

FILED 10941-1
10941
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

20 DEC 1991

S.E. Oonnithan, Ph.D.
Registration Agent
Joe F. Ball Co., Inc.
2055 Pinehurst Street
Glendora, CA 91740

Subject: Liquid Chlorine
EPA Registration No. 10941-1
Your Amendment Dated September 5, 1991

Dear Dr. Oonnithan:

This is in response to your submitted labeling revised in response to Cal-EPA's objections concerning efficacy claims.

The labeling referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, is acceptable subject to the comments below. A stamped copy is enclosed for your records. Five copies of the finished labeling must be submitted before the product is released for shipment.

On the primary label (bottom of front panel) and the operating manual (front page), the full EPA Registration No. (10941-1) must appear.

Beside the Directions for Use heading on the primary label, delete the term "General Classification." It is no longer permitted on labels.

If you have any questions about these comments, you may call Wallace Powell at 703-305-6938.

Sincerely,

Ruth G. Douglas
Product Manager (32)
Antimicrobial Program Branch
Registration Division (H-7504C)

Enclosures

CONCURRENCES

SYMBOL								
SURNAME								
DATE								

LIQUID CHLORINE
JFB PROCESS CHEMICAL NO. 1

For use by trained personnel under the supervision of the JOE F. BALL COMPANY, INC. from large stationary containers such as 1-ton and 150 pound cylinders. To be used only in the JFB Process as a wash water treatment for the post harvest cleaning of raw agricultural commodities.

sanitizer

ACTIVE INGREDIENTS	
Compressed Chlorine Gas	100.00%w/w
INERT INGREDIENTS	None
TOTAL	100.00%w/w

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS
(and Domestic Animals)**

DANGER

Fatal if inhaled. Do not breathe vapor. Corrosive to eyes, skin and mucous membranes in the presence of moisture. Do not heat containers.


ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish. Do not discharge into lakes, streams, ponds or public waters, unless in accordance with an NPDES permit. For guidance contact the regional office of the Environmental Protection Agency.

CHEMICAL-PHYSICAL HAZARDS

Chlorine is a non-flammable gas, liquified, under pressure. Do not drop container. Keep away from intense heat or open sunlight. Corrosive to most metals in the presence of moisture.

KEEP OUT OF REACH OF CHILDREN

DANGER  **POISON**

COMPRESSED GAS

FATAL IF INHALED
LIQUID CAUSES SEVERE BURNS

STATEMENT OF PRACTICAL TREATMENT

FIRST AID - If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen, preferably with a physician's advice. Keep warm by covering with a blanket and keep quiet.

In case of skin or eye contact, immediately flush all affected areas with large amounts of running water for at least 15 minutes while removing contaminated clothing and shoes. For eyes, hold eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and flush with water. Call a physician immediately.

SEE SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

DIRECTIONS FOR USE - General Classification

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

LIQUID CHLORINE is to be used only in the JFB Process under the supervision of the Joe F. Ball Company, Inc. The JFB Process produces treated wash water for the post-harvest control of decay causing organisms in artichokes, carrots, cauliflower, celery, cherries, citrus fruits, onions, cucumbers, melons, peppers, potatoes, radishes and tomatoes.

LIQUID CHLORINE may be used only in equipment supplied by the Joe F. Ball Company, Inc. as part of the JFB Process and only under the supervision of the Company. Written operating instructions for the JFB Process in a booklet titled, *JFB Process Operating Manual* are provided with this product.

Have gas masks available approved for chlorine service by the U.S. Bureau of Mines or the National Institute for Occupational Safety and Health. Handle only in accordance with practices recommended in the *Chlorine Manual* published by the Chlorine Institute, Inc., New York. Use only in well ventilated areas. Keep container closed. Keep up wind of leaks and evacuate enclosed places until gas has dispersed. Make daily or more frequent inspections for leaks. Stop leaks at once. Chronic leaks become greater with time.

Manufactured-for: **JOE F. BALL COMPANY, INC.**
2055 PINEHURST STREET
GLENORA, CALIFORNIA 91740

EPA Establishment No. 37982-CA-1
EPA Registration No. 10941-

NET CONTENTS: — POUNDS

**ACCEPTED
with COMMENTS
in EPA Letter Dated**

DEC 20 1991

Under the Federal Insecticide, Fungicide, and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 10941-1

BEST AVAILABLE COPY

KNOW ABOUT CHLORINE - RESPECT IT - USE IT SAFELY

INTRODUCTION:

A new employee of the Joe F. Ball Company, Inc. must first become acquainted with the chemical Chlorine, and the equipment and practices for safe handling, storage, shipment, and use of Chlorine.

The Chlorine Manual published by the Chlorine Institute is provided to each employee. This is to be studied thoroughly for specific information on this subject. Only with the proper use of this chemical and the proper application of the process will we be able to safely provide our customers with the benefits of the process.

Please study the procedures manual and apply the information to your work. After you study the manual, we will discuss the subject thoroughly as it applies to the JFB Process.

EQUIPMENT:

The equipment for use with the JFB Process has been designed to meet all safety standards. The chlorinators used are made by the leading manufacturer of such equipment - Wallace & Tiernan (W&T), a Division of Pennwalt Corporation. There are two types of units used in the application of the process: the high- and low-capacity units.

High-Capacity Unit

This unit consists of the following components:

- 1. W&T V-Notch Chlorinator Series V 75 V.
- 2. Reaction tank.
- 3. Booster pump, electrical panel, and solution distribution system.

Low-Capacity Unit

This unit consists of the following components:

- 1. W&T V-Notch Chlorinator Series V-100.
- 2. Reaction tank.
- 3. Solution distribution system.

CHEMICALS:

sanitization

Chlorine is the chemical used in our Process. It is registered with the California Department of Food & Agriculture. Calcium Carbonate is used as a diluent for odor control.

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PH 32 10941-1

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Compressed Chlorine Gas	100.00%w/w
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TOTAL	100.00%w/w

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Manufactured for: **JOE F. BALL COMPANY, INC.**
2055 PINEHURST STREET
GLENORA, CALIFORNIA 91740

EPA Establishment No. 37982-CA-1
EPA Registration No. 10941-

NET CONTENTS: — POUNDS

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ACCEPTED
with COMMENTS
in EPA Letter Dated:

DEC 20 1991

Under the Federal Insecticide,
Fungicide and Rodenticide Act
as amended for the pesticide
registered under EPA Reg. No.
10941-1

METHOD OF APPLICATION

Process Equipment

1. Wallace & Tiernan Division of Pennell Corporation, V-Notch Chlorinator Series V 75 V (High Capacity) or Series V-100 (Low Capacity), supplied by Joe F. Ball Company.
2. Calcium Carbonate Reaction Tank, supplied by Joe F. Ball Company.
3. Solution Distribution system, supplied by the user of the JFB Process.
4. Operation Log Book.
5. JFB Process Operating Manual.

Process Chemicals

LIQUID CHLORINE, JFB Process Chemical No. 1, EPA Registration No. 10941-

CALCIUM CARBONATE, JFB Process Chemical No. 2.

Water.

Operating Procedures

See detailed operating instructions in the booklet, JFB Process Operating Manual.

All chlorine containers, including those on line, in reserve and empty, must be installed in a firmly secured manner outside of the packaging plants where the JFB Process is used. All cylinders must be handled in accordance with the instructions found in the "JFB Process Operating Manual" booklet provided with the label.

LIQUID CHLORINE, JFB Process Chemical No. 1 is metered into the chlorinator to prepare a water solution. The resulting chlorine solution passes into the Calcium Carbonate Reaction Tank containing CALCIUM CARBONATE, JFB Process Chemical No. 2 which is consumed at the rate of 1.41 lb. calcium carbonate per 1 pound of chlorine. Wash water is drawn off the reaction tank and metered to wash tanks, brush washer sprays, flumes, rinses and coolers.

Chlorine concentration tests are made at each point of application at the start of each operation to assure that application rate is at the desired level within the range from 50 to 200 ppm chlorine. Analyses are repeated several times each day as needed. All calibration tests and equipment adjustments are recorded in the log book provided.

STORAGE AND DISPOSAL

STORAGE - Cylinders and 1-ton containers of chlorine should be stored in a dry area away from sources of heat and protected from direct sunlight and precipitation. They should be segregated from other compressed gases and never stored near hydrocarbons, finely divided metals, turpentine, ether, anhydrous ammonia or other flammable materials. All storage containers must have a weather resistant label attached near the outlet valve and must not be accessible to the general public.

CONTAINER DISPOSAL - All chlorine containers are returnable and should be properly identified with return tags and returned as promptly as possible to supplier according to prescribed instructions and practices recommended by the Chlorine Institute. All valves must be closed tightly and closures or caps secured. It is illegal to ship a leaking chlorine container.

WARRANTY AND LIMITATION OF DAMAGES

JOE F. BALL COMPANY, INC. warrants that this material conforms to the chemical description and guaranteed limits of active ingredients as stated on this label.

JOE F. BALL COMPANY, INC. makes no other expression or implied warranty, including any other expressed or implied warranty of FITNESS or MERCHANTABILITY of any kind.

JOE F. BALL COMPANY, INC.'s maximum liability for breach of this warranty shall not exceed the purchase price of this product. In no event shall JOE F. BALL COMPANY, INC. be liable for indirect or consequential damages. This warranty shall not be changed by oral or written agreement unless signed by a duly authorized officer of JOE F. BALL COMPANY, INC.

Buyer assumes all risk of use or handling, whether in accordance with directions or not.

BEST AVAILABLE COPY

JFB PROCESS OPERATING MANUAL

To accompany the label of LIQUID CHLORINE
JFB process Chemical No. 1

EPA Registration No. 10941-___

Joe F. Ball Company, Inc.
2055 Pinehurst Street
Glendora, California 91740
(818) 335-1504

ACCEPTED
with COMMENTS
in EPA Letter Dated:

SEP 28 1980

Under the Federal Insecticide,
Fungicide, and Herbicide Act
as amended, for the pesticide
registered under EPA Reg. No.

10941-1

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CHEMICALS:

sanitization

Chlorine is the chemical used in our Process. It is registered with the California Department of Food & Agriculture. Calcium Carbonate is used as a diluent for odor control.

OPERATION:

For each installation of the process, the washing equipment system of the customer must be studied so the proper application of the Process can be achieved.

Chlorine, Process Chemical No. 1, is metered from either a 150 pound cylinder or from a 2000 pound tank. The chlorine is mixed with water and the solution is diluted with the calcium carbonate granules. The resulting chlorine solution is then metered to wash tanks and to brush washer sprays, flumes, rinses and/or coolers. During calibration, many concentration tests are made to assure that chlorine concentrations for each point of application are within the proper range. After calibration, frequent daily concentration tests are made. The results of each test must be recorded in the book provided.

SERVICE:

Each Company employee assigned to servicing the equipment must do the following:

1. Check our equipment to assure proper operation.
2. Make a chlorine concentration test for each application point. Record the results. Make the necessary adjustments which are dictated by the results. Note these adjustments in the record book.
3. Replenish chemicals as required.
4. Check for chlorine leaks.
5. Check with operators of the packing house equipment for operating details on the washing equipment.
6. Keep the equipment clean and the area around the installation clean.
7. Observe and record the condition of the produce being processed.

CHLORINE SAFETY PROGRAM

PURPOSE:

To assist our customers in providing a safe working environment for their employees, for our employees, and for the community surrounding our customers' packing house facilities.

TO OUR CUSTOMER:

We recognize that chlorine gas is a hazardous chemical. We have always recognized this fact, and we have always followed established safety procedures in our installations and in our service of our chlorine processes.

With the formal establishment of this program, we are involving you, our customer, in the program as the attainment of the purpose of the program is of mutual interest to everyone concerned.

TO OUR EMPLOYEES:

It is our responsibility to implement this program in the planning of our installations, in the making of our installations, with our customer contacts, with our local fire department contacts, and with all of our contacts with regulatory agencies. It is our responsibility to upgrade this program and to assist our customers in upgrading their safety programs whenever possible. Our safety record is very good, and that is the way we have planned it. Our goal is to eliminate the potential hazards associated with the use of chlorine gas.

STANDARD OPERATING PROCEDURES

1. All installations of chlorination equipment made by our company will be of the vacuum operated solution feed type. Under this type of operation, there is only chlorine under pressure in the chlorine tank or cylinder, at the tank or cylinder valve, and in the lower body of the cylinder unit. This safety feature is very important and one which is not generally known by, or fully understood by, the regulatory agencies. This point should be emphasized to all regulatory inspectors. We should emphasize our service frequency which is the established policy of the Joe F. Ball Company, Inc.

2. Chlorine cylinders are to be installed outside of the packing house whenever possible. All chlorine ton tanks will be installed outside of the packing house. All installations of chlorine cylinders and tanks should be installed remotely from the main entrances and exits of the packing house. With the

Cylinders and ton tanks installed outside of the packing house and with the use only of vacuum-operated chlorinators, there will not be chlorine under pressure in any of the chlorine lines or equipment in the packing house. Therefore, the hazard of chlorine leaks in the packing house is minimized or eliminated.

All chlorine cylinders will be securely chained on every installation. This includes cylinders on line, cylinders in reserve, and empty cylinders. All chlorine ton tanks will be properly cradled to prevent movement, and all chlorine cylinders and tanks will have protective barriers to prevent damage. Empty cylinders will be removed from the packing house promptly, and reserve inventory will be kept to a minimum. All installations of chlorine cylinders and tanks will be posted with "DANGER CHLORINE" signs.

All connections of chlorine cylinders and all disconnections of cylinders will only be performed by authorized personnel of the Joe F. Ball Company, Inc. Customers must be instructed in writing to leave this operation for us.

All company personnel shall periodically review our guidelines for cylinder connections and disconnection. A copy of these guidelines is included with this program.

All authorized company personnel shall be issued the chlorine institute manual, the chlorinator manufacturer's manual, and the safety manual. They will receive initial training on each of these manuals and then they will review them on a frequent schedule. Part-time employees will receive training appropriate for their job assignments.

All chlorine used by our company will be purchased from:

All Pure Chemical Company
26700 South Santa Road
PO Box 268
Tracy, CA 95376
(209) 835-5423

All Pure Chemical Company has proven to be a supplier which provides good service, and one dedicated to strict compliance with safety procedures. A copy of All Pure Chemical Company's cylinder inspection procedures is included for your reference. A copy of their Material Safety Data Sheet is included with this program.

In the event that we are ever unable to purchase chlorine from All Pure Chemical Company, we will seek out a similar chlorine supplier.

Prior to the completion of the sale of a new contract, we

will contact the responding fire department for that prospect, the appropriate hazardous materials agency, the building department, and the county health department and review this safety program with them. We will proceed with the completion of the sale only if these agencies approve the installation.

**INSTRUCTIONS
FOR
CONNECTION AND DISCONNECTION OF
CHLORINE CYLINDERS**

ALWAYS CONSIDER CHLORINE CONNECTIONS AS BEING UNDER PRESSURE

- d. Install valve cap being sure a gasket is in the cap.
- e. Install valve cover securely.

1. HOOKING UP FULL CYLINDERS OF CHLORINE

- a. Check cylinder valve to be sure it is closed.
- b. Loosen cylinder valve cap slightly to check for possible leak. If a chlorine leak is detected, secure the cap and return the cylinder to the supplier with an explanation of the problem.
- c. If no leak is detected, remove the valve cap.
- d. Clean cylinder valve face and the adapter face of the chlorine cylinder unit.
- e. Install a new gasket and mount cylinder unit on cylinder valve. Tighten cylinder yoke securely.
- f. Check cylinder unit installation for chlorine leaks by opening cylinder valve 1/4 turn and then check connections with ammonia.
- g. Secure cylinder valve cap to installation.
- h. Secure cylinder valve hood or cover to installation.
- i. Secure all chlorine cylinders with chain.
- j. Check control unit vent line.

2. REMOVING EMPTY OR PARTIALLY EMPTY CYLINDERS

- a. With our unit in operation, close cylinder valve to evacuate the chlorine from the lines and the metering equipment.
- b. Loosen the cylinder unit yoke slightly to allow air into the chlorine lines and metering equipment to fully evacuate chlorine.
- c. After the chlorine is fully evacuated, remove cylinder unit.

EMERGENCY PROGRAM

With our installation program of having the chlorine cylinders and tanks installed outside of the packing house building and with the vacuum operated equipment, the possibilities of an emergency are greatly minimized. However, in the event of an emergency, the following procedures are to be implemented immediately:

1. The employer's evacuation plan should be put into action immediately. Direct evacuation to an upwind area from the emergency.
2. Telephone emergency number 911 and any established emergency number for the jobsite. Report the emergency for fire department action. Be sure to give the exact location and nature of the emergency. The fire department should know of this installation, as we have reviewed the program with them.
3. Neither the personnel of Joe F. Ball and Company nor the personnel of the customer should attempt to stop a chlorine leak. Our employees do not have the equipment or backup assistance necessary to stop a chlorine leak. Note: leaks should only occur if damage occurs to the chlorine cylinder itself or the attached regulator. Let the fire department effect control. Allow the fire department clearance to the emergency site. Keep everyone away from the emergency site.

This program will be reviewed with each of our customers and with their respective fire and/or other local agencies. At the time of installation one of our personnel will take a representative of the fire department and/or other local agencies to the jobsite and give an explanation of our equipment, its operation, and provide them with a copy of our safety program. Users, by law, must supply local fire departments, and/or other local agencies, a written copy of their emergency evacuation plan under AB 2185, AB 2187, AB 3777.

In the event that a local agency requires a jobsite to have the inhouse ability to respond to chlorine leak emergencies, it will be necessary for the customer to purchase at least two self-contained respirators. It will be the customer's responsibility to train qualified employees in the use and care of these respirators.

By law, each user is responsible for their own hazardous materials plan and this responsibility can not be fully delegated to others.

EMERGENCY RESPONSE CONTACTS

<u>Contact</u>	<u>Telephone</u>
Emergency response agencies (fire-police-medical)	911
_____ County Office of Emergency Service	_____
State Warning Center	800 944-2181
Cheatrec Emergency Response Information Service	800 424-8802
All Pure Chemical Company	209 835-5423 209 835-9030 209 835-6725

NOTIFICATION

Company name: Joe F. Ball Company, Inc.
2055 Pinehurst Street
Glendora, California 91740
818 335-1405

Primary contacts: Joe F. Ball
Curtis F. Ball
At above address & telephone

Alternate contacts: Jeffery K. Ball
621 E. 23rd Street
Merced, California 95340
209 722-3456

Earl D. Albertson, Jr.
108 Cedar Street
Salinas, California 93905
408 422-2289

EMERGENCY NOTIFICATION PROCEDURES

The following agencies will be notified immediately following any release or threatened release of chlorine that presents an immediate hazard to the health and safety of employees or the public.

<u>CONTACT</u>	<u>TELEPHONE</u>
1. Emergency response agencies	911
2. Other established emergency number	_____
3. _____ County Office of Emergency Services	_____
4. State Warning Center	800 852-7550
5. Chemtrec	800 424-9300

When notifying these agencies of an emergency use the following procedures:

1. Identify yourself, company, address, & telephone number.
2. Identify the problem.
3. Name the hazardous materials.
4. Give the approximate quantity involved.
5. Give the time the incident occurred.
6. Name a safe location on or near the facility where emergency responders can meet with the company emergency coordinator.
7. Give the number of injuries and cause of injuries.
8. Indicate whether or not the facility is being evacuated.
9. Say whether the surrounding area should be evacuated.
10. Give any other information requested.

CHLORINE CYLINDER FILLING PROCEDURES AND THE PREVENTIVE SAFETY RESULTS

150 lb. CYLINDER

Each time a cylinder comes back to our plant the following is done:

1. A visual inspection of the cylinder is performed including the bottom of the cylinder.
2. We remove the "packing" and stem from the valve.
3. The cylinder is placed in a special "cradle" and turned upside down to check for foreign matter inside of the cylinder and to visually check the bottom of the cylinder.
4. The valve is cleaned and new "packing" put in valve.
5. The cylinder is weighed empty to compare with tare weight when cylinder was new.
6. Every five years the cylinder is hydrostatically tested by adding five times the normal pressure, holding the pressure for a period of time, then releasing it.

The fact that we charge customers demurrage over 120 days use of a cylinder assures that the cylinders are returned to our plant and reconditioned regularly.

TON TANK

The ton cylinder procedure is the same as the 150 lb. cylinder procedure with the exception of turning it upside down.

MATERIAL SAFETY DATA SHEET

APRIL 1, 1987

CHEMICAL NAME: CHLORINE

SYNONYMS: CHLORINE

FORMULA: Cl₂

TRADE NAME AND SYNONYM: CHLORINE

CHEMICAL FAMILY: CRYOGENIC GAS

CAS #: 7782-50-5

SECTION 1 - MANUFACTURER OR SUPPLIER

EMERGENCY NUMBER

ALL PURE CHEMICAL COMPANY, P.O. BOX 263, TRACY, CA 95376-0268

(209) 835-5423

SECTION 2 - PHYSICAL DATA

PHYSICAL STATE AT STP: GAS

APPEARANCE & ODOR: GREEN/YELLOW, PUNGENT

BOILING POINT: -34 C

PERCENT VOLATILE: 100

SPECIFIC GRAVITY (LIQUID): 1.4

VAPOR PRESSURE: 4800 MM HG

VAPOR DENSITY: 2.49

SOLUBILITY IN WATER: 0.7%

EVAPORATION RATE (WATER = 1): NOT PERTINENT

SECTION 3 - HAZARDOUS COMPONENTS

MATERIAL & PERCENT:
CHLORINE 99.5%

CAS #: 7782-50-5
UN/NA #: UN 1017

CARCINOGEN:
NOT CARCINOGEN

PEL:
1 PPM*
3 MG/M3

*CEILING LIMIT

11/16

SECTION 4 - FIRE & EXPLOSION HAZARD DATA

FLASH POINT: NON FLAMMABLE

AUTOIGNITION TEMP: NOT PERTINENT

FLAMMABLE LIMITS IN AIR (% BY VOLUME):

LOWER:
NOT PERTINENT

UPPER:

EXTINGUISHING MEDIA TO BE USED: SUITABLE FOR THE SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: SELF-CONTAINED BREATHING APPARATUS; FULL PROTECTIVE GEAR. CHLORINE FORMS CORROSIVE MIXTURES WITH WATER; SKIN CONTACT WITH CONTAMINATED WATER CAN CAUSE SEVERE BURNS. COOL EXPOSED CONTAINERS WITH WATER SPRAY; IF POSSIBLE, HAVE SPECIALLY-TRAINED PERSONEL REMOVE CONTAINERS FROM FIRE AREA.

UNUSUAL FIRE AND EXPLOSION HAZARDS: CHLORINE SUPPORTS COMBUSTION, AND FORMS EXPLOSIVE MIXTURES WITH FLAMMABLE GASES AND VAPORS. COMMON METALS MAY BURN IN HEATED CHLORINE. HIGHLY-TOXIC GASES MAY BE FORMED IN FIRES; CHLORINE ALONE CAN BE FATAL.

N.F.P.A. HAZARD CLASSIFICATION

HEALTH:
3

FLAMMABILITY:
0

REACTIVITY:
0 (GX)

SECTION 5 - HEALTH HAZARD DATA

CHLORINE IS HIGHLY CORROSIVE AND IS BELIEVED TO DAMAGE THE BODY BY LOCAL EFFECTS ONLY. NO SYSTEMIC (METABOLIC) EFFECTS ARE BELIEVED LIKELY. HOWEVER, SEVERE DAMAGE IS POSSIBLE AT ALL SITES OF CONTACT.

THRESHOLD LIMIT VALUE (TLV): (TWA:) 1 PPM (STEL:) 3 PPM
3 MG/ME 9 MG/ME
(NIOSH RECOMMENDED STANDARD: 0.5 PPM -- 15 MINUTE CEILING)

ROUTE(S) OF ENTRY: INHALATION, SKIN AND EYE CONTACT.

EFFECTS OF OVEREXPOSURE: INHALATION: SEVERE IRRITATION TO NOSE AND RESPIRATORY TRACT. COUGHING, BREATHELESSNESS, AND PULMONARY EDEMA (MAY BE DELAYED) MAY BE FOLLOWED BY DEATH IF TREATMENT IS INADEQUATE. SKIN CONTACT: ANY CONTACT WITH LIQUID CHLORINE CAUSES BURNS, BLISTERING AND TISSUE DESTRUCTION. LOCAL DAMAGE MAY ALSO BE CAUSED BY PROLONGED EXPOSURE TO THE GAS. EYE CONTACT: CONJUNCTIVITIS MAY BE CAUSED BY SUSTAINED EXPOSURE TO LOW CONCENTRATIONS; ANY LIQUID CONTACT WILL CAUSE SEVERE EYE DAMAGE.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: SKIN AND EYE IRRITATIONS CAN BE AGGRAVATED BY EXPOSURE. CHRONIC EXPOSURE MAY AGGRAVATE REDUCED RESPIRATORY CAPACITY (ESPECIALLY AMONG SMOKERS) AND MAY CAUSE DENTAL EROSION. IN GENERAL, WORKERS WITH PRE-EXISTING CARDIAC OR PULMONARY PROBLEMS SHOULD ONLY BE PERMITTED TO WORK AROUND CHLORINE WITH AFFIRMATIVE MEDICAL CLEARANCE.

EMERGENCY AND FIRST AID: CALL PHYSICIAN IMMEDIATELY FOR ANY PERSON OVER-EXPOSED TO CHLORINE. IMMEDIATE AND DEFINITIVE FIRST-AID TREATMENT IS ESSENT. EYE CONTACT: FLUSH EYES WITH CLEAR WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. CONTINUE FLUSHING UNTIL MEDICAL HELP IS AT HAND. SKIN CONTACT: (TREAT FOR INHALATION FIRST.) REMOVE CONTAMINATED CLOTHING UNDER A SAFETY SHOWER. WASH EXPOSED SKIN AREAS THOROUGHLY WITH WATER. INHALATION: REMOVE TO FRESH AIR. SUPPORT BREATHING IF NEEDED (USE CAUTION IN MOUTH-TO-MOUTH -- CHLORINE RESIDUAL MAY POISON RESCUER.) HAVE TRAINED PERSON GIVE OXYGEN UNTIL BREATHING EASES. IN MILD CASES, GIVE MILK TO RELIEVE THROAT IRRITATION.

SECTION 6 - REACTIVITY DATA

STABILITY: UNSTABLE: STABLE: XXX

CONDITIONS TO AVOID: MOISTURE INCREASES RATE OF ATTACK ON COMMON MATERIALS; HEAT MAY CAUSE INCREASED RATE OF ATTACK (STEEL IN CHLORINE IGNITES AT 215C).

INCOMPATIBILITIES (MATERIALS TO AVOID): CHLORINE IS A POWERFUL OXIDIZING AGENT. IT MAY REACT VIOLENTLY WITH REDUCING AGENTS OR COMBUSTIBLES. KEEP ALL FLAMMABLE SOLVENTS AND OTHER COMBUSTIBLES AWAY FROM CHLORINE. STORE IT WHERE IT WILL NOT MIX WITH OTHER GASES OR VAPORS.

HAZARDOUS DECOMPOSITION PRODUCTS: IT MAY COMBINE WITH OTHER GASES TO FORM HIGHLY TOXIC AGENTS, SUCH AS PHOSGENE, SULFURYL CHLORIDE, AND HYDROGEN CHLORIDE.

HAZARDOUS POLYMERIZATION: MAY OCCUR: WILL NOT OCCUR: XXX

SECTION 7 - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF SPILL OCCURS: (ESTABLISH WRITTEN EMERGENCY PLANS AND HAVE PERSONNEL TRAINED PRIOR TO ACCEPTANCE OF CHLORINE -- ONLY TRAINED PERSONNEL SHOULD WORK WITH IT.) EVACUATE THE AREA IMMEDIATELY -- ALLOW ONLY SPECIALLY TRAINED AND EQUIPPED PERSONNEL INTO THE SPILL AREA. NOTIFY SURROUNDING AREAS (ESP. DOWNWIND) AND LOCAL EMERGENCY RESPONSE AGENCIES. PROVIDE VENTILATION; HAVE TRAINED PERSONNEL IN FULL PROTECTIVE GARMENTS AND SUPPLIED-AIR RESPIRATORS FIND AND STOP LEAK OR MOVE LEAKING CONTAINER TO ISOLATED AREA. POSITION CONTAINER TO RELEASE GAS -- NOT LIQUID. WHEN POSSIBLE, DRAW OFF GAS TO PROCESS OR DISPOSAL SYSTEM.

WASTE DISPOSAL METHODS: BUBBLE GAS THROUGH LARGE VOLUME OF 1% NAOH OR OTHER ALKALI; DISPOSE OF RESULTING WASTE IN APPROVED SITE.

SECTION 8 - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: NIOSH/MSHA-APPROVED FULL-FACE RESPIRATORS SHOULD BE AVAILABLE FOR ALL NON-ROUTINE AND EMERGENCY PROCEDURES -- PREFERABLY SELF-CONTAINED.

VENTILATION

NATURAL:
MAY BE HELPFUL, BUT SHOULD NOT BE RELIED UPON ALONE.

MECHANICAL:
USE LOCAL AND GENERAL EXHAUST VENTILATION AS NEEDED TO MAINTAIN CONCENTRATIONS BELOW 1 PPM.

PROTECTIVE GLOVES:

RUBBER OR NEOPRENE

EYE PROTECTION:

CHEMICAL GOGGLES OR FACE SHIELD

OTHER PROTECTIVE EQUIPMENT: PROVIDE SAFETY SHOWERS, EYEWASH STATIONS AND WASHING FACILITIES IN ALL AREAS WHERE CHLORINE IS STORED OR USED. FULL PROTECTIVE CLOTHING AND RESPIRATORY PROTECTION MUST BE READILY AVAILABLE.

SECTION 9 - SPECIAL PRECAUTIONS

PRECAUTIONARY LABELLING: STORE IN COOL, WELL-VENTILATED AREA AWAY FROM OTHER CHEMICALS AND SOURCES OF HEAT OR IGNITION. PROTECT CONTAINERS FROM WEATHER AND PHYSICAL DAMAGE.

OTHER HANDLING AND STORAGE CONDITIONS:

PROVIDE POSITIVE VENTING FROM SAFETY RELEASES TO UNOCCUPIED AREA. LIQUID LEVELS SHOULD BE LESS THAN 85% OF CONTAINER CAPACITY. REGULARLY TEST PIPING AND CONTAINMENT USED IN CHLORINE SERVICE. PROVIDE TRAINING TO PERSONNEL ASSIGNED TO HANDLE CHLORINE; PROVIDE PRE-PLACEMENT MEDICAL EXAMS.

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SECTION 10

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

PROPER SHIPPING NAME: CHLORINE

IDENTIFICATION NUMBER: UN 1017

HAZARD CLASS: NONFLAMMABLE GAS; POISON

LABELS REQUIRED: CHLORINE