workstations; import data logged on

SmartScan Plus or other process monitoring/control system; or export data directly into a spreadsheet.

- **Heat Transfer Module**
  This will allow one to monitor the efficiency of critical heat exchangers. The design information specific to plant heat exchangers would be entered into the heat Transfer Module configuration section, thereby customizing the module.

e. **Additional Features of the Betz PaceSetter Plus**
- Not subject to background fluorescence interference
- Self-calibrating
- Telecommunication software
- Data logging (both chemical feed logging as well as monitoring information)
- Not subject to calibration standards spoilage. Can send analog output signals to DCS
- Monitor quantity of make up and blowdown
- Automatically control chemical additions based on ever-changing plant parameters
- Alarm capability when reading are out of range
- Provides chemical feed fallback on each controlled chemical

The **PaceSetter Plus** controllers will receive signals representing pH, conductivity, temperature and flow. **They can be wired to a Betz SmartScan computer for continuous on-line trending of performance and control variables.**

Each **PaceSetter Plus** controller is capable of providing automated control of the chemical feed pumps for their respective systems. Product feed control can be accomplished either a manual input of flowrates or with a flow meter. While the preferred method is to interface with a flow meter, the manual input option allows the ability to begin automated control immediately. The use of telephone/modem service allows manual entry to be accomplished either locally at the **PaceSetter Plus** or remotely from any specified computer.

The microprocessor based architecture of the **PaceSetter Plus** controller allows us the latitude of configuring feed control loops with custom algorithms designed specifically for plant needs. Product feed optimization can be accomplished by attenuating feed setpoints relative to monitored performance results.

The SmartScan provides its users with the ability to monitor variables, trend performance and adjust chemical treatment setpoints all from one location. As a Windows based program, data management is accomplished easily. The SmartScan data is formatted such that it can be directly downloaded to the Betz Action Alert software for Statistical Process Control (SPC) analysis and performance reporting.

Additionally this data can be downloaded to disk in a format that can be imported to common spreadsheet software such as Excel.

The table below identifies the proposed signals that will be interfaced with each **PaceSetter Plus** controller.

Variable	Engineering Range	Electrical Range
pH	4-10	4-20 ma
Conductivity	0-5000 µmhos	4-20 ma
90/10 Cu/Ni Corrosion Rate	0-2 mpy	4-20 ma
Mild Steel Corrosion Rate	0-2 mpy	4-20 ma
Flow Rate	0-10 gpm	4-20 ma
Blowdown Flow	0-4000 gpm	4-20 ma

Betz will collect and interpret all information/data collected from the test equipment. A good practice standardization program will be maintained to ensure all information received from the test equipment is accurate. The monitoring facility will remain on site as long as Betz is contracted for products/services or the plant decides otherwise.

OxyChem®

Responsible Care® A Public Commitment

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MSDS NUMBER : M31041 ISSUE DATE : 01-22-01

PRODUCT NAME : TOWERBROM® 90M TABLETS

Manufacturer's Name and Address : Occidental Chemical Corporation, Occidental Tower
5005 LBJ Freeway, P.O. Box 809050
Dallas, TX 75380 (972) 404-3800

24 HOUR EMERGENCY TELEPHONE : 1-800-733-3665 OR 972-404-3228

TO REQUEST AN MSDS : 1-800-699-4970

CUSTOMER SERVICE : 1-800-752-5151

PRODUCT USE : Algicide, microbiocide/microbiostat, disinfectant, sanitizer, bactericide, fungicide, bleaching agent

CHEMICAL NAME : Mixture

CHEMICAL FORMULA : Mixture

SYNONYMS/COMMON NAMES : None

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS NUMBER / NAME
87-90-1 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-trichloro-

EXPOSURE LIMITS	PERCENTAGE	
PEL: Not Established	VOL	ND
TLV: Not Established	WT	92-93
PELZ2:Not Established		

COMMON NAMES:
TRICHLOROISOCYANIC ACID (MW 232.5)
TRICHLOROISOCYANURIC ACID
TRICHLORO-S-TRIAZINETRIONE
TRICHLOR

Listed On(List Legend Below):
00 12 16 22 51

- -

2. COMPOSITION/INFORMATION ON INGREDIENTS (Continued)

7647-15-6 Sodium bromide (NaBr)

EXPOSURE LIMITS	PERCENTAGE	
PEL: Not Established	VOL	ND
TLV: Not Established	WT	7-8
PELZ2:Not Established		

COMMON NAMES:

Listed On(List Legend Below):
00 19 22 23 51
- -

LIST LEGEND

00 TSCA INVENTORY	12 PA HAZARDOUS SUBSTANCE
16 NJ WORKPLACE HAZ SUBSTANCE LST	19 PA REQUIREMENT- 3% OR GREATER
22 CANADIAN DOMESTIC SUB LIST	23 NJ REQUIREMENT- 1% OR GREATER
51 EINECS	

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********
*
STRONG OXIDIZING AGENT.

CORROSIVE.

CAUSES IRREVERSIBLE EYE DAMAGE AND SKIN BURNS.

MAY BE FATAL IF SWALLOWED.

HARMFUL IF ABSORBED THROUGH SKIN OR INHALED.
*
* White tablets with slight bromine odor *
****

POTENTIAL HEALTH EFFECTS

ROUTES OF ENTRY:

Inhalation, Ingestion.

TARGET ORGANS:

Eyes, Skin, Respiratory Tract, Gastrointestinal Tract.

IRRITANCY:

Severe, Potentially by all routes of exposure.

SENSITIZING CAPABILITY:

None known.

3. HAZARDS IDENTIFICATION (Continued)

REPRODUCTIVE EFFECTS:

None known.

CANCER INFORMATION:

Not classified as carcinogenic by NTP, IARC, OSHA, ACGIH, or NIOSH.

SHORT-TERM EXPOSURE (ACUTE)

INHALATION:

Breathing dust or fumes is expected to be a primary route of exposure and may produce throat and respiratory tract irritation.

EYES:

Contact can cause severe damage including burns and blindness.

SKIN:

On contact with moisture, this material readily hydrolyzes to acid which may result in burns if not promptly removed.

INGESTION:

May cause burns to gastrointestinal tract.

REPEATED EXPOSURE (CHRONIC)

No known chronic effects.

Chronic exposure to large amounts of this compound has not been characterized and the irritating properties of the compound make such an exposure highly unlikely.

SYNERGISTIC MATERIALS:

None known.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Pre-existing disorders affecting target organs.

4. FIRST AID MEASURES

EYES:

IMMEDIATELY FLUSH EYES WITH A DIRECTED STREAM OF WATER for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. Washing eyes within several seconds is essential to achieve maximum effectiveness. GET MEDICAL ATTENTION IMMEDIATELY.

4. FIRST AID MEASURES (Continued)

SKIN:

Immediately brush off excess chemical and flush with plenty of soap and water. Remove contaminated clothing. Wash clothing before reuse. GET MEDICAL ATTENTION if irritation persists.

INHALATION:

Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If respiration stops, have a trained person administer artificial respiration. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. (If available, give several glasses of milk.) If vomiting occurs spontaneously, keep airway clear and give more water. GET MEDICAL ATTENTION IMMEDIATELY.

NOTES TO PHYSICIAN:

Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

Flash Point: Not applicable

Method: Not applicable

Autoignition Temperature: Not applicable

FLAMMABLE LIMITS IN AIR, BY % VOLUME

Upper: Not applicable
Lower: Not applicable

EXTINGUISHING MEDIA:

In case of fire or smoke call the fire department. Do not attempt to extinguish the fire without a self contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

FIRE FIGHTING PROCEDURES:

Firefighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Using a 10% solution of sodium carbonate, thoroughly decontaminate fire fighting equipment including all fire fighting wearing apparel after the incident.

5. FIRE FIGHTING MEASURES (Continued)

FIRE AND EXPLOSION HAZARD:

This product, when ignited, will burn with the evolution of noxious chlorine containing gases. Decomposition requires a continuous heat source. Once the heat source is removed, decomposition will not continue. In addition, when in contact with another combustible material, this product will increase the burning rate of the combustible material.

Nitrogen trichloride can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Nitrogen trichloride can present an explosion hazard.

Immediately after a fire has been extinguished, check for wet or damp material. Any spilled material from burned or broken containers should be assumed contaminated. Neutralize to a non-oxidizing material for safe disposal. Do not attempt to re-close broken drums, even for movement to the disposal area. They should be left open to disperse any nitrogen trichloride that may form.

Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the plastic liner of the drum is damaged or the material is damp, the material should be neutralized to a non-oxidizing material for safe disposal.

Bulging containers require extreme care. Contact the fire department.

Material glows on ignition and burns without a visible flame. Contact of molten material with limited amounts of water may result in steam explosion.

SENSITIVITY TO MECHANICAL IMPACT:

Not sensitive.

SENSITIVITY TO STATIC DISCHARGE:

Not sensitive.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Follow protective measures provided under Personal Protection in Section 8.

ENVIRONMENTAL PRECAUTIONS:

Contain spill with dike to prevent entry into sewers or waterways.

6. ACCIDENTAL RELEASE MEASURES (Continued)

METHODS FOR CLEANING UP:

Contain spilled material. Any spillage should be cleaned up as soon as possible. DO NOT add water to spilled material. Using clean, dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean, dry containers for disposal. DO NOT use floor sweeping compounds to clean up spills. DO NOT close drums containing wet or damp material. They should be left open to disperse any nitrogen trichloride that may form. DO NOT transport wet or damp material.

7. HANDLING AND STORAGE

HANDLING:

Do not get in eyes, on skin or clothing.

Avoid breathing airborne particulates; wear respiratory protection when exposure is possible.

Vapor space in a closed container may contain a slight amount of chlorine and bromine gases and compounds from decomposition of the product.

Wear goggles or face shield and rubber gloves when handling.

Wash thoroughly with soap and water after handling.

Wash contaminated clothing before reuse.

SPECIAL MIXING AND HANDLING INSTRUCTIONS:

Mix only with water. Use clean dry utensils. DO NOT add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter, or other chemicals may start a chemical reaction with generation of heat, liberation of hazardous gases, and possible generation of fire and explosion.

Vapor space in a closed container may contain a slight amount of chlorine gas and other chlorine containing compounds from decomposition of the product. Exposure to chlorine gas may cause burning of the eyes with tearing; burning of the nose and mouth with runny nose; and irritation of the linings of the entire respiratory tract with coughing, a choking sensation, substernal pain, vomiting, nausea, headache, dizziness and fainting. The onset of severe respiratory symptoms following exposure to chlorine, including pulmonary edema and pneumonitis, may be delayed.

DIRECTIONS FOR USE: It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

FOR INDUSTRIAL USE ONLY, FOR REPACKAGING OR FORMULATION AS A DISINFECTANT, SANITIZER, BACTERICIDE, FUNGICIDE OR ALGICIDE. Repackagers or formulators must obtain their own EPA Registration Number to legally market this product for these uses.

7. HANDLING AND STORAGE (Continued)

STORAGE:

Store in original container and in a dry area where temperatures do not exceed 52°C (125°F) for 24 hours. Retie polyethylene liner after each use and keep container tightly closed. Do not allow water to get into container. Keep container off wet floors. Do not contaminate water, food or feed by storage or disposal.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Handle product in a well ventilated area.

If product is handled in an open system, the use of process enclosures, local exhaust ventilation, and/or other engineering controls should be considered to control airborne levels to below recommended exposure limits, or below acceptable levels where there are no limits.

PERSONAL PROTECTION

RESPIRATORY:

A NIOSH approved respirator with an organic vapor acid gas cartridge with dust, fume and mist filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.

A respiratory protection program that meets 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant use of a respirator.

EYE/FACE:

Wear chemical safety goggles. (ANSI Z87.1)

SKIN:

Wear chemical resistant gloves such as rubber, neoprene or vinyl.

Launder contaminated clothing and clean protective equipment before reuse.

OTHER:

Emergency shower and eyewash facility should be in close proximity (ANSI Z358.1).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: White tablets with slight bromine odor

9. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

Odor Threshold: Not determined

Specific Gravity (Water=1): Not determined

Vapor Pressure: Not determined

Vapor Density (Air=1): Not determined

Density: 63-66 lbs/cu.ft. (loose bulk)

Evaporation Rate: Not determined

% Volatiles by Wt: Not determined

Boiling Point: Not determined

Freezing Point: Not determined

Melting Point: 225-230°C (437-446°F) (decomposes)

Solubility in Water (% by wt.): 1.2g/100g @ 25°C

pH: 3-3.5 (1% solution @ 25°C)

Octanol/Water Partition Coefficient: Not determined

Thermal Decomposition Temperature: 225-230°C (437-446°F)

Other: Not applicable

VOC (% by wt;g/l): Not determined

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:

X	STABLE		UNSTABLE

REACTS WITH:

	AIR		OXIDIZERS		METALS
X	WATER	X	ACIDS		OTHER
	HEAT	X	ALKALIS		NONE

HAZARDOUS POLYMERIZATION:

	OCCURS	X	WILL NOT OCCUR

COMMENTS:

NFPA Oxidizer Classification 1

This material is a strong oxidizing agent. The preparation of concentrated solutions or slurries is not recommended. Avoid contact with water on concentrated material in the container. Also avoid contact with easily oxidizable organic material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; calcium hypochlorite; alkalis.

10. STABILITY AND REACTIVITY (Continued)

HAZARDOUS DECOMPOSITION PRODUCTS:

Chlorine containing gases can be produced.

Bromine containing gases can be produced.

Revised

11. TOXICOLOGICAL INFORMATION

87-90-1 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tri-

This material contains 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-trichloro- at levels that may produce a biological effect. Minimize contact. This substance is moderately toxic by ingestion. It is extremely irritating to the eyes and skin.

For further information call or write the address shown on page 1 of the MSDS.

Revised

12. ECOLOGICAL INFORMATION

87-90-1 1,3,5-Triazine-2,4,6(1H,3H,5H)-trione, 1,3,5-tri-

TOXICITY: This material has been determined to be highly toxic to freshwater fish and invertebrates in acute toxicity tests.

PERSISTENCE: This material will readily biodegrade.

BIOACCUMULATION: This material is believed to be unlikely to bioaccumulate.

For further information call or write the address shown on page 1 of the MSDS.

13. DISPOSAL CONSIDERATIONS

Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Product disposal: Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction and fire. Do not transport damp or wet material. Neutralize materials to a non-oxidizing state for safe disposal.

CONTAINER DISPOSAL:

13. DISPOSAL CONSIDERATIONS (Continued)

FIBER DRUM: Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Remove and triple rinse polyethylene liner. Then dispose of liner in a sanitary landifll or by incineration as allowed by State and local authorities. If drum is contaminated and cannot be reused, dispose of in the same manner.

METAL CONTAINER: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

PLASTIC DRUM: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

BULK BAG OR PLASTIC BAG: Completely empty bag into application equipment. Remove and triple rinse polyethylene liner. Dispose of empty bag and liner in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. Do not reuse bag.

BULK BIN: Return empty bulk bin for reuse. Do not vacuum, wash, or clean inside of bin.

vised

14. TRANSPORT INFORMATION

DOT PROPER SHIPPING NAME: Trichloroisocyanuric Acid,Dry,Mixture

DOT HAZARD CLASS: 5.1

DOT IDENTIFICATION N0: UN2468

DOT PACKING GROUP: II

DOT HAZARDOUS SUBSTANCE: Not Applicable

DOT MARINE POLLUTANT(S): Not Applicable

ADDITIONAL DESCRIPTION REQUIREMENT: Not Applicable

15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

OSHA Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

15. REGULATORY INFORMATION (Continued)

TSCA:

All components of this product that are required to be on the TSCA inventory are listed on the inventory.

SARA/TITLE III HAZARD CATEGORIES:

If the word "YES" appears next to any category, this product may be reportable by you under the requirements of 40 CFR 370. Please consult those regulations for details.

Immediate(Acute) Health:	YES	Reactive Hazard	YES
Delayed(Chronic) Health:	NO	Sudden Release of Pressure	NO
Fire Hazard:	YES		

HMIS HAZARD RATINGS:

HEALTH HAZARD: 3 FIRE HAZARD: 1 REACTIVITY: 2

STATE REGULATIONS:

See Section 2. COMPOSITION/INFORMATION ON INGREDIENTS list legend for applicable state regulation.

INTERNATIONAL REGULATIONS:

Consult the regulations of the importing country.

CANADA:

WHMIS Hazard Class: C, D2B

16. OTHER INFORMATION

For additional non-emergency health, safety or environmental information telephone (972) 404-2076 or write to:

Occidental Chemical Corporation
Product Stewardship Department
5005 LBJ Freeway
P.O. Box 809050
Dallas, Texas 75380

16. OTHER INFORMATION (Continued)

MSDS LEGEND:

ACGIH = American Conference of Governmental Industrial Hygienists

CAS = Chemical Abstracts Service Registry Number

CEILING = Ceiling Limit (15 Minutes)

CEL = Corporate Exposure Limit

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit (OSHA)

STEL = Short Term Exposure Limit (15 Minutes)

TDG = Transportation of Dangerous Goods (Canada)

TLV = Threshold Limit Value (ACGIH)

TWA = Time Weighted Average (8 Hours)

WHMIS = Worker Hazardous Materials Information System (Canada)

* = See Section 3 Hazards Identification - Repeated Exposure(Chronic) Information

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, OR OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. This information is not intended to be all-inclusive as to the manner and conditions of use, handling and storage. Other factors may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended as, and nothing herein shall be construed as a recommendation to infringe any existing patents or violate any federal, state or local laws, rules, regulations or ordinances.

17. WARNING LABEL INFORMATION

This product is registered with the United States Environmental Protection Agency (EPA) as a pesticide, as required under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). It is shipped under a FIFRA approved product label. It is a violation of Federal law to use this product for pesticidal applications in a manner inconsistent with the FIFRA labeling.

Repackers or formulators must obtain their own EPA registration and FIFRA approved label to legally market this product for pesticidal applications.

This product may be used by manufacturers of non-pesticidal products provided no pesticidal claim is made.

ONDEO Nalco

MATERIAL SAFETY DATA SHEET

PRODUCT

TOWERBROM® 960

EMERGENCY TELEPHONE NUMBER
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	**TOWERBROM® 960**
APPLICATION :	BIOCIDE
COMPANY IDENTIFICATION :	ONDEO Nalco Company ONDEO Nalco Center Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER :	(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 1 / 1 REACTIVITY : 2 / 2 OTHER : OXIDIZER
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Dichloroisocyanurate	2893-78-9	89.0
Sodium Bromide	7647-15-6	5.0 - 10.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
CORROSIVE. CAUSES EYE AND SKIN DAMAGE. IRRITATING TO NOSE AND THROAT. HARMFUL OR FATAL IF SWALLOWED. Prolonged ingestion of large amounts may cause adverse central nervous system effects.
Strong Oxidizer.
Do not get in eyes, on skin, on clothing. Remove contaminated clothing and wash before reuse.
Wear goggles and face shield and rubber gloves when handling.
Not flammable but can act as an oxidizing agent, enhancing the burning rate of other materials. Water Reactive; material will react with water and may release a flammable or toxic gas. In addition, nitrogen trichloride, which can present an explosion hazard, can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Decomposes; flammable and/or toxic gases will form at elevated temperatures (thermal decomposition).

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

INGESTION :
Not a likely route of exposure. Corrosive; causes chemical burns to the mouth, throat and stomach. Can cause central nervous system depression, nausea, dizziness, vomiting, or unconsciousness.

INHALATION :
Not a likely route of exposure. Irritating, in high concentrations, to the eyes, nose, throat and lungs.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Excessive exposure may cause central nervous system effects, nausea, vomiting, anesthetic or narcotic effects.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :
Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention.

INGESTION :
DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Use water spray to cool containers exposed to fire and massive quantities of water to dilute material involved in a fire or spilled from containers. Do not use ABC or other dry chemical fire extinguishers since there is the potential for a violent reaction.

FIRE AND EXPLOSION HAZARD :
Not flammable but can act as an oxidizing agent, enhancing the burning rate of other materials. Water Reactive; material will react with water and may release a flammable or toxic gas. In addition, nitrogen trichloride, which can present an explosion hazard, can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Decomposes; flammable and/or toxic gases will form at elevated temperatures (thermal decomposition).

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ensure adequate ventilation. Do not touch spilled material. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
Sweep up and shovel. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).. DO NOT allow water to come into contact with this material.

ENVIRONMENTAL PRECAUTIONS :
This product is toxic to fish. Do not discharge effluent containing this active ingredient into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating dusts. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed. Store in suitable labelled containers. Store separately from bases. Keep in dry place. Store away from organic chemicals and other oxidizable materials, reducing agents, acids and alkalis. DO NOT allow water to come into contact with this material.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Manufacturer's Recommendation : Substance(s)	
Sodium Dichloroisocyanurate	TWA: 0.5 mg/m3 STEL: 1.5 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

RESPIRATORY PROTECTION :
If dusts are generated, use an approved air-purifying respirator. An organic vapor/acid gas cartridge with dust/mist prefilter may be used. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Neoprene gloves, PVC gloves, Butyl gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Crystalline, Granular
APPEARANCE	White
ODOR	Slight, Pungent

SOLUBILITY IN WATER	Moderate
pH (1 %)	6 - 7
MELTING POINT	Decomposes 460 - 480 °F / 240 - 250 °C
VOC CONTENT	0.0 %

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Moisture

Avoid temperatures greater than 400 °F

MATERIALS TO AVOID :
Do not bring in contact with organic materials and reducing agents. DO NOT allow water to come into contact with this material.

HAZARDOUS DECOMPOSITION PRODUCTS :
Oxides of nitrogen (NOx), disodium oxide, bromine, and traces of phosgene (under fire conditions); chlorine (released in presence of moisture) and other chlorine containing compounds; hypobromous acid, hypochlorous acid, and cyanuric acid (released when dissolved in water); nitrogen trichloride, an explosion hazard (generated slowly by the reaction of small quantities of water with high concentration of this product).

11. TOXICOLOGICAL INFORMATION

The following results are for a similar product.

ACUTE ORAL TOXICITY :

Species	LD50	Tested Substance
Rat	1,350 mg/kg	

Rating : Non-Hazardous

ACUTE DERMAL TOXICITY :

Species	LD50	Tested Substance
Rabbit	> 5g/kg	

Rating : Non-Hazardous

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Tested Substance
Fathead Minnow	96 hrs	0.7 mg/l	
Sheepshead Minnow	96 hrs	3.42 mg/l	

Rating : Very toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Tested Substance
Daphnia magna	48 hrs	2.5 mg/l		
Mysid Shrimp (A. bahia)	48 hrs	3.54 mg/l		

Rating : Toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D001, D003

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are:

LAND TRANSPORT :

Proper Shipping Name : DICHLOROISOCYANURIC ACID, SALTS, MIXTURE

Technical Name(s) :	
UN/ID No :	UN 2465
Hazard Class - Primary :	5.1
Packing Group :	II
Flash Point :	None

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	DICHLOROISOCYANURIC ACID, SALTS, MIXTURE
Technical Name(s) :	
UN/ID No :	UN 2465
Hazard Class - Primary :	5
Packing Group :	II
IATA Cargo Packing Instructions :	511
IATA Cargo Aircraft Limit :	25 KG (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	DICHLOROISOCYANURIC ACID, SALTS, MIXTURE
Technical Name(s) :	
UN/ID No :	UN 2465
Hazard Class - Primary :	5.1
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Dichloroisocyanurate : Corrosive, Oxidizer
Sodium Bromide : Eye irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
X	Fire Hazard
-	Sudden Release of Pressure Hazard
X	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The chemical substances in this product are on the TSCA 8(b) Inventory (40 CFR 710).

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
E - Corrosive Material, C - Oxidizing Material

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should

be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, Co.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO

Prepared By : Product Safety Department
Date issued : 09/18/2000
Replaces : 01/31/1996

Towerchlor® 860

CALGON CORPORATION

P.O. Box 1346
Pittsburgh, PA 15230-1346
Phone--(412)494-8000

MATERIAL SAFETY DATA SHEET

Section 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **Towerchlor® 860**

CHEMICAL DESCRIPTION: Chlorinated isocyanurate
PRODUCT CLASS: Microbiocide
MSDS CODE: 0B23-02-01-93

Section 2. INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	% by Weight	OSHA PEL	ACGIH TLV
Sodium dichloro-s-triazinetrione	2893-78-9	96	None established	TWA 0.5 mg/m^3, STEL 1.5 mg/m^3 (supplier recommendation)

Product ingredient, Sodium dichloro-s-triazinetrione, is also referred to as Sodium dichloroisocyanurate. Product provides 62% available chlorine in solution.

Section 3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

DANGER!
May cause severe eye and skin damage.
May be harmful if swallowed.
May cause respiratory tract irritation.
STRONG OXIDIZING AGENT. WILL BURN WITH THE EVOLUTION OF CHLORINE AND EQUALLY TOXIC GASES.
Contact with water slowly liberates irritating and hazardous chlorine containing gases.
Decomposes at 460-480°F with release of harmful gases.

****

PRIMARY ROUTES OF ENTRY: Eye and skin contact, inhalation, ingestion

TARGET ORGANS: Eye, skin, respiratory tract, gastrointestinal tract

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: No data available.

Continued on Page 2

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product may cause severe irritation and damage upon contact with the eye.

SKIN CONTACT: This product may be irritating and damaging to the skin upon contact. In dry form, the product is not appreciably irritating to dry skin. However, on contact with moisture, sodium dichloro-s-triazinetrione readily hydrolyzes to form hypochlorous acid which may cause tissue damage. This product is not expected to be absorbed through the skin in harmful amounts or to cause an allergic skin reaction.

INGESTION: Ingestion of sodium dichloroisocyanurate has been reported to cause ulceration or bleeding from the stomach, gastrointestinal irritation, salivation, tearing, shortness of breath, weakness, emaciation, lethargy, diarrhea, and coma.

INHALATION: Inhalation of sodium dichloro-s-triazinetrione dust has been reported to produce nose, throat, and respiratory tract irritation and in some individuals bronchospasm may result. In solution with water, hypochlorous acid is produced which, if aerosolized, can cause eye and respiratory tract irritation. Chlorine gas from decomposition of the product has been reported to cause burning of the nose and mouth and irritation of the lining of the respiratory tract with coughing, a choking sensation, chest pain, vomiting, nausea, headache, dizziness and fainting. The onset of severe respiratory symptoms following exposure to chlorine, including pulmonary edema and pneumonitis, may be delayed.

SUBCHRONIC, CHRONIC:
Following repeated exposures (8-weeks) to sodium dichloroisocyanurate in their drinking water (pH adjusted to 7.2 - 7.6), clinical signs of toxicity, decreases in body weight gain and drinking water consumption, and changes in urine composition at dosages which produced some deaths were noted in rats. In a 90-day feeding study with rats, the two highest dose levels of 6000 and 12,000 ppm caused increases of the relative kidney and liver weights.

Signs of eye and nose irritation and changes in body weight, liver weight and blood cell composition were noted following repeated inhalation (4-weeks) of sodium dichloroisocyanurate dust by rats. No birth defects were noted in rats given sodium dichloroisocyanurate orally during pregnancy, even at amounts which produced adverse effects on the mothers.

CARCINOGENICITY:
NTP:
No ingredients listed in this section
IARC:
No ingredients listed in this section
OSHA:
No ingredients listed in this section

Section 4. FIRST AID MEASURES

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Seek medical aid immediately.

SKIN CONTACT: In case of contact, immediately brush off excess product and flush with plenty of soap and water. Remove contaminated clothing. Seek medical aid immediately. Wash clothing before reuse.

Continued on Page 3

INGESTION: If swallowed, give large amounts of water to dilute the toxicant. If immediately available, demulcents such as milk, vegetable oil or egg whites can be given. Do NOT induce vomiting as it is likely to cause considerable mucosal damage. If vomiting does occur, give fluids again. Get medical attention immediately.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical aid.

Section 5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable
This product is not, by definition, flammable or combustible, however, it is an oxidizing and chlorinating agent. If heated by an outside source to temperatures above 240°C (464°F), it will undergo vigorous self-sustaining decomposition with the evolution of heat and dense noxious gases. In addition, when in contact with another combustible material, this product will increase the burning rate of the combustible material. When ignited, it will burn with the evolution of noxious chlorine containing gases.

LOWER FLAMMABLE LIMIT: Not applicable UPPER FLAMMABLE LIMIT: Not applicable

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use water spray to cool containers exposed to fire and massive quantities of water to dilute material involved in a fire or spilled from containers. Do not use ABC or other dry chemical fire extinguishers since there is the potential for a violent reaction.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.
Chlorine containing gases with traces of phosgene can be liberated at temperatures in excess of 400°F. Using a 10% solution of sodium carbonate, thoroughly decontaminate fire fighting equipment including all fire fighting wearing apparel after the incident.

FIRE & EXPLOSION HAZARDS: Nitrogen trichloride can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Nitrogen trichloride can present an explosion hazard.

Immediately after a fire has been extinguished, check for wet or damp material. Any spilled material from burned or broken containers should be assumed to be contaminated. Neutralize to a non-oxidizing material for safe disposal. Do not attempt to re-close broken containers, even for movement to the disposal area. They should be left open to disperse any nitrogen trichloride that may form.

Bulging containers require extreme care. Contact the fire department.

DECOMPOSITION PRODUCTS: Chlorine (released in presence of moisture) and other chlorine containing compounds. Hypochlorous acid and cyanuric acid (released when dissolved in water). Thermal decomposition or combustion may produce oxides of nitrogen, disodium oxide, and traces of phosgene.

NFPA RATINGS: Health = 3 Flammability = 1 Reactivity = 2 Special Hazard = Oxidizer

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

Continued on Page 4

Section 6. ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled material. Any spillage should be cleaned up as soon as possible. DO NOT add water to spilled material. Using clean, dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean, dry containers for disposal. DO NOT use floor sweeping compounds to clean up spills. DO NOT close drums containing wet or damp material. They should be left open to disperse any nitrogen trichloride that may form. DO NOT transport wet or damp material. Keep product out of sewers, watersheds and water systems. DO NOT contaminate water, food, or feed by storage or disposal. Report any release of this product if it could cause harm to people or the environment, or if the State requires a more stringent reporting threshold. If this product spill gets into the ground or surface water or is involved in a fire, toxic gases are released; therefore, the spill should be reported.

Section 7. HANDLING AND STORAGE

HANDLING: It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Do not get in eyes, on skin or clothing.
Avoid breathing dust or fume.
Use with adequate ventilation.
Wash thoroughly after handling. Keep container closed when not in use.
Keep from contact with clothing and other combustible materials.
Remove and wash contaminated clothing promptly.
Never add water to product. Always add product to large quantities of water. Use clean, dry utensils. DO NOT add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter, or other chemicals may start a chemical reaction with generation of heat, liberation of hazardous gases, and possible fire and explosion.
Vapor space in a closed container may contain a slight amount of chlorine gas and compounds from decomposition of the product.

STORAGE: Store in a cool, dry, well-ventilated place away from flammable liquids, combustible materials, and oxidizable materials.
Store in original container and in a dry area where temperatures do not exceed 125°F (52°C) for 24 hours. Keep container tightly closed. DO NOT allow water to get into container and keep off wet floors. Do not contaminate water, food or feed by storage or disposal.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles and face shield
SKIN PROTECTION: Chemical resistant gloves and protective clothing
RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134).

Continued on Page 5

ENGINEERING CONTROLS: Use local and/or general exhaust ventilation to maintain airborne concentrations below exposure limits.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Not applicable

SOLUBILITY IN WATER: 25 g/100 g @ 25°C

VAPOR PRESSURE: Not available

SPECIFIC GRAVITY: Not applicable

VAPOR DENSITY (air=1): Not available

pH: 6.0 - 7.0 (1% solution @ 25°C)

%VOLATILE BY WEIGHT: Nil

FREEZING POINT: Not applicable

APPEARANCE AND ODOR: White crystalline granules with a slight chlorine odor.

Section 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Avoid overheating. The preparation of concentrated solutions or slurries (10% or greater) is not recommended.

INCOMPATIBILITY: Avoid contact with water on concentrated material in the container. Also avoid contact with easily oxidizable organic material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; calcium hypochlorite; alkalis. Contact with ammonia, ammonium salts, urea or similar compounds which contain nitrogen may form nitrogen trichloride, a highly explosive compound. Mixture with hydrated salts may result in an exothermic reaction, decomposition and container rupture due to pressure. Mixture with nonionic surfactants may result in highly exothermic reactions causing fire or explosion.

DECOMPOSITION PRODUCTS: Chlorine (released in presence of moisture) and other chlorine containing compounds. Hypochlorous acid and cyanuric acid (released when dissolved in water). Thermal decomposition or combustion may produce oxides of nitrogen, disodium oxide, and traces of phosgene.

Section 11. TOXICOLOGICAL INFORMATION

ON PRODUCT:
See the following information on the main ingredient.

ON INGREDIENTS:

Chemical Name	Oral LD_{50} (rat)	Dermal LD_{50} (rabbit)	Inhalation LC_{50} (rat)
Sodium dichloro-s-triazinetrione	700 mg/kg	6000 mg/kg	Not available

Continued on Page 6

Section 12. ECOLOGICAL INFORMATION

ON PRODUCT:

Environmental hazards:
This product is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

Environmental Effects:
Oral LD_{50} mallard duck: 1916 mg/kg
8-day dietary LC_{50} mallard duck: > 10,000 ppm
8-day dietary LC_{50} bobwhite quail: > 10,000 ppm

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Sodium dichloroisocyanurate	96 hr LC_{50} (rainbow trout): 0.37 ppm 96 hr LC_{50} (bluegill sunfish): 0.43 ppm

Section 13. DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste based on the characteristics of ignitability and reactivity. The EPA Hazardous Waste Numbers are D001 and D003.

DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction and fire. Do not transport damp or wet material. Neutralize materials to a non-oxidizing state for safe disposal.

Section 14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Class/Division: 5.1
Proper Shipping Name: Dichloroisocyanuric acid salts
Label: Oxidizer
Packing Group: II
ID Number: UN 2465

Section 15. REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

Continued on Page 7

TSCA: Pesticides are exempted by TSCA (the Toxic Substances Control Act), under Section 3(2)(a)ii, from the provisions of the Act.

CERCLA reportable quantity of EPA hazardous substances in product:

Chemical Name	RQ
No ingredients of this product have CERCLA reportable quantities.	

Product RQ: This product has not been assigned an RQ; however, releases may be reportable. (Notify EPA of product spills exceeding this amount.)

SARA TITLE III:

Section 302 Extremely Hazardous Substances:

Chemical Name	CAS #	RQ	TPQ
There are no SARA 302 Extremely Hazardous Substances in this product.			

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
[yes]	[yes]	[yes]	[no]	[yes]

Section 313 Toxic Chemicals:

Chemical Name	CAS #	% by Weight
There are no reportable SARA 313 Toxic Chemicals in this product.		

Section 16. OTHER INFORMATION

HMIS RATINGS: Health = 3* Flammability = 1 Reactivity = 2
Personal Protective Equipment = X (to be specified by user depending on use conditions)

*There are potential chronic health effects to consider.

Hazard rating scale: 0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe

MSDS REVISION SUMMARY: Reason for reissue: Update to new format.

While this information and recommendations set forth herein are believed to be accurate as of the date hereof, CALGON CORPORATION MAKES NO WARRANTY WITH RESPECT HERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

PREPARED BY: P.J. Maloney

MATERIAL SAFETY DATA SHEET

MSDS

Date-Issued: 10/03/1997
MSDS Ref. No: BBIO61734
Date-Revised: 11/03/1999
Revision No: 2

Tower Pro Tablets

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Tower Pro Tablets
GENERAL USE: Industrial water treatment.
CHEMICAL FAMILY: Chlorinated Isocyanurates

MANUFACTURER
Bio-Lab, Inc.
Commercial & Specialties Division
P.O. Box 1489
Decatur, GA 30031
Customer SERVICE: (800) 600-4523

24 HR. EMERGENCY TELEPHONE NUMBERS
CHEMTREC (Transportation) (800) 424-9300
Poison Control Center (Medical)(877) 800-5553

COMMENTS:
EPA Registration Number: 5185-144

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS#	EINECS #
Trichloro-s-triazinetrione	99	87-90-1	201-782-8

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
PHYSICAL APPEARANCE:
White tablets with halogen odor.

IMMEDIATE CONCERNS:
DANGER: Highly Corrosive: Causes skin and eye damage. May be fatal if swallowed. Do not get in eyes, on skin, or on clothing. Wear goggles or safety glasses and rubber gloves when handling this product. Irritating to nose and throat. Avoid breathing dust and fumes. Remove contaminated clothing and wash before reuse.

POTENTIAL HEALTH EFFECTS
EYES:
DANGER: Highly Corrosive. Causes eye damage. Do not get in eyes.

SKIN:
DANGER: Highly Corrosive. Causes skin damage. Do not get on skin.

INGESTION:
May be fatal if swallowed.

INHALATION:
Irritating to nose and throat. Avoid breathing dust or fumes.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

EYES:
May result in corrosion to the eyes. Dust or vapors may cause irritation and tearing.

SKIN:
Dermal contact is expected to be a primary route of exposure and can cause skin irritation which may result in corrosion if not promptly removed.

INGESTION:
Will result in burning of mouth, throat and esophagus, abdominal distress and severe irritation, possible corrosion of the digestive tract.

INHALATION:
Breathing dust or fumes is expected to be a primary route of exposure and may produce throat and respiratory tract irritation.

ROUTES OF ENTRY:
Skin Contact, Inhalation, Ingestion, Eye Contact.

COMMENTS HEALTH:
There are no known chronic hazards.

4. FIRST AID MEASURES

EYES:
If contact with eyes occurs: Immediately flush with cold water for at least 15 minutes. Then get immediate medical attention.

SKIN:
If contact with skin: Brush off excess chemical and flush skin with cold water for at least 15 minutes. If irritation persists, get medical attention.

INGESTION:
If swallowed: Drink promptly large quantities of water. Do not induce vomiting. Avoid alcohol. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

INHALATION:
If inhaled: Remove to fresh air. If breathing is difficult, have trained person administer oxygen. If not breathing, give artificial respiration. Call a physician immediately.

NOTES TO PHYSICIAN:
Probable mucosal damage may contraindicate the use of gastric lavage.

Do not use floor sweeping compounds to clean up spills. Do not close containers containing wet or damp material. They should be left open to disperse any hazardous gases that may form. Do not transport wet or damp material. Keep product out of sewers, watersheds and water systems. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Dispose of according to local, state and federal regulations.

7. HANDLING AND STORAGE

HANDLING:

STRONG OXIDIZING AGENT: Do not mix with other chemicals. Mix only with water. Never add water to product. Always add product to large quantities of water. Use clean dry utensils. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause a violent reaction leading to fire or explosion. Contamination with moisture, organic matter or other chemicals will start a chemical reaction and generate heat, hazardous gas, possible fire and explosion. In case of contamination or decomposition, do not reseal container. If possible, isolate container in open air or well ventilated area. Flood area with large volumes of water.

STORAGE:

Keep this product in original closed container when not in use. Store in a cool, dry, well ventilated area away from heat or open flame. Do not contaminate water, food or feed by storage or disposal or cleaning of equipment. Do not store above 125 F (52 C).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

		EXPOSURE LIMITS					
		OSHA PEL		ACGIH TLV		SUPPLIER OEL	
		ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3
Trichloro-s-triazinetrione	TWA	N/E[1]		N/E			

OSHA TABLE COMMENTS:

1. N/E = Not Established

ENGINEERING CONTROLS:

General room ventilation plus local exhaust should be used to minimize exposure to dust/vapors.

PERSONAL PROTECTIVE EQUIPMENT:

EYES AND FACE:

Wear goggles or safety glasses with side shields when handling this product.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: Not Applicable
AUTOIGNITION TEMPERATURE: Not Applicable

GENERAL HAZARD:
This product did not ignite when exposed to pallet scale burn tests. When in direct contact with combustible material, this product may slightly enhance the burning rate of the combustible material. Under extreme heat (greater than 400F), this product will evolve noxious chlorine containing gases necessitating the need for self contained breathing apparatus (SCBA) when applying extinguishing media (WATER).

EXTINGUISHING MEDIA:
In case of fire or smoke, call the fire department. Do not attempt to extinguish the fire without a self-contained breathing apparatus (SCBA). Do not let the fire burn. Flood with copious amounts of water. DO NOT use ABC or other dry chemical extinguishers since there is the potential for a violent reaction.

EXPLOSION HAZARDS:
Nitrogen trichloride can be generated slowly by the reaction of small quantities of water with a high concentration of this product. Nitrogen trichloride can present an explosion hazard.

Immediately after a fire has been extinguished, check for wet or damp material. Any spilled material from burned or broken containers should be assumed contaminated. Neutralize to a non-oxidizing material for safe disposal. Do not attempt to re-close broken containers, even for movement to the disposal area. They should be left open to disperse any nitrogen trichloride that may form.

Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. If the plastic liner (where applicable) of the container is damaged or the material is damp, the material should be chemically treated if allowable, to a non-oxidizing material for safe disposal.

Bulging containers require extreme care. Contact the fire department.

FIRE FIGHTING PROCEDURES:
Firefighters should wear full protective clothing and self-contained breathing apparatus (SCBA). Using a 10% solution of sodium carbonate, thoroughly decontaminate fire fighting equipment including all fire fighting wearing apparel after the incident.

6. ACCIDENTAL RELEASE MEASURES

GENERAL PROCEDURES:
Using appropriate protective clothing and safety equipment, contain spilled material. Do not add water to spilled material. Using clean dedicated equipment, sweep and scoop all spilled material, contaminated soil, and other contaminated material and place into clean dry containers for disposal.

SKIN:
Wear rubber gloves when handling this product. Avoid contact with skin.

RESPIRATORY:
A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

WORK HYGIENIC PRACTICES:
Remove and wash contaminated clothing before reuse.

OTHER USE PRECAUTIONS:
Facilities storing or utilizing this material should be equipped with an eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid
ODOR: Chlorine
APPEARANCE: Tablet
COLOR: White
pH: 3 to 3.5(1% solution @ 25 C)
VAPOR PRESSURE: Not Available
VAPOR DENSITY: Not Determined
BOILING POINT: Not Applicable
FREEZING POINT: Not Applicable
THERMAL DECOMPOSITION: 225°C to 230°C
SOLUBILITY IN WATER: 1.2g/100g Water
DENSITY: 55 - 60 lb / cu ft

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:
High temperature. Poor ventilation. Contamination. Moisture/high humidity.

STABILITY:
This product is stable under normal conditions.

POLYMERIZATION:
Hazardous polymerization will not occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS:
Chlorine containing gases can be produced.

INCOMPATIBLE MATERIALS:
This material is a strong oxidizing agent. Avoid contact with water on concentrated material in the container. Also avoid contact with easily oxidizable organic material; ammonia, urea, or similar nitrogen containing compounds; inorganic reducing compounds; floor sweeping compounds; calcium hypochlorite; alkalis; other swimming pool/spa chemicals in their concentrated forms.

11. TOXICOLOGICAL INFORMATION

ACUTE
DERMAL LD_{50}: 7600 mg/kg of body weight in rabbits.
ORAL LD_{50}: 600 mg/kg of body weight in rats
On contact with moisture, this material readily hydrolyzes to hypochlorous acid and cyanuric acid. The tissue damage resulting from contact is considered to result, in part, from its hypochlorous acid decomposition products. May cause gastrointestinal and respiratory tract irritation. May be severely irritating or corrosive to eyes and skin.

EYE EFFECTS:
This product is corrosive to eyes.

SKIN EFFECTS:
This product is corrosive to skin.

SUBCHRONIC:
Chronic exposure to large amounts of this compound has not been characterized and the irritating properties of the compound make such an exposure highly unlikely.

CARCINOGENICITY:
This product is not listed as a carcinogen by IARC.
This product is not listed as a carcinogen by NTP.
This product is not listed as a carcinogen by OSHA.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
This pesticide is toxic to fish and aquatic organisms. Do not disharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or ther waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:
Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance. Do not contaminate water, food, or feed by storage or disposal or cleaning of equipment. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction or fire.

EMPTY CONTAINER:
Do not reuse container. Rinse throughly before discarding in trash.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)
PROPER SHIPPING NAME: Trichloroisocyanuric Acid, Dry
PRIMARY HAZARD CLASS/DIVISION: 5.1
UN/NA NUMBER: 2468
PACKING GROUP: II

15. REGULATORY INFORMATION

UNITED STATES
SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)
313 REPORTABLE INGREDIENTS: This product or its components are not listed.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)
CERCLA REGULATORY: This product or its components are not listed.

TSCA (TOXIC SUBSTANCE CONTROL ACT)
TSCA REGULATORY: This product or its components are not subject to export notification.
TSCA STATUS: This product or its components are listed on the TSCA Inventory.

OSHA HAZARD COMM. RULE:
Product is hazardous by definition of the Hazardous Communication Standard.

FIFRA (FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT):
This product is a registered pesticide.

16. OTHER INFORMATION

MATERIAL SAFETY DATA SHEET

MSDS

Date-Issued: 10/03/1997
MSDS Ref. No: BBIO61734
Date-Revised: 11/03/1999
Revision No: 2

Tower Pro Tablets

REVISION SUMMARY
Revision #: 2

This MSDS replaces the October 28, 1997 MSDS. Any changes in information are as follows:
In Section 2
Emergency Overview - Immediate Concerns (text) Potential Heath Effects - Eyes (text) Potential Health Effects - Skin (text) Potential Health Effects - Skin Absorption (text) Potential Health Effects - Inhalation (text) Potential Health Effects - Ingestion (text) Signs & Symptoms - Eyes (text) Signs & Symptoms - Ingestion (text) Signs & Symptoms - Inhalation (text) Signs & Symptoms - Skin (text)

In Section 3
Firstaid - Eyes (text) Firstaid - Skin (text) Firstaid - Inhalation (text)

In Section 4
(Group Field) for Auto Ignition (Group Field) for Flash Point

In Section 8
(Group Field) for Vapor Pressure (Group Field) for Vapor Pressure Density (Group Field) for Boiling Point (Group Field) for Freezing Point

In Section 10
Dermal LD50 (Value) Dermal LD50 (Unit) Chronic (text) Oral LD50 (text) Inhalation LC50 (text) Oral LD50 (Value) Oral LD50 (Unit) Acute (text)

In Section 14
Clean Water Act (text) Clean Air Act 40 CFR (text) SDWA (text)

NFPA CODES
HEALTH: 3 FIRE: 1 REACTIVITY: 1

NFPA STORAGE CLASSIFICATION:
NFPA Oxidizer Class 1

HMIS CODES
HEALTH: 3 FIRE: 1 REACTIVITY: 1 PROTECTION: B

MANUFACTURER DISCLAIMER:
IMPORTANT: This information is given without a warranty or guarantee. No suggestions for use are intended or shall be construed as a recommendation to infringe any existing patents or violate any Federal, State or local laws. Safe handling and use is the responsibility of the customer. Read the label before using this product. This information is true and accurate to the best of our knowledge.

MSDS

Stockcode (Product ID) : NWC00145/TRC256 **Page number** 1 **of** 3

MSDS Part 1 **of** 1 **Kit?** y **Hazardous?** y **Product from MMIS?** n

MSDS's Date: 10/30/1991 **Trade Secret?** n **Product CAS:**

Product Name: Chemical, Water treatment, Calgon TRC-256

Special Handling Instructions:

Warning! May cause eye, skin irritation. Wear chemical splash goggles. Wash thoroughly after handling. Keep container closed when not in use. Use only in well ventilated areas that will maintain air levels below limits established by local, state and federal regulations.

General Short Name: Water treatment Chemical

Synonym 1 :
2 :
3 :
4 :
5 :

HEADER INFORMATION

N/A

Manufacturer: Calgon

Catalog # TRC-256 **FORMULA:** N/A

PRODUCT ID TEXT

Calgon Corporation, PO Box 1346, Pittsburgh, PA 1530-1346, Phone--412-494-8000

SECTION II -- HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS NO	PCT	FORMULA	PEL
Sodium molybdate dihydtate	7631-95-0	30		5 mg/m3
Sodium tetraborate pentahydrate	12179-04-3	1		10 mg/m3

HAZARDOUS INGREDIENTS TEXT

N/A

SECTION III - PHYSICAL DATA

Appearance: Water white clear liquid

Odor: none

Boiling Point: 212 F **Specific Gravity (H2O=1) :** 1.28

Melting Point: N/A **Vapor Pressure (mm Hg) :** =H2O

Solubility In Water: Complete **Vapor Density (air=1) :** =H2O

Evaporation Rate (butyl acetate=1) : n/a

PHYSICAL DATA TEXT

n/a

SECTION IV -- FIRE/EXPLOSION HAZARD

Flash Point : n/a

Flash Point Method Used: n/a

Lower Explosion Limit: n/a **Upper Explosion Limit:** n/a

Extinguishing Media:

Use extinguishing media appropriate for the surrounding fire.

Special Fire Fighting Procedures:

Excerise caution when fighting any chemical fire. A SCBA and protective clothing are essential.

Unusual Fire & Explosion Hazard:

none

NFPA Labeling : 1 **Health Hazard -- Blue Label (0-4)**

MSDS

Stockcode (Product ID) :	NWC00145/TRC256	Page number	2 of 3
MSDS Part	1 of 1	Kit?	y
Hazardous?	y	Product from MMIS?	n
MSDS's Date:	10/30/1991	Trade Secret?	n
Product CAS:			
Product Name:	Chemical, Water treatment, Calgon TRC-256		

0 Flammability -- Red Label (0-4)

0 Reactivity -- Yellow Label (0-4)

Special Note -- White Label (W,OXY,ACID,ALK,COR)

FIRE/EXPLOSION HAZARD TEXT

N/A

SECTION V -- HEALTH HAZARDS

Carcinogenicity (Y or N) : IARC Monographs N OSHA Regulated N NTP N

Route of Entry (Y or N) : Inhalation N Ingestion Y Skin Y

Signs & Symptoms of Exposure:

May be eye and skin irritant. Moderately toxic by ingestion. Swallowing this product may irritate the gastrointestinal tract and cause nausea and vomiting. Inhalation of this product mist may be irritating to the respiratory tract.

Medical Conditions Aggravated by Exposure:

none

Emergency & First Aid Procedures:

Eye and skin contact - Flush with water for at least 15 minutes. Seek medical attention for eyes and also if skin irritation persists. If swallowed, seek medical advice. Do not induce vomiting unless directed by medical personnel. If inhaled and irritation or difficulty in breathing occurs, remove to fresh air. Seek medical aid if irritation or discomfort persists.

HEALTH HAZARDS TEXT

Signs of Mo poisoning are loss of appetite, listlessness, diarrhea, and reduced growth rate. Anemia is characteristic of Mo poisoning, with low hemoglobin concentration and reduced red cell counts. Cattle, rabbits and chicks on high dietary levels of Mo showed deformities of joints of the extremities. Histopathologically, livers and kidneys of severely poisoned animals showed fatty degeneration.

SECTION VI -- REACTIVITY DATA

Stable (Y or N) : y Hazardous Polymerization (Y or N): n

Stability Conditions to Avoid:

No specific information.

Hazardous Polymerization Conditions to Avoid:

Will not occur.

Incompatibility (Materials to Avoid):

No significant incompatibilities known.

Hazardous Decomposition or By Products:

none

REACTIVITY DATA TEXT

N/A

SECTION VII -- SAFE HANDLING PROCEDURES

Spill or Release Measures:

Wearing appropriate personal protective equipment, contain spill, collect into inert absorbent and place in suitable container.

Waste Disposal Method:

Not a RCRA Hazardous Waste. Dispose of in accordance with local, state and federal guidelines.

SAFE HANDLING PROCEDURES TEXT

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash thoroughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area . Toxicological information: Sodium molybdate LD50 RAT = 245mg/kg Oral, >2080 mg/m3/4H Inhalation. Ecological information: 96 hr LC50 (Rainbow trout) = 7340 ppm, 48n hr LC50 (Daphnia) = 3220 ppm.

MSDS

Stockcode (Product ID) :	NWC00145/TRC256			Page number	3 of 3
MSDS Part	1 of 1	Kit?	y	Hazardous?	y
Product from MMIS?	n				
MSDS's Date:	10/30/1991	Trade Secret?	n	Product CAS:	
Product Name:	Chemical, Water treatment, Calgon TRC-256				

SECTION VIII -- SPECIAL PROTECTION

Protective Gloves: Chemical resistant gloves

Eye Protection: Chemical splash goggles

Respiratory Protection (specific type):

If airborne concentrations present above regulated levels 29CFR1910.134 requirements.

Ventilation Instructions:

Local or general adequate.

Other Protective Clothing or Equipment:

N/A

Work/Hygenic Practices:

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash thoroughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area . Toxicological information: Sodium molybdate LD50 RAT = 245mg/kg Oral, >2080 mg/m3/4H Inhalation. Ecological information: 96 hr LC50 (Rainbow trout) = 7340 ppm, 48n hr LC50 (Daphnia) = 3220 ppm.

SPECIAL PROTECTION TEXT

N/A

SECTION IX -- SPECIAL PRECAUTIONS

Handling/Storage Precautions:

Avoid contact with eyes, skin or clothing. Avoid breathing mist. Use adequate ventilation. Wash thoroughly after handling. Keep container closed when not in use. Store in a cool, well-ventilated area .

SPECIAL PRECAUTIONS TEXT

N/A

TRAILER TEXT

1st SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

2nd SECTION EXTRA TEXT

Which Section Needs This Additional Text? : (1-9)

PRODUCT NAME:
VERSENE* DIAMMONIUM EDTA CHELATING AGENT

DS #: DW90602

2. COMPOSITION/INFORMATION ON INGREDIENTS

DIAMMONIUM SALT OF ETHYLENEDIAMINETETRAACETIC ACID	CAS# 020824-56-0	45%
WATER	CAS# 007732-18-5	55%

(ACTIVE INGREDIENTS AS EDTA ACID - 40%)

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

```
*************************************************************************
*  LIGHT YELLOW LIQUID.  AMMONIA ODOR.  NO SIGNIFICANT IMMEDIATE        *
*  HAZARDS FOR EMERGENCY RESPONSE ARE KNOWN.                            *
*************************************************************************
```

POTENTIAL HEALTH EFFECTS (SEE SECTION 11 FOR TOXICOLOGICAL DATA.)

EYE: MAY CAUSE PAIN. MAY CAUSE SLIGHT TRANSIENT (TEMPORARY) EYE IRRITATION.

SKIN: PROLONGED OR REPEATED EXPOSURE MAY CAUSE SKIN IRRITATION. A SINGLE PROLONGED EXPOSURE IS NOT LIKELY TO RESULT IN THE MATERIAL BEING ABSORBED THROUGH SKIN IN HARMFUL AMOUNTS.

INGESTION: SINGLE DOSE ORAL TOXICITY IS CONSIDERED TO BE LOW. SMALL AMOUNTS SWALLOWED INCIDENTAL TO NORMAL HANDLING OPERATIONS ARE NOT LIKELY TO CAUSE INJURY; SWALLOWING LARGER AMOUNTS MAY CAUSE INJURY.

INHALATION: SINGLE EXPOSURE TO VAPORS IS NOT EXPECTED TO POSE A HAZARD; VAPORS ARE PRIMARILY WATER.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: NO SIGNIFICANT TOXICOLOGIC EFFECTS WERE OBSERVED IN LABORATORY ANIMALS FED THE SODIUM SALT OF EDTA.

CANCER INFORMATION: THE TRISODIUM SALT OF EDTA DID NOT CAUSE CANCER IN LABORATORY ANIMALS.

TERATOLOGY (BIRTH DEFECTS): EDTA AND ITS SODIUM SALTS HAVE BEEN REPORTED TO CAUSE BIRTH DEFECTS IN LABORATORY ANIMALS ONLY AT EXAGGERATED DOSES THAT WERE TOXIC TO THE MOTHER. BIRTH DEFECTS ARE UNLIKELY. THESE EFFECTS ARE LIKELY ASSOCIATED WITH ZINC DEFICIENCY DUE TO CHELATION. EXPOSURES HAVING NO EFFECT ON THE MOTHER SHOULD HAVE NO EFFECT ON THE FETUS.

REPRODUCTIVE EFFECTS: LIMITED DATA IN LABORATORY ANIMALS SUGGEST THAT THE MATERIAL DOES NOT AFFECT REPRODUCTION.

4. FIRST AID

EYE: FLUSH EYES WITH PLENTY OF WATER.

SKIN: WASH OFF IN FLOWING WATER OR SHOWER.

INGESTION: IF SWALLOWED, SEEK MEDICAL ATTENTION. DO NOT INDUCE VOMITING UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL.

INHALATION: NO ADVERSE EFFECTS ANICIPATED BY THIS ROUTE OF EXPOSURE.

NOTE TO PHYSICIAN: NO SPECIFIC ANTIDOTE. SUPPORTIVE CARE. TREATMENT BASED ON JUDGMENT OF THE PHYSICIAN IN RESPONSE TO REACTIONS OF THE PATIENT.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES
FLASH POINT: IT HAS NO MEASURABLE FLASH POINT.
METHOD USED: PMCC
AUTOIGNITION TEMPERATURE: NOT APPLICABLE

FLAMMABILITY LIMITS
LFL: NOT APPLICABLE
UFL: NOT APPLICABLE

HAZARDOUS COMBUSTION PRODUCTS: FIRE CONDITIONS MAY CAUSE THIS PRODUCT TO DECOMPOSE. REFER TO "HAZARDOUS DECOMPOSITION SECTION".

OTHER FLAMMABILITY INFORMATION: IF EXPOSED TO FIRE FROM ANOTHER SOURCE AND WATER IS EVAPORATED, EXPOSURE TO HIGH TEMPERATURES MAY CAUSE TOXIC FUMES. THIS MATERIAL DOES NOT BURN.

EXTINGUISHING MEDIA: THIS MATERIAL DOES NOT BURN. IF EXPOSED TO FIRE FROM ANOTHER SOURCE, USE SUITABLE EXTINGUISHING AGENT FOR THAT FIRE.

FIRE FIGHTING INSTRUCTIONS: KEEP PEOPLE AWAY. ISOLATE FIRE AREA AND DENY UNNECESSARY ENTRY. THIS MATERIAL DOES NOT BURN. FIGHT FIRE FOR OTHER MATERIAL THAT IS BURNING.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: WEAR POSITIVE-PRESSURE SELF-CONTAINED BREATHING APPARATUS (SCBA) AND PROTECTIVE FIRE FIGHTING CLOTHING (INCLUDES FIRE FIGHTING HELMET, COAT, PANTS, BOOTS, AND GLOVES). IF PROTECTIVE EQUIPMENT IS NOT AVAILABLE OR NOT USED, FIGHT FIRE FROM A PROTECTED LOCATION OR SAFE DISTANCE.

6. ACCIDENTAL RELEASE MEASURES (SEE SECTION 15 FOR REGULATORY INFORMATION)

PROTECT PEOPLE: ISOLATE AREA.

PROTECT THE ENVIRONMENT: PREVENT WASH WATER ENTERING NATURAL WATERWAYS OR PUBLIC WATER SUPPLIES.

CLEANUP: CLEAN UP RESIDUAL WITH NON-COMBUSTIBLE ABSORBENT MATERIAL AND WASH WITH WATER.

7. HANDLING AND STORAGE

HANDLING: FOR MORE STORAGE AND HANDLING INFORMATION REFER TO BULLETIN 113-1290-394 AMS.

STORAGE: DO NOT STORE IN ALUMINUM, CARBON STEEL, COPPER, COPPER ALLOYS, ZINC OR NICKEL CONTAINERS. STORE BETWEEN 20F AND 120F.

EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: GOOD GENERAL VENTILATION SHOULD BE SUFFICIENT FOR MOST CONDITIONS.

PERSONAL PROTECTIVE EQUIPMENT:
EYE/FACE PROTECTION: USE SAFETY GLASSES.

SKIN PROTECTION: USE GLOVES IMPERVIOUS TO THIS MATERIAL WHEN PROLONGED OR FREQUENTLY REPEATED CONTACT COULD OCCUR.

RESPIRATORY PROTECTION: NO RESPIRATORY PROTECTION SHOULD BE NEEDED.

EXPOSURE GUIDELINE(S): NONE ESTABLISHED.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: LIGHT YELLOW LIQUID.
ODOR: AMMONIA.
VAPOR PRESSURE: SAME AS WATER
VAPOR DENSITY: SAME AS WATER
BOILING POINT: 219F, 104C
SOLUBILITY IN WATER: COMPLETELY MISCIBLE
SPECIFIC GRAVITY: 1.21 25/25C
FREEZING POINT: 7F, -14C

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: STABLE UNDER RECOMMENDED STORAGE CONDITIONS. SEE STORAGE SECTION.

CONDITIONS TO AVOID: NONE KNOWN.

INCOMPATIBILITY WITH OTHER MATERIALS: AVOID CONTACT WITH OXIDIZING MATERIALS. AVOID CONTACT WITH METALS SUCH AS: ALUMINUM. FLAMMABLE HYDROGEN IS FORMED IN THE PRESENCE OF ALUMINUM.

HAZARDOUS DECOMPOSITION PRODUCTS: HAZARDOUS DECOMPOSITION PRODUCTS MAY INCLUDE AND ARE NOT LIMITED TO: AMMONIA.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

11. TOXICOLOGICAL INFORMATION (SEE SECTION 3 FOR POTENTIAL HEALTH

EFFECTS. FOR DETAILED TOXICOLOGICAL DATA, WRITE OR CALL THE

ADDRESS OR NON-EMERGENCY NUMBER SHOWN IN SECTION 1)

SKIN: THE DERMAL LD50 HAS NOT BEEN DETERMINED.

INGESTION: THE ORAL LD50 FOR RATS IS >2000 MG/KG.

MUTAGENICITY: MOST DATA INDICATE THAT EDTA AND ITS SALTS ARE NOT MUTAGENIC. MINIMAL EFFECTS REPORTED ARE LIKELY DUE TO TRACE METAL DEFICIENCIES RESULTING FROM CHELATION BY EDTA.

12. ECOLOGICAL INFORMATION (FOR DETAILED ECOLOGICAL DATA, WRITE OR CALL

THE ADDRESS OR NON-EMERGENCY NUMBER SHOWN IN SECTION 1)

ENVIRONMENTAL FATE
MOVEMENT & PARTITIONING: BASED LARGELY OR COMPLETELY ON INFORMATION FOR SIMILAR MATERIAL. BIOCONCENTRATION POTENTIAL IS LOW (BCF LESS THAN 100 OR LOG POW LESS THAN 3).

DEGRADATION & PERSISTENCE: BIODEGRADATION UNDER AEROBIC CONDITIONS IS BELOW DETECTABLE LIMITS. CHEMICAL OR PHYSICAL DEGRADATION IS EXPECTED IN THE ENVIRONMENT. DEGRADATION IS EXPECTED IN THE SOIL ENVIRONMENT.

ECOTOXICITY: MATERIAL IS PRACTICALLY NON-TOXIC TO FISH ON AN ACUTE BASIS (LC50 GREATER THAN 100 MG/L). ACUTE LC50 FOR BLUEGILL (LEPOMIS MACROCHIRUS) IS 2340 MG/L.

. DISPOSAL CONSIDERATIONS (SEE SECTION 15 FOR REGULATORY INFORMATION)

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. ALL DISPOSAL METHODS MUST BE IN COMPLIANCE WITH ALL FEDERAL, STATE/PROVINCIAL AND LOCAL LAWS AND REGULATIONS. REGULATIONS MAY VARY IN DIFFERENT LOCATIONS. WASTE CHARACTERIZATIONS AND COMPLIANCE WITH APPLICABLE LAWS ARE THE RESPONSIBILITY SOLELY OF THE WASTE GENERATOR. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (COMPOSITION/ INFORMATION ON INGREDIENTS).

FOR UNUSED & UNCONTAMINATED PRODUCT, THE PREFERRED OPTIONS INCLUDE SENDING TO A LICENSED, PERMITTED: RECYCLER, RECLAIMER, INCINERATOR OR OTHER THERMAL DESTRUCTION DEVICE, WASTE WATER TREATMENT SYSTEM, LANDFILL.

AS A SERVICE TO ITS CUSTOMERS, DOW CAN PROVIDE NAMES OF INFORMATION RESOURCES TO HELP IDENTIFY WASTE MANAGEMENT COMPANIES AND OTHER FACILITIES WHICH RECYCLE, REPROCESS OR MANAGE CHEMICALS OR PLASTICS, AND THAT MANAGE USED DRUMS. TELEPHONE DOW'S CUSTOMER INFORMATION CENTER AT 800-258-2436 OR 989-832-1556 FOR FURTHER DETAILS.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): FOR D.O.T. REGULATORY INFORMATION, IF REQUIRED, CONSULT TRANSPORTATION REGULATIONS, PRODUCT SHIPPING PAPERS OR CONTACT YOUR DOW REPRESENTATIVE.

CANADIAN TDG INFORMATION: FOR TDG REGULATORY INFORMATION, IF REQUIRED, CONSULT TRANSPORTATION REGULATIONS, PRODUCT SHIPPING PAPERS OR CONTACT YOUR DOW REPRESENTATIVE.

15. REGULATORY INFORMATION (NOT MEANT TO BE ALL-INCLUSIVE--SELECTED

REGULATIONS REPRESENTED)

NOTICE: THE INFORMATION HEREIN IS PRESENTED IN GOOD FAITH AND BELIEVED TO BE ACCURATE AS OF THE EFFECTIVE DATE SHOWN ABOVE. HOWEVER, NO WARRANTY, EXPRESS OR IMPLIED IS GIVEN. REGULATORY REQUIREMENTS ARE SUBJECT TO CHANGE AND MAY DIFFER FROM ONE LOCATION TO ANOTHER; IT IS THE BUYER'S RESPONSIBILITY TO ENSURE THAT ITS ACTIVITIES COMPLY WITH FEDERAL, STATE OR PROVINCIAL, AND LOCAL LAWS. THE FOLLOWING SPECIFIC INFORMATION IS MADE FOR THE PURPOSE OF COMPLYING WITH NUMEROUS FEDERAL, STATE OR PROVINCIAL, AND LOCAL LAWS AND REGULATIONS. SEE OTHER SECTIONS FOR HEALTH AND SAFETY INFORMATION.

SARA 313 INFORMATION: THIS PRODUCT CONTAINS THE FOLLOWING SUBSTANCES SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION	
IONIA	007664-41-7	4.69	%

AMMONIA INCLUDES ANHYDROUS AMMONIA AND AQUEOUS AMMONIA FROM WATER DISSOCIABLE AMMONIA SALTS AND OTHER SOURCES.

SARA HAZARD CATEGORY: THIS PRODUCT HAS BEEN REVIEWED ACCORDING TO THE EPA "HAZARD CATEGORIES" PROMULGATED UNDER SECTIONS 311 AND 312 OF THE SUPERFUND AMENDMENT AND REAUTHORIZATION ACT OF 1986 (SARA TITLE III) AND CONSIDERED, UNDER APPLICABLE DEFINITIONS, TO MEET THE FOLLOWING CATEGORIES:

NOT TO HAVE MET ANY HAZARD CATEGORY

TOXIC SUBSTANCES CONTROL ACT (TSCA):

ALL INGREDIENTS ARE ON THE TSCA INVENTORY OR ARE NOT REQUIRED TO BE LISTED ON THE TSCA INVENTORY.

STATE RIGHT-TO-KNOW: THIS PRODUCT IS NOT KNOWN TO CONTAIN ANY SUBSTANCES SUBJECT TO THE DISCLOSURE REQUIREMENTS OF

NEW JERSEY
PENNSYLVANIA

OSHA HAZARD COMMUNICATION STANDARD:

THIS PRODUCT IS NOT A "HAZARDOUS CHEMICAL" AS DEFINED BY THE OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200.

CANADIAN REGULATIONS

WHMIS INFORMATION: THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION FOR THIS PRODUCT IS:

D2B - EYE OR SKIN IRRITANT
REFER ELSEWHERE IN THE MSDS FOR SPECIFIC WARNINGS AND SAFE HANDLING INFORMATION. REFER TO THE EMPLOYER'S WORKPLACE EDUCATION PROGRAM.

- - - - -

CPR STATEMENT: THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CANADIAN CONTROLLED PRODUCTS REGULATIONS (CPR) AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

- - - - -

HAZARDOUS PRODUCTS ACT INFORMATION: THIS PRODUCT CONTAINS THE FOLLOWING INGREDIENTS WHICH ARE CONTROLLED PRODUCTS AND/OR ON THE INGREDIENT DISCLOSURE LIST (CANADIAN HPA SECTION 13 AND 14):

COMPONENTS:	CAS #	AMOUNT(%W/W)
DIAMMONIUM SALT OF ETHYLENEDIAMINETETRAACETIC ACID	020824-56-0	45%

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16. OTHER INFORMATION

MSDS STATUS: NO REVISIONS. REVIEWED FOR CANADIAN REGULATIONS.

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

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

---------- NOTICE ----------

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ALL EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A

PARTICULAR PURPOSE, WITH RESPECT TO THE PRODUCT OR INFORMATION PROVIDED HEREIN,

AND SHALL UNDER NO CIRCUMSTANCES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

DO NOT USE INGREDIENT INFORMATION AND/OR INGREDIENT PERCENTAGES IN THIS MSDS AS A PRODUCT SPECIFICATION. FOR PRODUCT SPECIFICATION INFORMATION REFER TO A PRODUCT SPECIFICATION SHEET AND/OR A CERTIFICATE OF ANALYSIS. THESE CAN BE OBTAINED FROM YOUR LOCAL UNIVAR SALES OFFICE.

ALL INFORMATION APPEARING HEREIN IS BASED UPON DATA OBTAINED FROM THE MANUFACTURER AND/OR RECOGNIZED TECHNICAL SOURCES. WHILE THE INFORMATION IS BELIEVED TO BE ACCURATE, UNIVAR MAKES NO REPRESENTATIONS AS TO ITS ACCURACY OR SUFFICIENCY. CONDITIONS OF USE ARE BEYOND UNIVARS CONTROL AND THEREFORE USERS 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.

* * * E N D O F M S D S * * *

Material Safety Data Sheet

HydroChem Industrial Services, Inc.
6210 Rothway, Houston, Texas 77040

CHEMTREC Emer. No:1-800-
HydroChem Phone: 1-800-934-

CHEMICAL CODE: V700
PRODUCT NAME: VERTAN (*) 700 CHELANT V700

EFFECTIVE DATE: 08 APR 92 PREPARED BY: W. W. SHEPHE

HMIS RATING:
Health 2 Flammability 1 Reactivity 0

HAZARDOUS INGREDIENTS:	CAS NUMB
PROPRIETARY ORGANIC AMINE CHELANT IN WATER.	
TRISODIUM NITRILOTRIACETATE (LESS THAN 1.5 PERCENT)	005064-3
SODIUM HYDROXIDE (LESS THAN 1.5 PERCENT)	001310-7

SECTION 1 - PHYSICAL PROPERTIES:

Chemical Nature: Chelant	Form: Liquid
Color: Light yellow-brown	Odor: Amine
Vap.Density: Not determined	%Sol. In Water: 100
pH: 11-12 at 1 percent	Sp. Gravity: 1.29
Pour Point: -30 F (-34 C)	Boiling Pt.: 225 F (107 C)
Vap.Pressure:Not determined	% Volatile: >50
Viscosity: Not determined	Bulk Density: Not determined

SECTION 2 - FIRE AND EXPLOSION HAZARDS:

Flash Point: >200 F (>93 C) Method Used: Pensky-Martens CC
Ignition Temperature: Not determined
Explosion Limits in Air - Lower: Not applicable Upper: Not app
Extinguishing Media: Water Fog, Alcohol Foam, CO2, Dry Chemical
Special Fire Fighting Equipment and Hazards:
Wear protective fire fighting clothing and avoid breathing vap
Use self-contained breathing apparatus in closed areas.

SECTION 3 - REACTIVITY HAZARDS:

Stability: Stable.
Incompatibility:
Contact with aluminum can release hydrogen which can be explos the presence of an ignition source.
Hazardous Decomposition:
When heated strongly or burned, oxides of carbon, nitrogen oxi ammonia and harmful organic chemical fumes are released.
Hazardous Polymerization: Will not occur.

SECTION 4 - FIRST AID PROCEDURES:

Eye Contact:	Immediately flush eyes with water for 30 minute while holding eyelids open. See a doctor at onc
Skin Contact:	Wash thoroughly with soap and water. See a doct if irritation occurs. Wash clothes thoroughly before reusing.
Swallowing:	If several grams are swallowed, induce vomiting with ipecac (preferred), or by giving water and sticking finger down throat. After vomiting giv milk (preferred) or water and consult physician
Inhalation:	Remove to fresh air. See a doctor if effects occur.
Notes:	None

SECTION 5 - HANDLING PRECAUTIONS:

Ventilation: General ventilation is required.

Respiratory Protection:
None normally needed. Use NIOSH approved respirator with organic vapor/acid gas protection (color coded yellow) if vapors are generated and for emergencies.

Protective Clothing:
Clean, body-covering clothing and impervious gloves. For spills emergencies, also wear boots and slicker (rain) suit.

Eye Protection:
Chemical goggles required and an eye wash in work area.

Exposure Guidelines:
TLV is ceiling of 2 mg/m3 (ACGIH); PEL is 2 mg/m3 (OSHA) for soc hydroxide.

SECTION 6 - SPILL AND DISPOSAL PROCEDURES:

Spills:	Contain with dikes. Put in steel or plastic drum. Flush residual with plenty of water.
Disposal Method	
Product:	Ship via permitted waste hauler to permitted hazardous waste disposal facility for incineratio (preferred) or disposal well injection of all liquids and landfilling of solids.
Container:	Leave label on drum and sell drum to an approved drum reconditioner or triple rinse, crush, and ship to sanitary landfill unless prohibited by local regulations.
Degradability:	Not determined
Fish Toxicity:	No information.

CERCLA Reportable Quantity: > 6,000 gallons (sodium hydroxide)

RCRA Hazardous Waste Number: None.

SECTION 7 - TOXICOLOGY:

Eye Contact:	Severe irritant. Causes pain and redness. Prolonged or repeated contact may cause mild burn
Skin Contact:	Irritant. May cause pain, redness, dermatitis. Not likely to be absorbed in toxic amounts.
Swallowing:	No effect expected. Swallowing large amounts may cause illness. LD50 (rats) = 4,000-8,000 mg/kg.
Inhalation:	No effect expected. Prolonged or repeated exposure may cause mild irritation.
Carcinogens:	Nitilotriacetic acid and its trisodium salt are listed by NTP as causing cancer in animals. They have a potential to cause cancer in humans but are expected to be metabolized.
Other:	

SECTION 8 - ADDITIONAL INFORMATION:

Special Precautions: None.

Physical Hazard: None.

Handling and Storage Precautions:
Do not store in contact with aluminum.

Packaging Requirements:
Steel or plastic drum or can.

Additional Information: Q1 (Protective Equipment Code)

SECTION 8 - CONTINUED

This product reacts with aluminum to produce hydrogen gas.

SECTION 9 - REGULATORY INFORMATION:

This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372: sodium hydroxide (less than 1.5 percent).

NFPA Rating:
Health 2 ; Flammability 1 ; Reactivity 0 ; Other: None

WHMIS Classification (Canada): Not determined

TSCA Status: All components of this material are on the TSCA inventory.

SECTIONS AFFECTED BY LAST REVISION:

6, shipping

SHIPPING INFORMATION:

ICC Tariff Classification:
Compound, Boiler Cleaning, Scale Removing, Liquid

ICC Item Number: ICC Class: 55 LTL TL

Department of Transporation - (DOT):

Description: Hazardous Material
Hazard Class: 8 (corrosive)
Shipping Name: Corrosive liquids, N.O.S. (contains sodium hydroxide), 8, UN 1760, PG III
DOT Label: Corrosive 8
Comment:
Tank Exempt.#: N/A
CERCLA RQ: > 6,000 gallons (sodium hydroxide)

US Foreign Trade Schedule B# (Export):

Canadian Shipments:
Shipping Name:
Special Provision:
Classification:

ICAO Class: Pkg Group:

(*) Indicates a trade or service mark of HydroChem Industrial Services Inc. The information herein is believed to be accurate and is presented in good faith; however, no warranties or representations are made by HydroChem regarding the accuracy or completeness of the information

ZEP MANUFACTURING COMPANY
Acuity Specialty Products Group, Inc.
P.O. BOX 2015
ATLANTA, GA 30301
1-877-I-BUY-ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Issue Date	06/05/00
Supersedes	06/15/88
Product Name	ZEP FORMULA 6352
Product No.	0372

Car Wash - Liquid

Printing date: 09/10/03

SECTION I - EMERGENCY CONTACTS

For MSDS Information:
Acuity Specialy Products Group, Inc.
Compliance Services 1-877-I-BUY-ZEP

For Medical Emergency:
INFOTRAC
(877) 541-2016 Toll Free - All Calls Recorded

For a Transportation Emergency:
CHEMTREC
(800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

SECTION II - HAZARDOUS INGREDIENTS

** POTASSIUM DODECYLBENZENE SULFONATE ** linear alkyl aryl sulfonate; CAS# 27177-77-1; RTECS# NONE OSHA PEL N/D; TLV - N/D; EFFECTS - IRR; % IN PROD - < 10
@ -Reportable under the SARA 313 Toxic Release Inventory

SECTION III - HEALTH HAZARD DATA

SPECIAL NOTE: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.
ACUTE EFFECTS OF OVEREXPOSURE:
This product, particularly in its concentrated form, may irritate eyes and skin upon contact. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or blistering.
CHRONIC EFFECTS OF OVEREXPOSURE:
Contact, especially if prolonged or repeated, may cause redness, itching, or irritation of the skin. None of the hazardous ingredients are listed as carcinogens by IARC, NTP, & OSHA
EST'D PEL/TLV: Not established
PRIMARY ROUTES OF ENTRY: N/A
HMIS CODES: HEALTH 1; FLAM 0; REACT 0; PERS. PROTECT B; CHRONIC HAZ NO
FIRST AID PROCEDURES:
SKIN: Flush contaminated skin with plenty of water. Consult a physician if irritation develops.
EYES: Immediately flush eyes with plenty of water for at least 15 minutes. If irritation develops, consult a physician.
INHALE: If symptoms occur, move affected person to fresh air. If symptoms persist, get medical attention promptly.
INGEST: If this product is swallowed, do not induce vomiting. If individual is alert, give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PRECAUTION INFORMATION

PROTECTIVE CLOTHING: The use of neoprene, nitrile or natural rubber gloves is strongly recommended, especially for prolonged contact.
EYE PROTECTION: Wear tight-fitting safety glasses especially if contact lenses are worn.
RESPIRATORY PROTECTION: Do not breathe mists generated during product use.
VENTILATION: Ventilation should be equal to outdoors. Use exhaust fans and/or exhaust hood in enclosed spaces.

SECTION V - PHYSICAL DATA

BOILING POINT (F) - ~ 212
VAPOR PRESSURE(mmHg) - N/A
VAPOR DENSITY(AIR-1) - N/A
SOLUBILITY IN WATER - COMPLETE
pH(USE DILUTION OF) - N/A
SPECIFIC GRAVITY - 1.04
EVAPORATION RATE (WATER=1) - 1.0
pH(CONCENTRATE) - 10.0-11.5
VOC CONTENT (CONCENTRATE) - 0.0% 0.00 lb/gl
APPERANCE AND ODOR - CLEAR, SLIGHTLY VISCOUS, FLUORESCENT YELLOW/GREEN LIQUID

SECTION VI - FIRE AND EXPLOSION DATA

FLASH POINT(F) (METHOD USED): None TCC
FLAMMABLE LIMITS:LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Noncombustible.
SPECIAL FIRE FIGHTING: Wear self-contained positive pres. breathing apparatus.
UNUSUAL FIRE HAZARDS: None

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY(AVOID): Strong oxidizing agents.
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, & oxides of sulfur

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIALS IS RELEASED OR SPILLED:
Observe safety procedures in section 4 & 9 during clean-up. Absorb spill on an inert absorbent material and place in a suitable waste container or, if permitted, flush to sewer. Rinse area well with water.
WASTE DISPOSAL METHOD:
Liquid wastes are not permitted in landfills. This product is not considered a hazardous waste under RCRA. Unusable liquid may be absorbed on an inert absorbent material, drummed, and taken to a chemical or industrial landfill. In some areas disposal by flushing into a sanitary sewer with plenty of water may be permissible. Consult local, state, and federal agencies for proper disposal method in your area.
RCRA HAZ WASTE NOS: N/A

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING
Store tightly closed container in a dry area at temps. between 40-120 degrees F. Do not breathe spray mists or vapors. Keep product out of eyes. Avoid prolonged contact with skin. Clothing or shoes which become contaminated with substance should be removed promptly and not reworn until thoroughly cleaned. Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: INDUSTRIAL CLEANERS N.O.I.,LIQUID KEEP FROM FREEZING
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: NA DOT PACKING GROUP:
DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): NONE
EPA CAA: N/A

ZEP MANUFACTURING COMPANY
Acuity Specialty Products Group, Inc.
P.O. BOX 2015
ATLANTA, GA 30301
1-877-1-BUY-ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Section 1. Chemical Product and Company Identification

Product name	ZEP XT-900
Product Use	Drying Agent
Product Code	F344
Date of Issue	02/11/00 Supersedes
Emergency Telephone Numbers	**For MSDS Information:** Acuity Specialy Products Group, Inc. **Compliance Services 1-877-1-BUY-ZEP** **For Medical Emergency:** INFOTRAC **(877) 541-2016 Toll Free - All Calls Recorded** **For a Transportation Emergency:** CHEMTREC **(800) 424-9300 - All Calls Recorded** **In the District of Columbia (202) 483-7616**
Prepared by	*Compliance Services Group* Acuity Specialty Products Group 1420 Seaboard Industrial Blvd. Atlanta, GA 30318

Printing date: 09/02/03

Section 2. Composition, Information on Ingredients

Name of Hazardous Ingredients	CAS #	% by Weight	Exposure Limits
QUATERNARY AMMONIUM COMPOUNDS; dicoco dimethyl ammonium chloride; dicocodimonium chloride	61789-77-3	10-20	Not established
ETHYLENE GLYCOL MONOBUTYL ETHER; 2-butoxyethanol; butyl cellosolve	111-76-2	< 10	**ACGIH TLV (United States). Skin** TWA: 20 ppm Form: Vapor **OSHA PEL (United States). Skin** TWA: 25 ppm Form: Vapor

Section 3. Hazards Identification

HMIS	
Health	2
Flammability	2
Reactivity	0
Personal Protection	B

Acute Effects Routes of Entry Skin. Inhalation.

Skin Hazardous in case of skin contact (irritant). Harmful if absorbed through the skin. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Eyes Hazardous in case of eye contact (irritant). Liquid in eye may cause irritation with possible damage if not rinsed immediately.

Inhalation Hazardous in case of inhalation (lung irritant). Material is irritating to mucous membranes and upper respiratory tract.

Ingestion Aspiration hazard if swallowed- can enter lungs and cause damage.

Carcinogenic Effects Ingredients: Not listed as carcinogen by OSHA, NTP or IARC.

Chronic Effects The substance may be toxic to blood, kidneys, liver. Laboratory experiments have shown teratogenic effects at maternally toxic doses. Prolonged or repeated contact may dry skin and cause irritation.

See Toxicological Information (section 11)

Section 4. First Aid Measures

Eye Contact Flush with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.

Skin Contact Rinse with plenty of running water. Get medical attention if irritation develops.

Inhalation If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If affected person is conscious, give plenty of water to drink. Get medical attention immediately.

Section 5. Fire Fighting Measures

Flash Point CLOSED CUP: 43.3°C (110°F). (Tagliabue.) Flammable Limits Not determined.

Flammability Combustible.

Fire Hazard None.

Fire-Fighting Procedures Use DRY chemicals, CO_2, water spray or foam. Use water spray to dilute spill to a nonflammable condition.

Section 6. Accidental Release Measures

Spill Clean up Eliminate all ignition sources. Put on appropriate personal protective equipment (see Section 8). Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Section 7. Handling and Storage

Handling Avoid contact with eyes, skin and clothing. Avoid breathing vapors or spray mists.

Storage Store and use away from heat, sparks, open flame, or any other ignition source. Store in a dry, cool and well-ventilated area. Store between 40°F - 120°F (4.4°C - 49°C). Keep away from incompatibles. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

Section 8. Exposure Controls, Personal Protection

	Personal Protection
Eyes	Splash goggles.
Body	Neoprene gloves. Nitrile gloves. Rubber gloves.
Respiratory	Use with adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Protective Clothing (Pictograms)

Section 9. Physical and Chemical Properties

Physical State	Liquid.	Color	Amber. (Light.)
pH	5.7 - 6.7	Odor	Solvent.
Boiling Point	100°C (212°F)	Vapor Pressure	Not determined.
Specific Gravity	0.93 (Water = 1)	Vapor Density	Not determined.
Solubility	Easily soluble in cold water, hot water.	Evaporation Rate	1 compared to Water
		VOC (Consumer)	8.3% 77 (g/l).

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Incompatibility	Avoid contact with strong oxidizers, excessive heat, sparks or open flame.
Hazardous Polymerization	Will not occur.
Hazardous Decomposition Products	Carbon Dioxide, Carbon Monoxide and other organic materials.

Section 11. Toxicological Information

Toxicity to Animals

Ethylene Glycol Monobutyl Ether:

ORAL (LD50): Acute: 1746 mg/kg [Rat]. 1519 mg/kg [Mouse]. 1414 mg/kg [Guinea pig].

DERMAL (LD50): Acute: 435 mg/kg [Rabbit]. >2000 mg/kg [Guinea pig].

VAPOR (LC50): Acute: 700 ppm 7 hour(s) [Mouse]. >633 ppm 1 hour(s) [Guinea pig]. >691 ppm 1 hour(s) [Guinea pig].

Section 12. Ecological Information

Ecotoxicity	Not available.
Biodegradable/OECD	Not available.

Section 13. Disposal Considerations

Waste Information Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Waste Stream Code: - (D001)
Classification: - (Hazardous waste.)
Origin: - (RCRA waste.)

Consult your local or regional authorities.

Section 14. Transport Information

Proper shipping name	None.		
DOT Classification	Not a DOT controlled material (United States).	UN number	Not regulated.

Section 15. Regulatory Information

U.S. Federal Regulations

SARA 313 toxic chemical notification and release reporting: Ethylene Glycol Monobutyl Ether

Clean Water Act (CWA) 311: No products were found.

Clean air act (CAA) 112 regulated toxic substances: Ethylene Glycol Monobutyl Ether

Section 16. Other Information

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ZEP MANUFACTURING COMPANY
Acuity Specialty Products Group, Inc.
P.O. BOX 2015
ATLANTA, GA 30301
1-877-I-BUY-ZEP

Material Safety Data Sheet
and Safe Handling and Disposal Information

Issue Date	03/12/98
Supersedes	03/09/98
Product Name	XT-1398
Product No.	9885

Printing date: 09/10/03

SECTION I - EMERGENCY CONTACTS

For MSDS Information:
Acuity Specialy Products Group, Inc.
Compliance Services 1-877-I-BUY-ZEP

For Medical Emergency:
INFOTRAC
(877) 541-2016 Toll Free - All Calls Recorded

For a Transportation Emergency:
CHEMTREC
(800) 424-9300 - All Calls Recorded
In the District of Columbia (202) 483-7616

SECTION II - HAZARDOUS INGREDIENTS

@ ** PROPRIETARY SOLVENT BLEND ** CAS# - PROPRIETARY; OSHA PEL - INGR #1 (3 ppm); INGR #2 (25 ppm); TLV - N/D; EFFECTS - TOX COR CBL; % IN PROD - 10-20
** SODIUM METASILICATE ** silicic acid (H2-Si-O3) di_ sodium salt; water glass; CAS# 6834-92-0; RTECS# VV9275000; OSHA Dust Limit-2mg/m3 (for powders only). ; TLV - N/D; EFFECTS - COR; % IN PROD - < 10
** ETHOXYLATED ALCOHOLS ** linear primary alcohol ethoxylate; CAS# 68439-46-3; RTECS# - NONE; OSHA PEL- N/D; TLV - N/D; EFFECTS - IRR; % IN PROD - 5-15
** TETRASODIUM ETHYLENEDIAMINE TETRAACETATE ** ethylenedinitrilo tetraacetic acid, tetrasodium salt; EDTA; CAS# 64-02-8; RTECS# AH5075000; OSHA PEL N/D ; TLV - N/D; EFFECTS - IRR; % IN PROD - 5-15
@ -Reportable under the SARA 313 Toxic Release Inventory

SECTION III - HEALTH HAZARD DATA

SPECIAL NOTE: MSDS data pertains to the product as dispensed from the container. Adverse health effects would not be expected under recommended conditions of use (diluted) so long as prescribed safety precautions are practiced.
ACUTE EFFECTS OF OVEREXPOSURE:
Concentrate may be corrosive to eyes and mucous membranes and solutions are severe eye irritants. Eye contact may result in corneal damage or blindness. Skin contact may produce irritation depending on length of contact time. Overexposure by inhalation may cause respiratory irritation.
CHRONIC EFFECTS OF OVEREXPOSURE:
Repeated or prolonged skin contact may produce chronic inflammation or dermatitis, characterized by redness, scaling, or itching. Repeated eye exposure may produce chronic inflammation of the eye or corneal damage. Animal studies indicate a potential for liver, kidney, or red blood cell damage. Relevance of these studies or exposure levels which might produce these effects in humans has not been established. None of the ingredients are listed as carcinogens by IARC, NTP, or OSHA.
EST'D PEL/TLV: Not established
PRIMARY ROUTES OF ENTRY: Skin.
HMIS CODES: HEALTH 2; FLAM 0; REACT 0; PERS. PROTECT B; CHRONIC HAZ NO
FIRST AID PROCEDURES:
SKIN: Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops.
EYES: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once.
INHALE: If symptoms occur, move affected person to fresh air. If symptoms persist, get medical attention promptly.
INGEST: If this product is swallowed, do not induce vomiting. If individual is alert, give plenty of water to drink. Get medical attention at once.

SECTION IV - SPECIAL PRECAUTION INFORMATION

PROTECTIVE CLOTHING: Wear butyl rubber gloves or use gloves with demonstrated resistance to the ingredients in the product.
EYE PROTECTION: Wear splash-proof safety goggles especially if contact lenses are worn.
RESPIRATORY PROTECTION: Keep face away from spray mist and do not breathe vapors.
VENTILATION: Ventilation should be equal to outdoors. Use exhaust fans and/or exhaust hood in enclosed spaces.

SECTION V - PHYSICAL DATA

BOILING POINT (F) - 212
SPECIFIC GRAVITY - 1.10
VAPOR PRESSURE(mmHg) - N/D
EVAPORATION RATE (WATER=1) - 1.0
VAPOR DENSITY(AIR-1) - N/D
pH(CONCENTRATE) - 13.0-13.5
SOLUBILITY IN WATER - COMPLETE
pH(USE DILUTION OF) - 1% 11.0-12.0
VOC CONTENT (CONCENTRATE) - 7.9% 0.73 lb/gl
APPERANCE AND ODOR - A CLEAR, LIGHT AMBER LIQUID WITH A MILD ODOR.

SECTION VI - FIRE AND EXPLOSION DATA

FLASH POINT(F) (METHOD USED): NONE TCC
FLAMMABLE LIMITS:LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, water, and foam
SPECIAL FIRE FIGHTING: Wear self-contained positive pres. breathing apparatus.
UNUSUAL FIRE HAZARDS: None

SECTION VII - REACTIVITY DATA

STABILITY: Stable
INCOMPATIBILITY(AVOID): Strong acids and oxidizing agents.
POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION: Carbon dioxide, carbon monoxide, & oxides of nitrogen

SECTION VIII - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIALS IS RELEASED OR SPILLED:
Observe safety precautions in sections 4 & 9 during clean-up. Absorb spill on an inert absorbent material; pick up and place in a clean D.O.T. specification container for disposal. Wash area thoroughly with a detergent solution and then rinse well with water.
WASTE DISPOSAL METHOD:
Liquids cannot be sent to landfills unless solidified. Unusable product and some collected, spent use-dilutions may require disposal as a hazardous waste at a permitted treatment/storage/disposal facility. In most states hazardous wastes in total amounts of 220 lbs. or less per month may be disposed of in a chemical or industrial waste landfill. If company effluent is ultimately treated by a publicly owned treatment works, neutralization of spent tank-solutions with subsequent discharge to the sewer may be possible. Consult local, state and federal agencies for proper disposal method in your area.
RCRA HAZ WASTE NOS: D002

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN WHEN HANDLING AND STORING
Store tightly closed container in a dry area at temps. between 40-120 degrees F. Store away from strong acids and oxidizing compounds. Keep product away from skin and eyes. Do not breathe spray mists or vapors. Clothing or shoes which become contaminated with substance should be removed promptly and not reworn until thoroughly cleaned. Keep out of the reach of children.

SECTION X - REGULATORY INFORMATION

DOT PROPER SHIPPING NAME: INDUSTRIAL CLEANERS N.O.I.,LIQUID KEEP FROM FREEZING
NOTE: DOT information applies to larger package sizes of affected products. For some products, DOT may require alternate names and labeling in accordance with packaging group requirements.
DOT HAZARD CLASS: NA DOT PACKING GROUP:
DOT I.D. NUMBER: DOT LABEL/PLACARD:
EPA TSCA CHEMICAL INVENTORY - ALL INGREDIENTS ARE LISTED
EPA CWA 40CFR PART 117 SUBSTANCE(RQ IN A SINGLE CONTAINER): NONE
EPA CAA: N/A

boron isotopes
EAGLE PICHER

Material Safety Data Sheet

Zinc Acetate Dihydrate
(< 1% ^{64}Zn)
($Zn(CH_3COO)_2 \cdot 2H_2O$)

Section 1. Manufacturer/Chemical Identification

MSDS CREATION DATE: May 31, 2000 — REVISED: Original

MANUFACTURER'S NAME:	Eagle Picher Technologies, LLC Boron Department
ADDRESS:	P.O. Box 798 Quapaw, OK 74363-0798
EMERGENCY TELEPHONE NUMBER:	918-673-2201 (24 Hours)
INFORMATION TELEPHONE NUMBER:	918-673-2201
FAX NUMBER:	918-673-1052
CHEMICAL NAME AND SYNONYMS:	Zinc Acetate Dihydrate (<1% ^{64}Zn) Acetic acid, zinc salt, zinc-64 depleted; Acetic acid, Zinc salt; Zinc acetate
CAS#:	200644-83-3
FORMULA:	$(Zn(CH_3COO)_2 \cdot 2H_2O)$

Section 2. Composition / Information on Ingredients

COMPONENTS	CAS#	TLV	PEL	%(optional)
Zinc Acetate Dihydrate (<1 % ^{64}Zn)	20064-83-3	5 mg/m^3	5 mg/m^3	100

Section 3. Hazardous Identification

EMERGENCY OVERVIEW

APPEARANCE: White crystals or crystalline plates.
Caution! May cause respiratory tract irritation. May be harmful if swallowed. May cause severe eye and skin irritation with possible burns. May cause digestive tract irritation with nausea, vomiting, and diarrhea.
TARGET ORGANS: None

POTENTIAL HEALTH EFFECTS:

EYE: Contact with eyes may cause severe irritation, and possible eye burns.

SKIN: Contact with skin causes irritation and possible burns, especially if the skin is wet or moist.

INGESTION: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May be harmful if swallowed.

INHALATION: Inhalation of fumes may cause metal fume fever, which is characterized by flulike symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause repiratory tract irritation.

CHRONIC: No information found.

Section 4. First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

Skin: Get medical aid. Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical attention.

Inhalation: Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid if cough or other symptoms appear.

NOTES TO PHYSICIAN:
Treat symptomatically and supportively.

Section 5. Fire Fighting Measures

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Fire Extinguishing Media:
In case of fire use water spray, dry chemical, carbon dioxide, or chemical foam.

Autoignition Temperature: Not Applicable

Flash Point: Not Applicable

NFPA Rating: Not Published

Explosion Limits: UEL: Not Available LEL: Not Available

Section 6. Accidental Release Measures

INFORMATION:
Use proper personal protective equipment as indicated in section 8.

SPILLS/LEAKS:
Clean up spills immediately, observing precautions in the Protective Equipment section.
Sweep up, then place into a suitable clean, dry container for disposal. Flush spill area with water.

Section 7. Handling and Storage

HANDLING:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with skin and eyes. Avoid ingestion and inhalation. Discard contaminated shoes.

STORAGE: Store in a cool, dry place. Keep containers tightly closed.

Section 8. Exposure Control/Personal Protection

ENGINEERING CONTROLS:
Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA-Final PELs
Zinc Acetate Dihydrate (<1% ^{64}Zn)	None Listed	None Listed	None Listed

OSHA VACATED PELS:
Zinc Acetate Dihydrate:
No OSHA Vacated PELs are listed for this chemical.

PERSONAL PROTECTIVE EQUIPMENT:

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Section 9. Physical and Chemical Properties

Physical State:	Solid
Appearance:	White crystals or crystalline plates.
Odor:	Faint vinegar-like odor.
pH:	Neutral to acidic.
Vapor Pressure:	Not Available
Vapor Density:	Not Available
Evaporation Rate:	Not Available
Viscosity:	Not Available
Boiling Point:	Not Available
Freezing/Melting Point:	237° C
Decomposition Temperature:	100° C
Solubility:	Very soluble in water
Specific Gravity/Density	1.735
Molecular Formula:	$Zn(CH_3COO)_2 \cdot 2H_2O$
Molecular Weight:	219.4464

Section 10. Stability and Reactivity

CHEMICAL STABILITY:
Stable under normal temperature and pressures.
CONDITIONS TO AVOID:
Incompatible materials.
INCOMPATIBILITIES with OTHER MATERIALS:
Zinc salts, alkalies and their carbonates, oxalates, phosphates, sulfides.
HAZARDOUS DECOMPOSITION PRODUCTS:
Carbon monoxide, carbon dioxide, toxic fumes of zinc oxide.
HAZARDOUS POLYMERIZATION:
Will not occur.

Section 11. Toxicological Information

RTECS #:
CAS # 5970-45-6: ZG8750000
LD50/LC50:
CAS # 5970-45-6: Oral, mouse: LD50 = 287 mg/kg; Oral, rat: LD50 = 794 mg/kg.
CARCINOGENICITY:
Zinc Acetate Dihydrate-
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
MUTAGENICITY:
Mutagenicity data exists for human lymphocyte cells at a dose of 7 mg/L.

Section 12. Ecological Information

None available

Section 13. Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.
RCRA D-Series Maximum Concentration of Contaminants: Not Listed.
RCRA D-Series Chronic Toxicity Reference Levels: Not Listed.
RCRA F-Series: Not Listed.
RCRA P-Series: Not Listed.
RCRA U-Series: Not Listed.
Not listed as a material banned from land disposal according to RCRA.

Section 14. Transport Information

US DOT: No information available.
IMO: No information available.
IATA: No information available.
RID/ADR: No information available.
Canadian TDG: No information available.

Section 15. · Regulatory Information

A. FEDERAL

TSCA:

CAS # 5970-45-6 is not listed on the TSCA Inventory.

HEALTH & SAFETY REPORTING LIST:

None of the chemicals are on the Health & Safety Reporting List.

CHEMICAL TEST RULES:

None of the chemicals in this product are under a Chemical Test Rule.

SECTION 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA SIGNIFICANT NEW USE RULE:

None of the chemicals in this material have a SNUR under TSCA.

SARA:

SECTION 302 (RQ)

None of the chemicals in this material have an RQ.

SECTION 302 (TPQ)

None of the chemicals in this product have a TPQ.

SARA CODES:

CAS # 5970-45-6: acute.

SECTION 313:

Zinc compounds are reportable under section 313.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

B. STATE

Not present on state lists from CA, PA, MN, MA, FL, or NJ.
California No Significant Risk Level.

Section 16. Other Information

The data given are those of the corresponding natural product unless specifically indicated otherwise. Safety data for isotopically altered compounds are generally unavailable but the hazards and properties are assumed to be similar or identical to those of the natural compounds. While the information set forth is believed to be accurate, Eagle Picher Technologies, LLC extends no warranties with respect hereto and disclaims all liabilities from reliance thereon. All judgements as to the suitability of the data presented with respect to the use of this product are the responsibility of the purchaser and intended user.