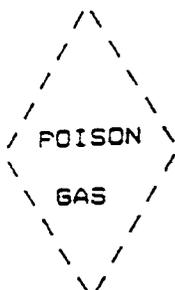


DATE: January 12, 1990



US ARMY CHEMICAL
RESEARCH, DEVELOPMENT
AND ENGINEERING CENTER

Emergency Telephone #s:
CRDEC Safety Office
301-671-4411, 0800-1630
EST. After normal duty
hours: 301-278-5201
Ask for CRDEC Staff
Duty Officer

HN1 MATERIAL SAFETY DATA SHEET

SECTION I - GENERAL INFORMATION

MANUFACTURER'S NAME: Department of the Army

MANUFACTURER'S ADDRESS: US ARMY ARMAMENT, MUNITIONS AND CHEMICAL
COMMAND
CHEMICAL RESEARCH, DEVELOPMENT AND ENGI-
NEERING CENTER
ATTN: SMCCR-SFS
ABERDEEN PROVING GROUND, MD 21010-5423

CAS REGISTRY NUMBER: 538-07-8

CHEMICAL NAME: 2,2'-Dichlorotriethylamine

Alternate Chemical Names:

Ethylbis(beta-chloroethyl)amine
Ethylbis(2-chloroethyl)amine
2-Chloro-N-(2-chloroethyl)-N-ethylethanamine

TRADE NAME AND SYNONYMS: Ethyl-S
HN1
TL 329
TL 1149

CHEMICAL FAMILY: Chloroamino hydrocarbon

FORMULA/CHEMICAL STRUCTURE: (C1 CH2 CH2)2 NC2 H5

NFPA 704 SIGNAL: Health - 4
Flammability - 1
Reactivity - 1



SECTION II - COMPOSITION

INGREDIENTS NAME	FORMULA	PERCENTAGE BY WEIGHT	TLV
Nitrogen Mustard 1	(C1 CH2 CH2)2 N C2 H5	100%	*
None established/available			

SECTION III - PHYSICAL DATA

BOILING POINT DEG F (DEG C): 150.8 (66) at 3 torr
185.9 (88.5) at 12 torr
381.2 (194) at 760 torr (Calculated)
Decomposes before boiling at 760 torr.

VAPOR PRESSURE (mm Hg): 0.0773 at 10 DEG C
0.25 at 25 DEG C
0.744 at 40 DEG C

VAPOR DENSITY (AIR=1): 5.9

LIQUID DENSITY (g/cc): 1.09 at 25 DEG C (77 DEG F)

SOLUBILITY IN WATER: Miscible with many organic solvents and oils.
Very slightly soluble in water.

SPECIFIC GRAVITY (H2O=1): 1.0861 at 23 DEG C
1.09 at 25 DEG C

FREEZING (MELTING) POINT: -34 DEG C

AUTOIGNITION TEMPERATURE DEG F (DEG C): Data not available

VISCOSITY (CENTISTOKES): Data not available

VOLATILITY: 127 mg/m³ at -10 DEG C
308 mg/m³ at 0 DEG C
744 mg/m³ at 10 DEG C
1520 mg/m³ at 20 DEG C
2290 mg/m³ at 25 DEG C
3100 mg/m³ at 30 DEG C
6290 mg/m³ at 40 DEG C

EVAPORATION RATE: Data not available

APPEARANCE AND ODOR: Pale amber to yellow oily liquid
Faint "fishy or musty" odor

SECTION IV - FIRE AND EXPLOSION DATA

FLASH POINT: No immediate danger of fire or explosion

FLAMMABILITY LIMITS (% BY VOLUME): Data not available

EXTINGUISHING MEDIA: Water, fog, foam, CO₂. Avoid use of extinguishing methods that will splash or spread HN1.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors of unburned agent will exhibit toxic effects.

SPECIAL FIRE FIGHTING PROCEDURES: Full protective clothing (see Section VIII) and full respiratory protection must be worn when fighting fires inside buildings and areas where HN1 is stored. Full protective clothing and canister or filter type masks can be worn where oxygen deficiency is not a problem. All persons not engaged in extinguishing the fire should be evacuated. Skin contact and inhalation of HN1 and its vapors must be avoided at all times. Although the fire may destroy most of the HN1, care must be taken to assure that the HN1 does not contaminate uncontrolled areas and that the fire fighters are adequately protected from physical contact with the agent and agent fumes. Contact may be fatal.

SECTION V - HEALTH HAZARD DATA

RECOMMENDED EXPOSURE LIMITS (REL): An REL is not available for HN1. No individual should be exposed to any direct skin or eye contact or any detectable airborne concentrations. Nitrogen mustards are classified as carcinogens by the International Agency for Research on Cancer (IARC).

EFFECTS OF OVEREXPOSURE: The vapors are irritating to the eyes and nasal membranes even in low concentration. HN1 is a vesicant (causing blisters) and alkylating agent producing cytotoxic action on the hematopoietic (blood-forming) tissues. HN1 is not naturally detoxified by the body, therefore repeated exposure produces a cumulative effect.

Median lethal dosages of HN1 in man are the following:

LCt₅₀ (man, inhalation) = 1500 mg-min/m³

LCt₅₀ (man, percutaneous vapor) = 20,000 mg-min/m³

Median incapacitating dosages of HN1 in man are the following:

ICt₅₀ (man, eye contact) = 200 mg-min/m³

ICt₅₀ (man, percutaneous) = 9000 mg-min/m³

Vesicancy doses in man are the following:

Liquid:

43.6 microliters produced 28 percent erythema
218 microliters produced 72 percent erythema
218 microliters produced 20 percent blisters (4 mm. av.
diameter.)

ACUTE PHYSIOLOGICAL ACTION OF HN1 IS LOCAL AND SYSTEMIC.

Locally, HN1 affects both the eyes and the skin. Skin damage occurs after percutaneous resorption. Skin penetration is rapid and skin irritation is noted very shortly after contact with the agent. Reddening (erythema) of the skin may occur within 30 minutes to 1 hour following the exposure, depending on degree of exposure and individual sensitivity. Blistering may not occur for more than 12 hours following exposure. Tender skin, mucous membrane and perspiration covered skin are more sensitive to the effects of HN1. Local action on the eyes is extremely rapid, and produces severe neurotic damage and loss of eyesight. Exposure of eyes to HN1 vapor or aerosol produces lacrimation, photophobia, and inflammation of the conjunctiva and cornea. Greatest immediate effect on HN-1 is on the eyes.

Systemic actions occur primarily through inhalation and ingestion. When inhaled, the lesions caused by nitrogen mustards are similar to those caused by mustards. They decrease in severity down the respiratory tract from the point of entry. The upper respiratory tract (nose, throat, trachea) is inflamed after a few hours latency period, accompanied by sneezing, coughing, hoarseness progressing to loss of voice, and persistent cough. Fever and moist rills develop followed by loss of appetite; diarrhea, and apathy. Broncho pneumonia may appear after the first twenty four hours. Exposure to near lethal doses of HN1 can produce injury to bone marrow, lymph nodes, and spleen as indicated by a drop in WBC count, and results in increased susceptibility to local and systemic infections. Ingestion of HN1 will produce severe stomach pains, vomiting, and bloody stools.

Chronic exposure to HN1 can cause sensitization and chronic lung impairment (cough, shortness of breath, chest pain). In mild vapor exposures there may be no skin lesions. After severe exposure or after exposure to liquid nitrogen mustard, reddening may appear earlier than in mustard contamination. There may be irritation and itching as with mustard; blisters may appear later. However, blisters may not occur for more than 12 hours following exposure. Skin lesions are similar to those caused by mustard.

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove from the source immediately. If breathing has stopped, give artificial respiration. If breathing

is difficult. administer oxygen. Seek medical attention immediately.

Eye Contact: immediately flush eyes with water for 10-15 minutes, pulling eyelids apart with fingers and pouring water into eyes. Do not cover eyes with bandages. After flushing eyes with water, protect eyes with dark or opaque goggles. Seek medical attention immediately.

Skin Contact: Don respiratory protective mask and gloves; remove victim from source immediately and remove contaminated clothing. immediately decontaminate skin by flushing with a 5% solution of liquid household bleach. After 3-4 minutes, wash off with soap and water to remove decon agent and protect against erythema. Seek medical attention immediately.

The rate of absorption of liquid nitrogen mustards through the skin is slower than that of mustard. Therefore, to prevent systemic toxicity, decontamination should be done as late as 2 or 3 hours after exposure even if it increases the severity of the local reaction. Further cleansing may be done with soap and water.

Ingestion: Do not induce vomiting. Give victim milk to drink. Seek medical attention immediately.

SECTION VI - REACTIVITY DATA

STABILITY: Polymerizes slowly

RATE OF HYDROLYSIS: Slow

HYDROLYSIS PRODUCTS: Hydroxyl derivatives and condensation products.

INCOMPATIBILITY: Corrosive to ferrous alloys beginning at 65 DEG C (149 DEG F)

HAZARDOUS DECOMPOSITION: Toxic intermediate products are produced during hydrolysis. Approximate half-life in water at 25 DEG C in 1.3 minutes. Decomposition comes through slow change into quaternary ammonium salts. Decomposition point is below 194 DEG C (381.2 DEG F)

HAZARDOUS POLYMERIZATION: Slowly

SECTION VII - SPILL, LEAK, AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Only personnel in full protective clothing will be allowed in an area where HN1 is spilled. HN1 should be contained using vermiculite,

diatomaceous earth, clay or fine sand and neutralized as soon as possible. A minimum of 65 grams of decon solution (5.25% Sodium Hypochlorite solution) is required for each gram of HN1. HN1 must be added to the decon solution and NOT DECON SOLUTION TO HN1. Decontamination/agent solution is allowed to agitate for a minimum of one hour. Agitation is not necessary following the first hour if a single phase is obtained. At the end of 24 hours, the resulting solution shall be adjusted to a pH between 10 to 11. Test for presence of active chlorine by use of acidic potassium iodide solution to give free iodine color. Place 3 ml of the decontaminant in a test tube. Add several crystals of potassium iodide and swirl to dissolve. Add 3 ml of 50 wt% sulfuric acid:water and swirl. IMMEDIATE iodine color indicates the presence of active chlorine. If negative, add additional 5.25% sodium hypochlorite solution to the decontamination solution, wait two hours, then test again for active chlorine. Continue procedure until positive chlorine is given by solution.

A 10 wt % HTH mixture may be substituted for sodium hypochlorite. Use 65 grams of decon per gram of HN1 and continue the test as described for sodium hypochlorite.

Do not use dry STB or HTH as they react violently with some chemicals. Scoop up all contaminated material and place in approved DOT containers. Pour in STB slurry or HTH solution. Decontaminate the outside of containers and label in accordance with federal, state and local regulations and hold for disposal.

NOTE: Surfaces contaminated with HN1 and then rinsed with water may evolve sufficient HN1 vapor to produce a physiological response.

WASTE DISPOSAL METHOD: All decontaminated material should be collected, contained, and chemically decontaminated, then thermally decomposed in an approved incinerator for HN1, which will filter or scrub toxic by-products from effluent air before discharge to the atmosphere. Any contaminated protective clothing should be decontaminated using HTH or bleach and analyzed to assure it is free of detectable contamination. The clothing should then be sealed in plastic bags inside properly labeled drums and held for shipment back to the Department of Army issue point. Decontamination of waste or excess material shall be accomplished in accordance with the following procedure:

(a) HN1 on laboratory glassware may be oxidized reacting it with strong bleaches, alkalies, or other oxidizers.

(b) Chemical decontamination of HN1 should be accomplished as described above. HN1 has poor solubility in water.

Decontaminated waste and/or HN1 shall be transported according to local SOP (in accordance with AR 55-355). Final disposition will be controlled according to AMCR 385-131 and AFG 200-2 and RCRA state regulations which take precedence (NOTE: Some states

consider certain decontaminated surety agents as RCRA hazardous waste. Local regulations must be considered before disposal action is taken).

SECTION VIII - SPECIAL PROTECTION INFORMATION

(U) RESPIRATORY PROTECTION:

<u>HN1 Concentration</u>	<u>Respiratory Protective Equipment</u>
Less than or equal to 0.003 mg/m ³ as an 8-hr TWA	<p>Protective mask not required provided that:</p> <ul style="list-style-type: none">(a) Continuous real-time monitoring (with alarm capability) is conducted in the work area at the 0.003 mg/m³ level of detection.(b) M9, M17 or M40 mask is available and donned if concentrations exceed 0.003 mg/m³.(c) Exposure has been limited to the extent practicable by engineering control (remote operations, ventilations, and process isolation) or work practices. <p>If those conditions are not met then the following applies:</p> <p>Full facepiece, chemical canister, air-purifying respirators. (The M9, M17 or M40 series or other certified equivalent masks acceptable for this purpose in conjunction with the M3 toxicological agent protective (TAP) suit for dermal protection.)</p>
Greater than 0.003 as an 8-hr TWA	<p>The Demilitarization Protective Ensemble (DPE), 30 mil, may be used with prior approval from the AMC Field Safety Activity</p> <p>Use time for the 30 mil DPE must be restricted to two hours or less.</p> <p>NOTE: When 30 mil DPE is not available the M17 or M40 mask with Level A protective ensemble including impregnated innerwear can be used. However, use time shall be restricted to the extent operationally feasible, and may not exceed one hour.</p>

As an additional precaution, the cuffs of the sleeves and the legs of the M3 suit shall be taped to the gloves and boots to reduce aspiration.

VENTILATION: Local Exhaust: Mandatory must be filtered or scrubbed to limit exit concentration to 0.003 mg/m³ averaged over 8 hr/day. Filtration must be adequate to maintain stack concentration below 0.03 mg/m³ as a 1 hour TWA. These values are based on structural similarity to HD.

SPECIAL: Chemical laboratory hoods shall have an average inward face velocity of 100 linear feet per minute (1fpm) plus or minus 10% with the velocity at any point not deviating from the average face velocity by more than 20%. Laboratory hoods shall be located such that cross drafts do not exceed 20 percent of the inward face velocity. A visual performance test utilizing smoke producing devices shall be performed in the assessment of the inclosure's ability to contain agent HN1.

Other: Recirculation of exhaust air from agent areas is prohibited. No connection between agent areas and other areas through ventilation system is permitted. Emergency backup power is necessary. Hoods should be tested semi-annually or after modification or maintenance operations. Operations should be performed 20 cm inside hoods.

PROTECTIVE GLOVES: MANDATORY - Butyl Toxicological Agent Protective Gloves (M3, M4, or glove set).

EYE PROTECTION: As a minimum, chemical goggles will be worn. For splash hazard use goggles and face-shield.

OTHER PROTECTIVE EQUIPMENT: Full protective clothing will consist of the M3 butyl rubber suit with hood, M2A1 boots, M3 gloves, underwear, M9 series mask and coveralls (if desired), STEPOI or the DPE. For general lab work, gloves and lab coat shall be worn with M9, M17, or M40 Mask readily available.

In addition, when handling contaminated lab animals wearing clean smock, foot covers, and head covers are required daily.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: During handling, the "buddy" (two man) system will be used. Containers should be periodically inspected for leaks (either visually or by a detector kit), and prior to transferring the containers from storage to work areas. Stringent control over all personnel handling HN1 must be exercised. Chemical showers, eyewash stations, and personal cleanliness facilities must be provided. Wash hands before meals and at the end of the workday. No smoking, eating, or drinking is permitted at the work site.

smoking, eating, or drinking is permitted at the work site. Decontamination equipment shall be conveniently located. Exits must be designed to permit rapid evacuation. HN1 should be stored in containers made of glass for Research Development Test and Evaluation (RDTE) quantities or one-ton steel containers for large quantities. Agent shall be double-contained in liquid-tight containers when in storage.

SECTION X - TRANSPORTATION DATA

PROPER SHIPPING NAME: Poisonous liquid, n.o.s.

DOT HAZARD CLASSIFICATION: Poison A

DOT LABEL: Poison Gas

DOT MARKING: Poison Liquid, n.o.s. (2,2'-Dichlorotriethylamine)
NA 1955

DOT PLACARD: POISON GAS

PRECAUTIONS TO BE TAKEN IN TRANSPORTATION: Motor vehicles will be placecarded regardless of quantity. Driver shall be given full and complete information regarding shipment and conditions in case of emergency. All shipments will be handled per local SOP. (AR 55-355)

EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURES: See sections IV, VII, and VIII.

While the Chemical Research, Development and Engineering Center, Department of the Army believes that the data contained herein are factual and the opinions expressed are those of qualified experts regarding the results of the tests conducted, the data are not to be taken as a warranty or representation for which the Department of the Army or Chemical Research, Development and Engineering Center assumes legal responsibility. They are offered solely for your consideration, investigation, and verification. Any use of these data and information must be determined by the user to be in accordance with applicable Federal, State, and local laws and regulations.

LIST OF REFERENCES FOR MSDS FOR HN1

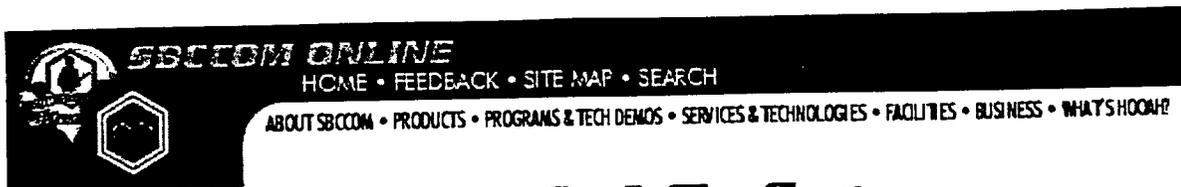
1. Compton, James A.F., Military Chemical and Biological Agents, The Telford Press, Caldwell, NJ, 1987.
2. Field Manual 8-9, NATO Handbook on the Medical Aspects of NBC Defensive Operations, Department of the Army, the Navy, and the Air Force, Washington, D.C., August 1973.
3. Summary Technical Report of Division 9, NDRC, Volume I. Chemical Warfare Agents and Related Chemical Problems, Parts I-II, "Chapter 6: Nitrogen Mustards", by Arthur C. Cope, Marshall Gates, and Birdsey Renshaw, Washington, DC, 1946.
4. Summary Technical Report of Division 9, NDRC, Volume I. Chemical Warfare Agents and Related Chemical Problems, Parts III-VI, "Chapter 22: Systemic Pharmacology and Pathology of Sulfur and Nitrogen Mustards", by William P. Anslow and C. Riley Houck, Washington, DC, 1946.
5. Field Manual 3-9, Military Chemistry and Chemical Compounds, Department of the Army and the Air Force, Washington, DC, 30 October 1975.
6. TM 8-285, Treatment of Chemical Agent Casualties and Conventional Military Chemical Injuries, Department of the Army, the Navy, and the Air Force, Washington, DC, May 1974.
7. The Merck Index, 10th ed., Merck and Co., Inc., Rahway, NJ, USA, 1983.
8. RTECS, Registry of Toxic Effects of Chemical Substances, US Department of Health and Human Services, Washington, DC, 1987.
9. CWS Field Lab Memo 1-4-5, Medical Division Status Summaries, Information Division, CWS Technical Command, Chemical Warfare Center, Edgewood Arsenal, MD, August 1944.
10. AMC-R 385-131, Safety Regulation for Chemical Agents H, HD, HT, GB, and VX, Department of the Army, Headquarters, United States Army Material Command, Alexandria, VA, 9 October 1987.
11. AR 385-64, Ammunition and Explosives Safety Standards, Headquarters, Department of the Army, Washington, DC, 22 May 1987.
12. CRDECR 385-1, Chemical, Explosive, and Occupational Safety and Health Program, Department of the Army, US Army Chemical Research, Development and Engineering Center, Aberdeen Proving Ground, MD, 15 August 1986.

ADDENDUM A

Equipment Description

M-9	Mask	-----	Mask, Chemical Biological Special Purpose M9, M9A1.
M-40	Mask	-----	Mask, Protective
M-17	Mask	-----	(M-17, M-17A1, M17-A2) - Biological/Chemical Field Protective Mask.
M-3	Tap	-----	Toxicological Agent Protective Ensemble
M-3	Hood	-----	Toxicological Agent Protective
M-2A1	Boots	-----	Butyl-Safety Toe-TAP-Toxicological Agent Protective
M3		-----	M3 Gloves Toxicological Protective
M4		-----	M4 Gloves Toxicological Protective
Gloves		-----	Gloves-Norton-Toxicological Protective

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Material Safety Data Sheet

Lethal Nerve Agent (GB)



Date: 22 September 1988
Revised: 29 September 1999

In the event of an emergency
Telephone the SBCCOM Operations
Center's 24-hour emergency
Number: 410-436-2148

Section I - General Information

Manufacturer's Address:

U.S. Army Soldier and Biological Chemical Command (SBCCOM)
Edgewood Chemical Biological Center (ECBC)
ATTN: AMSSB-RCB-RS
Aberdeen Proving Ground, MD 21010-5424

CAS Registry Numbers:

107-44-8, 50642-23-4

Chemical Name:

Isopropyl methylphosphonofluoridate

Alternate Chemical Names:

O-Isopropyl Methylphosphonofluoridate
Phosphonofluoridic acid, methyl-, isopropyl ester
Phosphonofluoridic acid, methyl-, 1-methylethyl ester

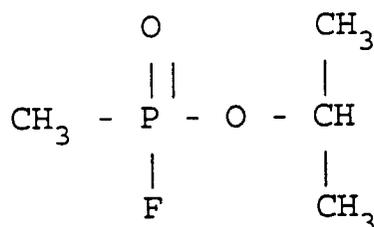
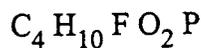
Trade Name And Synonyms:

Isopropyl ester of methylphosphonofluoridic acid
Methylisopropoxyfluorophosphine oxide
Isopropyl Methylfluorophosphonate
O-Isopropyl Methylisopropoxyfluorophosphine oxide
Methylfluorophosphonic acid, isopropyl ester
Isopropoxymethylphosphonyl fluoride
Isopropyl methylfluorophosphate

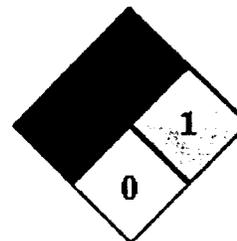
Isopropoxymethylphosphoryl fluoride
 GB
 Sarin
 Zarin

Chemical Family:

Fluorinated organophosphorous compound

Formula/Chemical Structure:**NFPA 704 Signal:**

Health - 4
 Flammability - 1
 Reactivity - 1
 Special - 0

**Section II - Ingredients**

Ingredients/Name: GB

Percentage by Weight: 100%

Threshold Limit Value (TLV): 0.0001 mg/m³

Section III - Physical Data

Boiling Point @ 760 mm Hg: 316 °F (158 °C)

Vapor Pressure (mm Hg): 2.9 @ 25 °C

Vapor Density (Air = 1 STP): 4.83 @ 25 °C

Solubility: Miscible with water. Soluble in all organic solvents.

Specific Gravity ($H_2O=1g/mL$): 1.0919 @ 25 °C

Freezing/Melting Point (°C): -56 °C

Liquid Density (g/cc): 1.0887 @ 25 °C
1.102 @ 20 °C

Volatility (mg/m^3): 22,000 @ 25 °C

Viscosity (CENTISTOKES): 1.283 @ 25 °C

Appearance and Odor: Colorless liquid. Odorless in pure form.

Section IV - Fire and Explosion Data

Flashpoint: Did not flash to 280 °F (McCutchan - Young)

Flammability Limits (% By Volume): Not Applicable

Lower Explosive Limit: Not Applicable

Upper Explosive Limit: Not Applicable

Extinguishing Media: Water mist, fog, foam, CO_2 .
Avoid using extinguishing methods that will cause splashing or spreading of the GB.



Special Fire Fighting Procedures: GB will react with steam or water to produce toxic and corrosive vapors. All persons not engaged in extinguishing the fire should be immediately evacuated from the area. Fires involving GB should be contained to prevent contamination to uncontrolled areas. When responding to a fire alarm in buildings or areas containing GB, fire fighting personnel should wear full firefighter protective clothing during chemical agent firefighting and fire rescue operations. Respiratory protection is required. Positive pressure, full face piece, NIOSH-approved self-contained breathing apparatus (SCBA) will be worn where there is danger of oxygen deficiency and when directed by the fire chief or chemical accident/incident (CAI) operations officer. In cases where firefighters are responding to a chemical accident/incident for rescue/reconnaissance purposes they will wear appropriate levels of protective clothing (See Section VIII).

Do not breathe fumes. Skin contact with nerve agents must be avoided at all times. Although the fire may destroy most of the agent,

care must still be taken to assure the agent or contaminated liquids do not further contaminate other areas or sewers. Contact with liquid GB or vapors can be fatal.

Unusual Fire And Explosion Hazards: Hydrogen may be present.

Section V - Health Hazard Data

Airborne Exposure Limits (AEL): The permissible airborne exposure concentration for GB for an 8-hour workday of a 40-hour work week is an 8-hour time weighted average (TWA) of 0.0001 mg/m³. This value can be found in "DA Pam 40-8, Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents GA, GB, GD, and VX." To date, however, the Occupational Safety and Health Administration (OSHA) has not promulgated a permissible exposure concentration for GB.

GB is not listed by the International Agency for Research on Cancer (IARC), American Conference of Governmental Industrial Hygienists (ACGIH), Occupational Safety and Health Administration (OSHA), or National Toxicology Program (NTP) as a carcinogen.

Effects Of Overexposure: GB is a lethal cholinesterase inhibitor. Doses which are potentially life-threatening may be only slightly larger than those producing least effects.

<i>Route</i>	<i>Form</i>	<i>Effect</i>	<i>Type</i>	<i>Dosage</i>
ocular	vapor	miosis	ECt50	<2 mg-min/m ³
Inhalation	vapor	runny nose	ECt50	<2 mg-min/m ³
Inhalation (15 l/min)	vapor	severe incapacitation	ICt50	35 mg-min/m ³
Inhalation (15 l/min)	vapor	death	LCt50	70 mg-min/m ³
Percutaneous	liquid	death	LD50	1700 mg/70 kg man

Effective dosages for vapor are estimated for exposure durations of 2-10 minutes.

Symptoms of overexposure may occur within minutes or hours, depending upon the dose. They include: miosis (constriction of pupils) and visual effects, headaches and pressure sensation, runny nose and nasal congestion, salivation, tightness in the chest, nausea,

vomiting, giddiness, anxiety, difficulty in thinking, difficulty sleeping, nightmares, muscle twitches, tremors, weakness, abdominal cramps, diarrhea, involuntary urination and defecation. With severe exposure symptoms progress to convulsions and respiratory failure.

Emergency And First Aid Procedures:

Inhalation: Hold breath until respiratory protective mask is donned. If severe signs of agent exposure appear (chest tightens, pupil constriction, in coordination, etc.), immediately administer, in rapid succession, all three Nerve Agent Antidote Kit(s), Mark I injectors (or atropine if directed by a physician). Injections using the Mark I kit injectors may be repeated at 5 to 20 minute intervals if signs and symptoms are progressing until three series of injections have been administered. No more injections will be given unless directed by medical personnel. In addition, a record will be maintained of all injections given. If breathing has stopped, give artificial respiration. Mouth-to-mouth resuscitation should be used when mask-bag or oxygen delivery systems are not available. Do not use mouth-to-mouth resuscitation when facial contamination exists. If breathing is difficult, administer oxygen. Seek medical attention **Immediately**.



Eye Contact: **Immediately** flush eyes with water for 10-15 minutes, then don respiratory protective mask. Although miosis (pinpointing of the pupils) may be an early sign of agent exposure, an injection will not be administered when miosis is the only sign present. Instead, the individual will be taken **Immediately** to a medical treatment facility for observation.

Skin Contact: Don respiratory protective mask and remove contaminated clothing. **Immediately** wash contaminated skin with copious amounts of soap and water, 10% sodium carbonate solution, or 5% liquid household bleach. Rinse well with water to remove excess decontaminant. Administer nerve agent antidote kit, Mark I, only if local sweating and muscular twitching symptoms are observed. Seek medical attention **Immediately**.

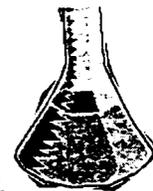
Ingestion: Do not induce vomiting. First symptoms are likely to be gastrointestinal. **Immediately** administer Nerve Agent Antidote Kit, Mark I. Seek medical attention **Immediately**.

Section VI - Reactivity Data

Stability: Stable when pure. Plant grade material stabilized with tri-n-butylamine can be stored in steel containers for long periods of time at temperatures up to 70 °C, but



unstablized material tends to build-up pressure within a few weeks.



Incompatibility: Attacks tin, magnesium, cadmium plated steel, and some aluminum. Slightly attacks copper, brass, and lead; practically no attack on 1020 steels, Inconel and K-monel.

Hazardous Decomposition Products: Hydrolyzes to form HF under acid conditions and isopropyl alcohol and polymers under basic conditions.

Hazardous Polymerization: Does not occur.

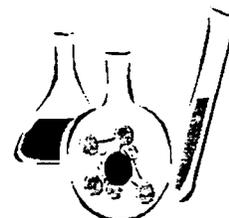
Section VII - Spill, Leak, and Disposal Procedures

Steps To Be Taken In Case Material Is Released Or Spilled: If leaks or spills of GB occur, only personnel in full protective clothing will remain in the area (See Section VIII). In case of personnel contamination see Section V for emergency and first aid instructions.

Recommended Field Procedures: Spills must be contained by covering with vermiculite, diatomaceous earth, clay, fine sand, sponges, and paper, or cloth towels. Decontaminate with copious amounts of aqueous sodium hydroxide solution (a minimum 10 wt.%). Scoop up all material and place in a DOT approved container. Cover the contents with decontaminating solution as above. After sealing, the exterior will be decontaminated and labeled according to EPA and DOT regulations. All leaking containers will be over packed with sorbent (e.g., vermiculite) placed between the interior and exterior containers. Decontaminate and label according to EPA and DOT regulations. Dispose of decontaminate according to Federal, state, and local laws. Conduct general area monitoring to confirm that the atmospheric concentrations do not exceed the airborne exposure limits (See Sections II and VIII).

If 10 wt.% aqueous sodium hydroxide is not available then the following decontaminants may be used instead and are listed in the order of preference: Decontaminating Agent (DS2), Sodium Carbonate, and Supertropical Bleach Slurry (STB).

Recommended Laboratory Procedures: A minimum of 56 grams of decon solution is required for each gram of GB. Decontaminant and agent solution is allowed to agitate for a minimum of one hour. Agitation is not necessary following the first hour. At the end of one hour, the resulting solution should be adjusted to a pH



greater than 11.5. If the pH is below 11.5, NaOH should be added until a pH above 11.5 can be maintained for 60 minutes. An alternate solution for the decontamination of GB is 10 wt.% sodium carbonate in place of the 10% sodium hydroxide solution above. Continue with 56 grams of decon for each gram of agent. Agitate for one hour but allow three hours for the reaction. The final pH should be adjusted to above zero. It is also permitted to substitute 5.25% sodium hypochlorite or 25 wt.% Monoethylamine (MEA) for the 10% sodium hydroxide solution above. MEA must be completely dissolved in water before addition of the agent. Continue with 56 grams of decon for each gram of GB and provide agitation for one hour. Continue with same ratios and time stipulations. Scoop up all material and clothing. Place all material in a DOT approved container. Cover the contents with decontaminating solution as above. After sealing, decontaminate the exterior of the container and label according to EPA and DOT regulations. All leaking containers will be over packed with sorbent placed between the interior and exterior containers. Decontaminate and label according to EPA and DOT regulations. Dispose of decontaminate according to Federal, State, and local laws. Conduct general area monitoring to confirm that the atmospheric concentrations do not exceed the airborne exposure limits (See Sections II and VIII).

Waste Disposal Method: Open pit burning or burying of GB or items containing or contaminated with GB in any quantity is prohibited. The detoxified GB (using procedures above) can be thermally destroyed by incineration in EPA approved incinerators according to appropriate provisions of Federal, state and local Resource Conservation and Recovery Act (RCRA) Regulations.

Note: Some decontaminate solutions are hazardous waste according to RCRA regulations and must be disposed of according to those regulations.

Section VIII - Special Protection Information

Respiratory Protection:

Concentration

Respiratory Protective Equipment

< 0.0001
mg/m³

A full face piece, chemical canister, air-purifying protective mask will be on hand for escape. M40-series masks are acceptable for this purpose. Other masks certified as



 equivalent may be used.

>0.0001 or =
 0.2 mg/m³

A NIOSH/MSHA approved pressure demand full face piece SCBA or supplied air respirators with escape air cylinder may be used. Alternatively, a full face piece, chemical canister air-purifying protective mask is acceptable for this purpose (See DA Pam 385-61 for determination of appropriate level)

>0.2 mg/m³ or
 unknown

NIOSH/MSHA approved pressure demand full face piece SCBA suitable for use in high agent concentrations with protective ensemble (See DA Pam 385-61 for examples).

Ventilation:

Local exhaust: Mandatory. Must be filtered or scrubbed to limit exit concentrations to < 0.0001 mg/m³. Air emissions will meet local, state, and federal regulations.

Special: Chemical laboratory hoods will have an average inward face velocity of 100 linear feet per minute (lfpm) ±20% with the velocity at any point not deviating from the average face velocity by more than 20%. Existing laboratory hoods will have an inward face velocity of 150 lfpm ±20%. Laboratory hoods will be located such that cross-drafts do not exceed 20% of the inward face velocity. A visual performance test using smoke-producing devices will be performed in assessing the ability of the hood to contain agent GB.

Other: Recirculation or exhaust air from chemical areas is prohibited. No connection between chemical areas and other areas through ventilation system is permitted. Emergency backup power is necessary. Hoods should be tested at least semiannually or after modification or maintenance operations. Operations should be performed 20 centimeters inside hood face.

Protective Gloves: Butyl Rubber Glove M3 and M4 Norton, Chemical Protective Glove Set

Eye Protection: At a minimum chemical goggles will be worn. For splash hazards use goggles and face shield.

Other Protective Equipment: For laboratory operations, wear lab

coats, gloves, and have mask readily accessible. In addition, daily clean smocks, foot covers, and head covers will be required when handling contaminated lab animals.

Monitoring: Available monitoring equipment for agent GB is the M8/M9 detector paper, detector ticket, M256/M256A1 kits, bubbler, Depot Area Air Monitoring System (DAAMS), Automated Continuous Air Monitoring System (ACAMS), Real-Time Monitor (RTM), Demilitarization Chemical Agent Concentrator (DCAC), M8/M43, M8A1/M43A1, CAM-M1, Hydrogen Flame Photometric Emission Detector (HYFED), the Miniature Chemical Agent Monitor (MINICAM), and the Real Time Analytical Platform (RTAP).

Real-time, low-level monitors (with alarm) are required for GB operations. In their absence, an Immediately Dangerous to Life and Health (IDLH) atmosphere must be presumed. Laboratory operations conducted in appropriately maintained and alarmed engineering controls require only periodic low-level monitoring.

Section IX - Special Precautions

Precautions To Be Taken In Handling And Storing: When handling agents, the buddy system will be incorporated. No smoking, eating, or drinking in areas containing agents is permitted. Containers should be periodically inspected for leaks, (either visually or using a detector kit). Stringent control over all personnel practices must be exercised. Decontaminating equipment will be conveniently located. Exits must be designed to permit rapid evacuation. Chemical showers, eyewash stations, and personal cleanliness facilities must be provided. Wash hands before meals and shower thoroughly with special attention given to hair, face, neck, and hands using plenty of soap and water before leaving at the end of the work day.

Other Precautions: Agent containers will be stored in a single containment system within a laboratory hood or in a double containment system.

For additional information see "AR 385-61, The Army Toxic Chemical Agent Safety Program," "DA Pam 385-61, Toxic Chemical Agent Safety Standards," and "DA Pam 40-173, Occupational Health Guidelines for the Evaluation and Control of Occupational Exposure to Nerve Agents GA, GB, GD, and VX."

Section X - Transportation Data

Note: Forbidden for transport other than via military (Technical Escort Unit) transport according to 49 CFR 172

Proper Shipping Name: Toxic liquids, organic, n.o.s.

DOT Hazard Class: 6.1, Packing Group I, Hazard Zone A

DOT Label: Poison

DOT Marking: Toxic liquids, organic, n.o.s. (Isopropyl methylphosphonofluoridate) UN 2810, Inhalation Hazard

DOT Placard: Poison

Emergency Accident Precautions And Procedures: See Sections IV, VII, and VIII.

Precautions To Be Taken In Transportation: Motor vehicles will be placarded regardless of quantity. Drivers will be given full information regarding shipment and conditions in case of an emergency. AR 50-6 deals specifically with the shipment of chemical agents. Shipment of agents will be escorted in accordance with AR 740-32.

The Edgewood Chemical Biological Center (ECBC), Department of the Army believes that the data contained herein are actual and are the results of the tests conducted by ECBC experts. The data are not to be taken as a warranty or representation for which the Department of the Army or ECBC assumes legal responsibility. They are offered solely for consideration. Any use of this data and information contained in this MSDS must be determined by the user to be in accordance with applicable Federal, State, and local laws and regulations.

This page last updated on 27 July 2000

MALLINCKRODT SCIENCE PRODUCTS DIV -- CHLOROFORM, CAT #4434 - CHLOROFORM
MATERIAL SAFETY DATA SHEET

FSC: 6810
NIIN: 010626566
Manufacturer's CAGE: 62910
Part No. Indicator: A
Part Number/Trade Name: CHLOROFORM, CAT #4434

=====
General Information
=====

Item Name: CHLOROFORM
Company's Name: MALLINCKRODT INC., SCIENCE PRODUCTS DIVISION
Company's Street: PARIS BYPASS
Company's P. O. Box: M
Company's City: PARIS
Company's State: KY
Company's Country: US
Company's Zip Code: 40361
Company's Emerg Ph #: 314-982-5000
Company's Info Ph #: 314-982-5000
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Date MSDS Prepared: 01JAN87
Safety Data Review Date: 17JUN86
Supply Item Manager: KX
MSDS Serial Number: BGJVV
Hazard Characteristic Code: T3
Unit Of Issue: BT
Unit Of Issue Container Qty: 80 FL OUNCES
Type Of Container: BOTTLE
Net Unit Weight: 7.5 LBS

=====
Ingredients/Identity Information
=====

Proprietary: NO
Ingredient: CHLOROFORM (SARA III)
Ingredient Sequence Number: 01
Percent: >99
NIOSH (RTECS) Number: FS9100000
CAS Number: 67-66-3
OSHA PEL: (C) 50 PPM
ACGIH TLV: 10 PPM; A2; 9293

=====
Physical/Chemical Characteristics
=====

Appearance And Odor: CLEAR COLORLESS LIQ.HEAVY ETHEREAL ODOR
Boiling Point: 142F,61C
Vapor Pressure (MM Hg/70 F): 100
Vapor Density (Air=1): 4.1
Specific Gravity: 1.49
Evaporation Rate And Ref: 11.6(BU-AC=1)
Solubility In Water: SLIGHT
Percent Volatiles By Volume: 100

=====
Fire and Explosion Hazard Data
=====

Flash Point: NONE

Extinguishing Media: EXTINGUISH W. AGENT SUITABLE FOR SURROUNDING FIRE.

Special Fire Fighting Proc: WEAR SELF-CNTD BRTHG, APP H2O SPRAY TO COOL CONTR.

Unusual Fire And Expl Hazrds: NOT CONSIDERED TO BE AN EXPLOSION HAZARD; SLIGHT FIRE HAZARD WHEN EXPOSED TO HIGH HEAT.

=====
Reactivity Data
=====

Stability: YES

Cond To Avoid (Stability): PREVENT EXPOSURE TO AIR AND LIGHT (FORM PHOSGENE & HCL GASES)

Materials To Avoid: STRONG CAUSTICS, CHEM ACTIVE METALS, AL, K, NA, METHANO, OXIDZRS.

Hazardous Decomp Products: HCL, CL2, PHOSGENE, & CO GASES WHEN HEATED TO DECOMPOSITION.

Hazardous Poly Occur: NO

=====
Health Hazard Data
=====

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: CHLOROFORM IS SUSPECTED BY NTP AND IARC TO BE CARCINOGENIC.

Signs/Symptoms Of Overexp: INH: ANESTHETIC. MAY IRRIT/IRREG HEART BEAT; INGEST: SEV BURN OF MOUTH/THROAT; SKIN/EYES: IRRITN/BURNS.

Emergency/First Aid Proc: INHAL: REMOVE TO FRESH AIR. GIVE CPR/OXYGEN IF NEEDED; INGEST: IF SWALLOWED, GIVE TWO GLASSES OF WATER & INDUCE VOMIT. NOTHING BY MOUTH IF UNCON; SKIN/EYE EXPOSURE: RMV CONTMNTD CLOTHG. WASH SKIN W/ SOAP & H2O. FLUSH SKIN/EYES W/LG H2O; GET MED HELP IMMEDIATLY

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Precautions for Safe Handling and Use
=====

Steps If Matl Released/Spill: ELIM IGN SOURCES, VENTL & EVAC AREA. USE PROTCV CLOTHG/RESP PROTCTION FM VAP. CONTAIN & RECOVER LIQ IF POSS. ABSORB W/ VRMCULITE, EARTH, ETC. SCOOP UP W/NON-SPARKG TOOLS & PLACE IN CLOSD CONTNRS. USE H2O SPRAY TO DISPERSE VAP/COOL CNTNR. DO NOT FLUSH TO SEWR

Waste Disposal Method: SPILLS & LOT SIZES MAY BE COLLECTD & ATOMIZED IN RCRA APPRVD COMBUSTN CHMBR EQUIPPD W/EFFLUENT GASE CLEANG DIVEICE, OR ABSORBED IN ABSORBNT & DISPOSED IN RCRA APPRVD FACILITY. ENSURE COMPLIANCE W/LOCAL, STATE & FEDERAL REGS; RCRA/CWA RQ: 5000 LBS.

Precautions-Handling/Storing: KEEP IN TIGHTLY CLOSED CONTANRS AT COOL, DRY, VENTILATED PLACE. PROTECT AGAINST PHY DAMAGE.

Other Precautions: AVOID BREATHING VAPS. USE W/ADEQUATE VENTILATION. KEEP CONTAINERS CLOSED. WASH THOROUGHLY AFTER HANDLING. AVOID SKIN, EYES & CLOTHING CONTACT; DANGER! MAY BE FATAL IF SWALLOWED, INHALED/ABSORBD BY SKIN

=====
Control Measures
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Respiratory Protection: SUPPLIED AIR RESPIR/SCBA; ESCAPE: GAS MASK
Ventilation: LOCAL EXHAUST TO MAINTN BELOW TLV.
Protective Gloves: IMPERVIOUS
Eye Protection: GOGGLES/FACE SHIELD
Other Protective Equipment: FULL PROTECTIVE CLOTHING, SAFETY SHOWER, EYE
WASH STATION
Suppl. Safety & Health Data: MSDS FROM MFR DATED 14NOV85, CONFORMS TO OSHA
HAZ COMM STD; VAP PRESSURE AT 10.4C; WARNING! POSSIBLE CANCER HAZARD ON
TESTS WITH LABORATORY ANIMALS AS DEFINED BY IARC, MAK, NIOSH, NTP & ACGIH.
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Transportation Data
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Trans Data Review Date: 86251
DOT PSN Code: DHF
DOT Proper Shipping Name: CHLOROFORM
DOT Class: 6.1
DOT ID Number: UN1888
DOT Pack Group: II
DOT Label: KEEP AWAY FROM FOOD *
IMO PSN Code: EEH
IMO Proper Shipping Name: CHLOROFORM
IMO Regulations Page Number: 6103
IMO UN Number: 1888
IMO UN Class: 6.1
IMO Subsidiary Risk Label: -
IATA PSN Code: GJO
IATA UN ID Number: 1888
IATA Proper Shipping Name: CHLOROFORM
IATA UN Class: 6.1
IATA Label: TOXIC *
AFI PSN Code: GJO
AFI Prop. Shipping Name: CHLOROFORM
AFI Class: 6.1
AFI ID Number: UN1888
AFI Pack Group: II
AFI Label: POISON
AFI Special Prov: N36
AFI Basic Pac Ref: 10-9
Additional Trans Data: DOT RQ:5000 LBS.

=====
Disposal Data
=====

Disposal Data Review Date: 88229
Rec # For This Disp Entry: 01
Tot Disp Entries Per NSN: 001
Landfill Ban Item: YES
Disposal Supplemental Data: MSDS FROM MFR DATED 14NOV85, CONFORMS TO OSHA
HAZ COMM STD; VAP PRESSURE AT 10.4C; WARNING! POSSIBLE CANCER HAZARD ON
TESTS WITH LABORATORY ANIMALS AS DEFINED BY IARC, MAK, NIOSH, NTP & ACGIH. IN
CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, CONSULT HEALTH AND SAFETY FILE
FOR PRECAUTIONS.
1st EPA Haz Wst Code New: U044
1st EPA Haz Wst Name New: CHLOROFORM; TRICHLOROMETHANE
1st EPA Haz Wst Char New: TOXIC (T)
1st EPA Acute Hazard New: NO

=====
Label Data
=====

Label Required: YES
Label Status: F
Special Hazard Precautions: POISONOUS; MAY BE FATAL IF INHALED, SWALLOWED
OR ABSORBED THROUGH SKIN. CONTACT MAY CAUSE BURNS TO SKIN AND EYES. RUNOFF
FROM FIRE CONTROL OR DILUTION WATER MAY GIVE OFF POISONOUS GASES AND CAUSE
WATER POLLUTION. FIRE MAY PRODUCE IRRITATING OR POISONOUS GASES.
Label Name: MALLINCKRODT INC. SCIENCE PRODUCTS DIVISION
Label Street: PARIS BYPASS
Label P.O. Box: M
Label City: PARIS
Label State: KY
Label Zip Code: 40361
Label Country: US
Label Emergency Number: 314-982-5000

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URL for this msds <http://hazard.com>. If you wish to change, add to, or
delete information in this archive please sent updates to dan@hazard.com.
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LIQUID AIR – PHOSGENE
MATERIAL SAFETY DATA SHEET
FSC: 6810
NIIN: 00F002675
Manufacturer's CAGE: 18260
Part No. Indicator: A
Part Number/Trade Name: PHOSGENE

General Information

Company's Name: LIQUID AIR CORPORATION
Company's Emerg Ph #: (800) 231-1366
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Date MSDS Prepared: 01JAN87
Safety Data Review Date: 28FEB86
MSDS Serial Number: BBLMB

Ingredients/Identity Information

Proprietary: YES
Ingredient: PROPRIETARY
Ingredient Sequence Number: 01

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS GAS WITH SWEET ODOR.
Boiling Point: 45.6F
Vapor Pressure (MM Hg/70 F): 22.
Vapor Density (Air=1): .255
Specific Gravity: 3.42
Solubility In Water: DECOMPOSES

Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: NONFLAMMABLE
Special Fire Fighting Proc: N/A
Unusual Fire And Expl Hazrds: N/A

Reactivity Data

Stability: YES
Cond To Avoid (Stability): TEMPERATURES ABOVE 572F
Materials To Avoid: WATER, AMMONIA, PRIMARY AMINES,
Hazardous Decomp Products: CO, CHLORINE
Hazardous Poly Occur: NO

Health Hazard Data

Signs/Symptoms Of Overexp: INHALATION: CHOKING/COUGHING/TIGHTNESS OF THE CHEST/BREATH/LACRYMATION/EVENTUAL CYANOSIS.
Emergency/First Aid Proc: INHALATION: UNCONSCIOUS PERSONS SHOULD BE ASSISTED TO AN UNCONTAMINATED AREA/INHALE FRESH AIR/GIVEN OXYGEN. KEEP THE VICTIM WARM/QUIET. CALL PHYSICIAN. _

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE ALL PERSONNEL FROM AFFECTED AREA. USE APPROPRIATE PROTECTIVE EQUIPMENT. IF AK IS IN USER'S EQUIPMENT, BE CERTAIN TO PURGE PIPING WITH AN INERT GAS IOR TO ATTEMPTING REPAIRS.

Waste Disposal Method: DONT ATTEMPT TO DISPOSE OF RESIDUAL OR UNUSED QUANTITIES. RETURN IN THE SHIPPING CONTAINER PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE TO LIQUID AIR CORPORATION FOR PROPER DISPOSAL.

Precautions-Handling/Storing: PROTECT CYLINDERS FROM PHYSICAL DAMAGE. STORE IN COOL, DRY, WELL-VENTILATED AREA AWAY FROM HEALY TRAFFICKED AREAS. DONT STORED ABOVE 130F.

Other Precautions: USE ONLY IN WELL-VENTILATED AREAS. VALVE PROTECTION CAPS AND VALVE OUTLET THREADED PLUGS MUST REMAIN IN PLACE UNLESS CONTAIN IS SECURED WITH VALVE OUTLET PIPED TO USE POINT.

Control Measures

Respiratory Protection: POSITIVE PRESSURE AIR LINE WITH MASK, SCBA FOR EMERGENCY USE.

Ventilation: HOOD WITH FORCED VENTILATION

Protective Gloves: RUBBER OR TEFLO

Eye Protection: GOGGLES/GLASSES/FACESHIEL

Other Protective Equipment: SAFETY SHOES/SHOWER/EYEWASH.

Suppl. Safety & Health Data: ONE CALIFORNIA PLAZA, SUITE 350/2121 N.

CALIFORNIA BLVD/WALNUT CREEK, CALIFORNIA 94596. MOLECULAR WEIGHT: 98.91

Transportation Data

Disposal Data

Disposal Data Review Date: 88320

Rec # For This Disp Entry: 01

Tot Disp Entries Per NSN: 001

Landfill Ban Item: YES

Disposal Supplemental Data: ONE CALIFORNIA PLAZA, SUITE 350/2121 N. CALIFORNIA BLVD/WALNUT CREEK, CALIFORNIA 94596. MOLECULAR WEIGHT: 98.91 IN CASE OF ACCIDENTAL EXPOSURE OR DISCHARGE, CONSULT HEALTH AND SAFETY FILE FOR PRECAUTIONS.

1st EPA Haz Wst Code New: P095

1st EPA Haz Wst Name New: PHOSGENE; CARBONYL CHLORIDE

1st EPA Haz Wst Char New: ACUTELY TOXIC (H)

1st EPA Acute Hazard New: YES

Label Data

Label Required: YES

Label Status: G

Common Name: PHOSGENE

Special Hazard Precautions: INHALATION: CHOKING/COUGHING/ TIGHTNESS OF THE CHEST/BREATH/LACRYMATION/EVENTUAL CYANOSIS.

Label Name: LIQUID AIR CORPORATION

Label Emergency Number: (800) 231-1366

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ATOMERGIC CHEMETALS CORPORATION
 222 SHEERWOOD AVENUE
 FARMINGDALE, NY 11735
 TEL: (516)-694-9000

MATERIAL
 SAFETY
 DATA SHEET

PRODUCT NAME Cyanogen Chloride <i>CK</i>	CAS # 506-77-4
TRADE NAME AND SYNONYMS Cyanogen Chloride	DOT ID. No. UN 1589
CHEMICAL NAME AND SYNONYMS Cyanogen Chloride	DOT Hazard Class Poison A
ISSUE DATE AND REVISIONS June 30, 1987	Formula: CNCl Molecular Wt. 61.471 Chemical Family:

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT 15 minute ceiling - 0.3 ppm (0.6 mg/m ³) ACGIH 1986-87
SYMPTOMS OF EXPOSURE Similar in toxicity and mode of action to Hydrogen Cyanide, but is much more irritating. Can cause a marked irritation of the respiratory tract, hemorrhagic exudate of the bronchi and trachea and pulmonary edema. It is improbable that anyone would voluntarily remain in areas with a high enough concentration to exert a typical nitrile effect. Liquid will burn skin and eyes.
TOXICOLOGICAL PROPERTIES Long term exposure causes dermatitis, loss of appetite, headache, upper respiratory irritation in humans.
RECOMMENDED FIRST AID TREATMENT PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO CYANOGEN CHLORIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Inhalation: If the patient is conscious, first aid and medical treatment should generally be directed toward the relief of any pulmonary symptoms. The patient should immediately be put at bedrest with head slightly elevated and a medical examination carried out as quickly as possible. Oxygen should be administered if there is any dyspnea or evidence of pulmonary edema. In case of long exposures (with symptoms of both the cyanide-type effects and pulmonary edema), combined therapy, with oxygen plus amyl nitrite inhalations and artificial respiration, is recommended. (Continued on last page.)

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the product's completeness thereof is not guaranteed and no warranty of any kind is made therefor. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition or matter of use.
 Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

N/A

PHYSICAL DATA

BOILING POINT @ 1 atm 13.1°C (55.6°F)	LIQUID DENSITY AT BOILING POINT 1.222 g/ml @ 0.°C
VAPOR PRESSURE @ 21.1°C 19.7 psig	GAS DENSITY AT 70°F, 1 atm 1.67 g/l (0.104 lb/ft ³)
SOLUBILITY IN WATER - 100 ml 2500 ml	FREEDING POINT -136.2°C (-213.2°F)
EVAPORATION RATE N/A	SPECIFIC GRAVITY (AIR = 1) @ 21.1°C is 1.39
APPEARANCE AND ODOR Colorless, very toxic gas with irritating odor.	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (method used) N/A	AUTO-IGNITION TEMPERATURE Nonflammable	FLAMMABLE LIMITS % BY VOLUME LEL N/A UEL N/A
EXTINGUISHING MEDIA N/A	ELECTRICAL CLASSIFICATION N/A	
SPECIAL FIRE FIGHTING PROCEDURES Wear chemical protective suit with NIOSH/OSHA approved self-contained breathing apparatus. Cool exposed containers with water.		
UNUSUAL FIRE AND EXPLOSION HAZARDS Poisonous gases are produced when heated in fire.		

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID
UNSTABLE	X	Polymerizes without stabilizer.
STABLE		
INCOMPATIBILITY (materials to avoid) When dry, not corrosive to ordinary metals		
HAZARDOUS DECOMPOSITION PRODUCTS 2,4,6 - trichloro-s-Triazine which can polymerize violently.		
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
MAY OCCUR	X	High temperature storage and moisture.
WILL NOT OCCUR		

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Keep people away. Evacuate area in case of large discharges. Stay upwind and use water spray to "knock down" vapor. Isolate and remove discharged material. Notify local health and pollution control agencies.

SPECIAL PROTECTION INFORMATION

Page

RESPIRATORY PROTECTION (See OSHA 1910.134) Positive pressure and line with mask or self-contained breathing apparatus should be available for emergency use.			
VENTILATION Hood with forced ventilation.	LOCAL EXHAUST To prevent accumulation above 0.3 ppm	SPECIAL	N/A
	MECHANICAL (Gen)	OTHER	N/A
PROTECTIVE GLOVES Rubber			
EYE PROTECTION Chemical safety goggles			
OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower, eyewash fountain			

SPECIAL PRECAUTIONS*

<p>SPECIAL LABELING INFORMATION DOT Shipping Name: Cyanogen Chloride DOT Shipping Label: Poison Gas and Flammable Gas</p>
<p>SPECIAL HANDLING RECOMMENDATIONS Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.</p>
<p>SPECIAL STORAGE RECOMMENDATIONS Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.</p>
<p>SPECIAL PACKAGING RECOMMENDATIONS Cylinders must contain 5% Tetrasodium Pyrophosphate as a stabilizer. When used in anhydrous conditions, it is not corrosive to ordinary metals. In the presence of moisture, monel, tantalum, glass or glass lined equipment should be used.</p>
<p>OTHER RECOMMENDATIONS OR PRECAUTIONS Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR).</p>

*Various Government agencies i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others may have specific regulations concerning the transportation, handling, storage or use of this product which are not reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

ADDITIONAL DATA

RECOMMENDED FIRST AID TREATMENT: (Continued)

INGESTION: Have victim drink water or milk. Do not induce vomiting.

SKIN OR EYE CONTACT: Flush affected areas with plenty of water. If in eyes, hold open while flushing.

Occupational Health Guideline for Chloropicrin

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: CCl_3NO_2
- Synonyms: Nitrotrichloromethane; trichloronitromethane; nitrochloroform
- Appearance and odor: Colorless, oily liquid with a sharp, penetrating odor that causes tears.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for chloropicrin is 0.1 part of chloropicrin per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 0.7 milligram of chloropicrin per cubic meter of air (mg/m^3).

HEALTH HAZARD INFORMATION

- Routes of exposure
Chloropicrin can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.
- Effects of overexposure
 1. *Short-term Exposure:* Chloropicrin causes eye irritation and tearing. It also causes cough, nausea, and vomiting, and severe irritation of the skin. Breathing chloropicrin vapors may also cause delayed severe breathing difficulties and which may cause death.
 2. *Long-term Exposure:* Overexposure to chloropicrin may cause increased susceptibility to future overexposure.
 3. *Reporting Signs and Symptoms:* A physician should be contacted if anyone develops any signs or symptoms

and suspects that they are caused by exposure to chloropicrin.

• Recommended medical surveillance

The following medical procedures should be made available to each employee who is exposed to chloropicrin at potentially hazardous levels:

1. *Initial Medical Examination:*

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the respiratory system should be stressed. The skin should be examined for evidence of chronic disorders.

—FVC and FEV (1 sec): Chloropicrin is a severe respiratory irritant. Persons with impaired pulmonary function may be at increased risk from exposure.

—14" x 17" chest roentgenogram: Chloropicrin may cause respiratory impairment. Persons with pre-existing pulmonary disease may be at increased risk.

2. *Periodic Medical Examination:* The aforementioned medical examinations should be repeated on an annual basis.

• Summary of toxicology

Chloropicrin vapor is a severe irritant of the eyes, skin, and respiratory tract. A lethal exposure for humans is stated to be 119 ppm for 30 minutes, with death usually resulting from pulmonary edema; particular injury occurs in the medium and small bronchi. In addition to pulmonary irritation, human exposure results in lacrimation, cough, nausea, vomiting, and skin irritation; individuals injured by inhalation of chloropicrin vapor are said to be more susceptible to subsequent exposures. A concentration of 15 ppm could not be tolerated longer than 1 minute, even by persons acclimated to chloropicrin; exposure to 4 ppm for a few seconds is temporarily disabling, due to the irritant effects. Concentrations of 0.3 to 0.37 ppm resulted in painful eye irritation in 3 to 30 seconds. Chloropicrin is a severe skin irritant.

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

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

CHEMICAL AND PHYSICAL PROPERTIES

• Physical data

1. Molecular weight: 164.4
2. Boiling point (760 mm Hg): 112 C (234 F)
3. Specific gravity (water = 1): 1.635
4. Vapor density (air = 1 at boiling point of chloropicrin): 5.7
5. Melting point: -64 C (-83 F)
6. Vapor pressure at 20 C (68 F): 20 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): 0.18
8. Evaporation rate (butyl acetate = 1): Data not available

• Reactivity

1. Conditions contributing to instability: High temperatures or severe shock, particularly when involving containers of greater than 30 gallons capacity.
2. Incompatibilities: Contact with strong oxidizers may cause fires or explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as oxides of nitrogen, phosgene, nitrosyl chloride, chlorine, and carbon monoxide) may be released when chloropicrin decomposes.
4. Special precautions: Liquid chloropicrin will attack some forms of plastics, rubber, and coatings.

• Flammability

1. Not combustible, but with strong initiation, heated material under confinement will detonate.
2. Fires involving chloropicrin should be fought from an explosion-resistant location.

• Warning properties

1. Odor Threshold: Stern reports an odor threshold of 0.0073 mg/l (1.1 ppm)
2. Eye Irritation Level: The *Documentation of TLVs* states that "according to Flury and Zernik, chloropicrin in concentrations of from 0.3 to 0.37 ppm resulted in painful irritation to the eyes in 3 to 30 seconds." Patty, however, reports that 1.3 ppm is the lowest irritant concentration, but that 0.3 to 3.7 ppm for 3 to 30 seconds causes "closing of the eyelids according to individual sensitivity."
3. Evaluation of Warning Properties: Through its irritant effects on the eyes, chloropicrin can be detected within three times the permissible exposure limit, according to the *Documentation of TLVs*. For the purposes of this guideline, therefore, it is treated as a material with good warning properties.

MONITORING AND MEASUREMENT PROCEDURES

• General

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the

employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• Method

At the time of publication of this guideline, no measurement method for chloropicrin had been published by NIOSH.

RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

• Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with liquid chloropicrin.

• Clothing contaminated with chloropicrin should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of chloropicrin from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the chloropicrin, the person performing the operation should be informed of chloropicrin's hazardous properties.

• Where there is any possibility of exposure of an employee's body to liquid chloropicrin, facilities for quick drenching of the body should be provided within the immediate work area for emergency use.

• Non-impervious clothing which becomes contaminated with chloropicrin should be removed immediately and not reworn until the chloropicrin is removed from the clothing.

• Employees should be provided with and required to use splash-proof safety goggles where there is any possibility of liquid chloropicrin contacting the eyes.

• Where there is any possibility that employees' eyes may be exposed to liquid chloropicrin, an eye-wash fountain should be provided within the immediate work area for emergency use.

SANITATION

- Skin that becomes contaminated with chloropicrin should be immediately washed or showered with soap or mild detergent and water to remove any chloropicrin.
- Eating and smoking should not be permitted in areas where liquid chloropicrin is handled, processed, or stored.
- Employees who handle liquid chloropicrin should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to chloropicrin may occur and control methods which may be effective in each case:

Operation	Controls
Use as a soil fumigant, disinfectant, and sterilizer for control of fungi, nematodes, and other injurious organisms; liberation as a fumigant for stored grains, cereals, and fruits	Process enclosure; general dilution ventilation; personal protective equipment
Use as a rodenticide and insecticide for rats and insects	Process enclosure; general dilution ventilation; personal protective equipment
Use as a chemical intermediate in organic synthesis in dyes and as an oxidizing agent	Process enclosure; general dilution ventilation; personal protective equipment
Use as a warning agent in illuminating gas; use as a lacrimator, and as a nauseant in chemical warfare	General dilution ventilation; personal protective equipment
Use as a chemical sterilant without high temperature	General dilution ventilation; process enclosure; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

- **Eye Exposure**
If liquid chloropicrin or high concentrations of chloropicrin vapor get into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation persists after washing, get

medical attention. Contact lenses should not be worn when working with this chemical.

- **Skin Exposure**

If liquid chloropicrin gets on the skin, immediately wash the contaminated skin using soap or mild detergent and water. If liquid chloropicrin soaks through the clothing, remove the clothing immediately and wash the skin using soap or mild detergent and water. If irritation persists after washing, get medical attention.

- **Breathing**

If a person breathes in large amounts of chloropicrin, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Swallowing**

When liquid chloropicrin has been swallowed and the person is conscious, give the person large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Do not make an unconscious person vomit. Get medical attention immediately.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL, LEAK, AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

- If liquid chloropicrin is spilled or leaked, the following steps should be taken:

1. Ventilate area of spill or leak.
2. Collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material.

- **Waste disposal method:**

Chloropicrin may be disposed of by absorbing in vermiculite, dry sand, earth, or a similar material and disposing in sealed containers in a secured sanitary landfill.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Chloropicrin," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
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- International Labour Office: *Encyclopedia of Occupational Health and Safety*, McGraw-Hill, New York, 1971.
- Jacobs, M.: *The Analytical Chemistry of Industrial Poisons, Hazards, and Solvents*, Interscience, New York, 1956.
- Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.
- Sax, N. I.: *Dangerous Properties of Industrial Materials* (3rd ed.), Van Nostrand Reinhold, New York, 1968.
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- Stern, A. C. (ed.): *Air Pollution* (2nd ed.), Academic Press, New York, 1968.
- von Oettingen, W. F.: *Poisoning: A Guide to Clinical Diagnosis and Treatment* (2nd ed.), Saunders, Philadelphia, 1958.

RESPIRATORY PROTECTION FOR CHLOROPICRIN

Condition	Minimum Respiratory Protection* Required Above 0.1 ppm
Vapor Concentration 4 ppm or less	<p>A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s).</p> <p>A gas mask with a chin-style or a front- or back-mounted organic vapor canister.</p> <p>Any supplied-air respirator with a full facepiece, helmet, or hood.</p> <p>Any self-contained breathing apparatus with a full facepiece.</p>
Greater than 4 ppm** or entry and escape from unknown concentrations	<p>Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.</p> <p>A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.</p>
Fire Fighting	<p>Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.</p>
Escape	<p>Any gas mask with a full facepiece providing protection against organic vapors.</p> <p>Any escape self-contained breathing apparatus with a full facepiece.</p>

*Only NIOSH-approved or MSHA-approved equipment should be used.

**Use of supplied-air suits may be necessary to prevent skin contact while providing respiratory protection from airborne concentrations of chloropicrin; however, this equipment should be selected, used, and maintained under the immediate supervision of trained personnel. Where supplied-air suits are used above a concentration of 4 ppm, an auxiliary self-contained breathing apparatus operated in positive pressure mode should also be worn.

ALDRICH CHEMICAL -- BENZONITRILE, 99%, 8895-9
MATERIAL SAFETY DATA SHEET
NSN: 681000N037938
Manufacturer's CAGE: 60928
Part No. Indicator: A
Part Number/Trade Name: BENZONITRILE, 99%, 8895-9

=====
General Information
=====

Company's Name: ALDRICH CHEMICAL CO
Company's P. O. Box: 355
Company's City: MILWAUKEE
Company's State: WI
Company's Country: US
Company's Zip Code: 53201
Company's Emerg Ph #: 414-273-3850
Company's Info Ph #: 414-273-3850
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 08JAN92
Safety Data Review Date: 17DEC92
MSDS Serial Number: BQVJM
Hazard Characteristic Code: NK

=====
Ingredients/Identity Information
=====

Proprietary: NO
Ingredient: BENZONITRILE; (BENZENE, CYANO-) (SARA III)
Ingredient Sequence Number: 01
Percent: 99
NIOSH (RTECS) Number: DI2450000
CAS Number: 100-47-0
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

=====
Physical/Chemical Characteristics
=====

Appearance And Odor: COLORLESS LIQUID.
Boiling Point: 376F, 191C
Melting Point: 9F, -13C
Specific Gravity: 1.010

=====
Fire and Explosion Hazard Data
=====

Flash Point: 161F, 72C
Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL POWDER OR
APPROPRIATE FOAM.
Special Fire Fighting Proc: COMBUSTIBLE. WEAR NIOSH/MSHA APPROVED SCBA AND
FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

=====
Reactivity Data
=====

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: STRONG ACIDS, STRONG BASES, STRONG OXIDIZING AGENTS,
STRONG REDUCING AGENTS.
Hazardous Decomp Products: THERMAL DECOMPOSITION MAY PRODUCE CARBON
MONOXIDE, CARBON DIOXIDE, AND NITROGEN OXIDES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION. CAUSES SEVERE EYE IRRITATION. CAUSES SKIN IRRITATION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT.
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES: SHOULD BE TREATED BY IMMEDIATE & PROLONGED IRRIGATION WITH COPIOUS AMTS OF WATER FOR AT LEAST 15 MINS. SEEK MEDICAL ADVICE. SKIN: IMMEDIATE WASH WITH SOAP AND COPIOUS AMTS OF WATER. REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY. INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING GIVE WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS. CALL PHYSICIAN.

Precautions for Safe Handling and Use

Steps If Material Released/Spill: EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS AND HEAVY RUBBER GLOVES. ABSORB ON SAND/VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL. VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: THIS COMBUSTIBLE MATERIAL MAY BE BURNED IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS (FP N).
Precautions-Handling/Storing: COMBUSTIBLE. KEEP TIGHTLY CLOSED. KEEP AWAY FROM HEAT & OPEN FLAME. STORE IN A COOL DRY PLACE. DO NOT BREATHE VAPOR. DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
Other Precautions: HARMFUL LIQUID. SEVERE EYE IRRITANT. HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED. RISK OF SERIOUS DAMAGE TO EYES. IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE (SHOW LABEL WHERE POSSIBLE). TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING.

Control Measures

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation: MECHANICAL EXHAUST REQUIRED.
Protective Gloves: CHEMICAL-RESISTANT GLOVES.
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: OTHER PROTECTIVE CLOTHING. SAFETY SHOWER AND EYE BATH.
Work Hygienic Practices: DO NOT BREATHE VAPOR. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 17DEC92
Label Date: 16DEC92
Label Status: G
Common Name: BENZONITRILE, 99%, 8895-9
Chronic Hazard: NO

Signal Word: WARNING!

Acute Health Hazard-Slight: X

Contact Hazard-Slight: X

Fire Hazard-Moderate: X

Reactivity Hazard-None: X

Special Hazard Precautions: COMBUSTIBLE LIQUID. AVOID HEAT AND OPEN FLAME.

ACUTE: INHALATION, INGESTION OR SKIN ABSORPTION MAY BE HARMFUL. EYE CONTACT
NONE LISTED BY MANUFACTURER.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: ALDRICH CHEMICAL CO

Label P.O. Box: 355

Label City: MILWAUKEE

Label State: WI

Label Zip Code: 53201

Label Country: US

Label Emergency Number: 414-273-3850

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MD 21009-2339

EMERGENCY PHONE 1-516-467-3535

DATE: 06/02/94
CUST#: 01 011768
PO#: 0694104216

M A T E R I A L S A F E T Y D A T A S H E E T PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -
PRODUCT #: 63320 NAME: DIETHYL MALONATE

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -
CAS #: 105-53-3
MF: C7H12O4
SYNONYMS
CARBETHOXYACETIC ESTER * DICARBETHOXYMETHANE * DIETHYL MALONATE *
DIETHYL PROPANEDIOATE * ETHYL MALONATE * MALONIC ESTER *
METHANEDICARBOXYLIC ACID, DIETHYL ESTER * PROPANEDIOIC ACID, DIETHYL
ESTER *

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -
EL PRECAUTIONARY STATEMENTS
IRRITANT.
IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING.

SECTION 4. - - - - - FIRST-AID MEASURES - - - - -
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS
AMOUNTS OF WATER.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
WATER FOR AT LEAST 15 MINUTES.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL
RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -
EXTINGUISHING MEDIA
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIRE FIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 2

CUST#: 0-1 0-11768
PO#: 0694104216

PRODUCT #: 63320
MF: C7H12O4

NAME: DIETHYL MALONATE

PREVENT CONTACT WITH SKIN AND EYES.
UNUSUAL FIRE AND EXPLOSIONS HAZARDS
EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES - - - - -

WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY
RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR
DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE - - - - -
REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION - - - - -

CHEMICAL SAFETY GOGGLES.
COMPATIBLE CHEMICAL-RESISTANT GLOVES.
NIOSH/MSHA-APPROVED RESPIRATOR.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
DO NOT BREATHE VAPOR.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
AVOID PROLONGED OR REPEATED EXPOSURE.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
KEEP TIGHTLY CLOSED.
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR
LIQUID.
BOILING POINT: 199 C
MELTING POINT: -51 C TO -50 C
FLASHPOINT 212 F

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 3

CUST#: 0-1 0-11768
 PO#: 0694104216

PRODUCT #: 63320
 MF: C7H12O4

NAME: DIETHYL MALONATE

VAPOR PRESSURE: 99C
 VAPOR DENSITY: 5.52 1MM 40 C
 SPECIFIC GRAVITY: 1.055

SECTION 10. ---STABILITY AND REACTIVITY ---

COMPATIBILITIES

ACIDS
 BASES
 OXIDIZING AGENTS
 REDUCING AGENTS
 STORE AWAY FROM HEAT AND DIRECT SUNLIGHT.
 HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
 TOXIC FUMES OF:
 CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. --- TOXICOLOGICAL INFORMATION ---

ACUTE EFFECTS

MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
 VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
 RESPIRATORY TRACT.
 CAUSES SKIN IRRITATION.
 TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND
 TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

ECS NO: 000700000

MALONIC ACID, DIETHYL ESTER

IRRITATION DATA

SKN-RBT 500 MG/24H MLD

FCTXAV 14,745,76

TOXICITY DATA

ORL-RAT LD50:15 GM/KG

AIHAAP 30,470,69

ORL-MUS LD50:6400 MG/KG

BIJOAK 34,1196,40

ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES
 (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR
 COMPLETE INFORMATION.

SECTION 12. --- ECOLOGICAL INFORMATION ---
 DATA NOT YET AVAILABLE.

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 4

PRODUCT #: 63320
MF: C7H12O4

NAME: DIETHYL MALONATE

CUST#: 0-1 0-11768
PO#: 0694104216

SECTION 13. - - - - - DISPOSAL CONSIDERATIONS - - - - -

DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS
NOES 1983: HZD X4574; NIS 3; TNF 78; NOS 7; TNE 5363; TFE 916
EPA TSCA CHEMICAL INVENTORY, JUNE 1993

SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR A ADDITIONAL TERMS AND CONDITIONS OF SALE.

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 ABINGDON MD 21009-2339

EMERGENCY PHONE 1-516-467-3535

DATE: 06/02/94
 CUST#: 01 011768
 PO#: 0694104216

M A T E R I A L S A F E T Y D A T A S H E E T PAGE 1

SECTION 1. - - - - - CHEMICAL IDENTIFICATION - - - - -
 PRODUCT #: 21670 NAME: ETHYL CAPRYLATE

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - -
 CAS #: 106-32-1
 MF: C10H20O2
 - SYNONYMS
 ETHYL CAPRYLATE * ETHYL OCTANOATE * ETHYL OCTYLATE *

SECTION 3. - - - - - HAZARDS IDENTIFICATION - - - - -
 LABEL PRECAUTIONARY STATEMENTS
 IRRITANT
 IRRITATING TO EYES, RESPIRATORY SYSTEM AND SKIN.
 COMBUSTIBLE.
 IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF
 WATER AND SEEK MEDICAL ADVICE.
 WEAR SUITABLE PROTECTIVE CLOTHING.

SECTION 4. - - - - - FIRST-AID MEASURES - - - - -
 IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS
 AMOUNTS OF WATER.
 IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF
 WATER FOR AT LEAST 15 MINUTES.
 IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL
 RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
 IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
 CALL A PHYSICIAN.
 REMOVE AND WASH CONTAMINATED CLOTHING PROMPTLY.

SECTION 5. - - - - - FIRE FIGHTING MEASURES - - - - -
 EXTINGUISHING MEDIA
 CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
 SPECIAL FIREFIGHTING PROCEDURES
 WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO
 PREVENT CONTACT WITH SKIN AND EYES.
 COMBUSTIBLE.

CONTINUED ON NEXT PAGE

Fluka

Fluka Chemical Corp
980 South Second Street
Ronkonkoma, New York 11779-7238

Phone 516-467-0980
Telex 96-7807
Fax 516-467-0663

M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 2

PRODUCT #: 21670
MF: C10H20O2

NAME: ETHYL CAPRYLATE

CUST#: 0-1 0-11768
PO#: 0694104216

SECTION 6. - - - - - ACCIDENTAL RELEASE MEASURES- - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. - - - - - HANDLING AND STORAGE- - - - - REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -

CHEMICAL SAFETY GOGGLES.
USE PROTECTIVE CLOTHING, GLOVES AND MASK.
SAFETY SHOWER AND EYE BATH.
MECHANICAL EXHAUST REQUIRED.
DO NOT BREATHE VAPOR.
AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
WASH THOROUGHLY AFTER HANDLING.
IRRITANT.
KEEP TIGHTLY CLOSED.
KEEP AWAY FROM HEAT AND OPEN FLAME.
STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

APPEARANCE AND ODOR
COLORLESS LIQUID
BOILING POINT: 206 C TO 208 C
MELTING POINT: -48 C TO -47 C
FLASHPOINT 167 F
74C
VAPOR PRESSURE: 0.2MM 25 C

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

CUST#: 0-1 0-11768
 PO#: 0694104216

PRODUCT #: 21670
 MF: C10H20O2

NAME: ETHYL CAPRYLATE

SPECIFIC GRAVITY: 0.878

SECTION 10. --- STABILITY AND REACTIVITY ---

COMPATIBILITIES
 ACIDS
 BASES
 OXIDIZING AGENTS
 REDUCING AGENTS
 HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
 TOXIC FUMES OF:
 CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. --- TOXICOLOGICAL INFORMATION ---

ACUTE EFFECTS
 MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
 VAPOR OR MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES AND UPPER
 RESPIRATORY TRACT.
 CAUSES SKIN IRRITATION.

ECS NO: RH0680000
 OCTANOIC ACID, ETHYL ESTER

IRRITATION DATA
 SKN-RBT 500 MG/24H MOD

FCTXAV 14,763,76

TOXICITY DATA
 ORL-RAT LD50:25960 MG/KG
 ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES
 (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR
 COMPLETE INFORMATION.

FCTXAV 14,763,76

SECTION 12. --- ECOLOGICAL INFORMATION ---
 DATA NOT YET AVAILABLE.

SECTION 13. --- DISPOSAL CONSIDERATIONS ---

THIS COMBUSTIBLE MATERIAL MAY BE BURNED IN A CHEMICAL INCINERATOR
 EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T
- - - - -

CUST#: 0-1 0-11768
PO#: 0694104216

PRODUCT #: 21670
MF: C10H2002

NAME: ETHYL CAPRYLATE

OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - TRANSPORT INFORMATION - - - - -

CONTACT FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - REGULATORY INFORMATION - - - - -

REVIEWS, STANDARDS, AND REGULATIONS

NOES 1983: HZD X4667; NIS 2; TNE 24; NOS 4; TNE 402
EPA TSCA CHEMICAL INVENTORY, JUNE 1993
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 1994

SECTION 16. - - - - - OTHER INFORMATION - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR A ADDITIONAL TERMS AND CONDITIONS OF SALE.

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ATTN: SAFETY DIRECTOR
SCI TECH
1311 CONTINENTAL DRIVE
SUITE G
ABINGDON MD 21009-2339

EMERGENCY PHONE 1-516-467-3535

DATE: 06/02/94
CUST#: 01 011768
PO#: 0694104216

M A T E R I A L S A F E T Y D A T A S H E E T PAGE 1

SECTION 1. ----- CHEMICAL IDENTIFICATION -----
PRODUCT #: 70090 NAME: ETHYL MYRISTATE

SECTION 2. ----- COMPOSITION/INFORMATION ON INGREDIENTS -----
CAS #: 124-06-1
MF: C16H32O2

SECTION 3. ----- HAZARDS IDENTIFICATION -----
DATA NOT AVAILABLE

SECTION 4. ----- FIRST-AID MEASURES -----
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH SOAP AND COPIOUS AMOUNTS OF WATER.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
WASH CONTAMINATED CLOTHING BEFORE REUSE.

SECTION 5. ----- FIRE FIGHTING MEASURES -----
EXTINGUISHING MEDIA
WATER SPRAY.
CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.
SPECIAL FIREFIGHTING PROCEDURES
WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

SECTION 6. ----- ACCIDENTAL RELEASE MEASURES -----
WEAR RESPIRATOR, CHEMICAL SAFETY GOGGLES, RUBBER BOOTS AND HEAVY RUBBER GLOVES.
ABSORB ON SAND OR VERMICULITE AND PLACE IN CLOSED CONTAINERS FOR DISPOSAL.
VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

SECTION 7. ----- HANDLING AND STORAGE -----

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 2

CUST#: 0-1 0-11768
PO#: 0694104216

PRODUCT #: 70090
MF: C16H32O2

NAME: ETHYL MYRISTATE

REFER TO SECTION 8.

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -

- CHEMICAL SAFETY GOGGLES.
- COMPATIBLE CHEMICAL-RESISTANT GLOVES.
- NIOSH/MSHA-APPROVED RESPIRATOR.
- SAFETY SHOWER AND EYE BATH.
- MECHANICAL EXHAUST REQUIRED.
- AVOID INHALATION.
- AVOID CONTACT WITH EYES, SKIN AND CLOTHING.
- AVOID PROLONGED OR REPEATED EXPOSURE.
- WASH THOROUGHLY AFTER HANDLING.
- KEEP TIGHTLY CLOSED.
- STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - -

- APPEARANCE AND ODOR
- COLORLESS LIQUID
- BOILING POINT: 178 C TO 180 C/12MM.
- MELTING POINT: 11 C TO 12 C
- FLASHPOINT >230
- > 109C
- SPECIFIC GRAVITY: 0.862

SECTION 10. - - - - - STABILITY AND REACTIVITY - - - - -

- INCOMPATIBILITIES
- STRONG OXIDIZING AGENTS
- HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS
- TOXIC FUMES OF:
- CARBON MONOXIDE, CARBON DIOXIDE

SECTION 11. - - - - - TOXICOLOGICAL INFORMATION - - - - -

CONTINUED ON NEXT PAGE



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M A T E R I A L S A F E T Y D A T A S H E E T

CUST#: 0-1 0-11768
PO#: 0694104216

PRODUCT #: 70090
MF: C16H32O2

NAME: ETHYL MYRISTATE

ACUTE EFFECTS
MAY BE HARMFUL BY INHALATION, INGESTION, OR SKIN ABSORPTION.
MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

SECTION 12. ----- ECOLOGICAL INFORMATION -----
DATA NOT YET AVAILABLE.

SECTION 13. ----- DISPOSAL CONSIDERATIONS -----
DISSOLVE OR MIX THE MATERIAL WITH A COMBUSTIBLE SOLVENT AND BURN IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER. OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. ----- TRANSPORT INFORMATION -----
CONTACT FLUKA CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. ----- REGULATORY INFORMATION -----
DATA NOT AVAILABLE

SECTION 16. ----- OTHER INFORMATION -----

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

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M A T E R I A L S A F E T Y D A T A S H E E T

PAGE 4

PRODUCT #: 70090
MF: C16H32O2

NAME: ETHYL MYRISTATE

CUST#: 0-1 0-11768
PO#: 0694104216

ETHYL HEPTANOATE, 99%

REVISED: 09 May 1995

ALDRICH CHEMICAL CO., INC.

PHONE: (414) 273-3850

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL IDENTIFICATION

MANUFACTURER'S NAME: Aldrich Chemical Co., Inc.

MANUFACTURER'S ADDRESS:

Aldrich Chemical Co., Inc.

P.O. BOX 355

MILWAUKEE, WISCONSIN 53201

PRODUCT #: 11236-4

CHEMICAL NAME AND SYNONYMS:

Ethyl Heptanoate, 99%

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

CAS #: 106-30-9

MF: C₉H₁₈O₂

SYNONYMS: cognac oil, enanthylic ether, ethyl enanthate, ethyl heptanoate, ethyl n-heptanoate, ethyl heptoate, ethyl heptylate, ethyl oenanthate, ethyl oenanthylate, oenanthic ether

SECTION III - HAZARDS IDENTIFICATION

LABEL PRECAUTIONARY STATEMENTS: Irritant. Irritating to eyes, respiratory system and skin. Combustible. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing.

Ethyl Heptanoate-1

SECTION IV - FIRST-AID MEASURES

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes. In case of contact, immediately wash skin with soap and copious amounts of water. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, wash out mouth with water provided person is conscious. Call a physician. Wash contaminated clothing before reuse.

SECTION V - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Water Spray. Carbon dioxide, dry chemical powder or appropriate foam.

SPECIAL FIREFIGHTING PROCEDURES: Wear self-contained breathing apparatus and protective clothing. Prevent contact with skin and eyes. Combustible liquid.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS: Emits toxic fumes under fire conditions.

SECTION VI - ACCIDENTAL RELEASE MEASURES

Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves. Cover with dry lime or soda ash, pick-up, keep in a closed container and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

SECTION VII - HANDLING AND STORAGE

Refer to Section 8.

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Safety Goggles
Compatible Chemical-Resistant Gloves
NIOSH/MSHA-Approved Respirator
Safety Shower and Eye Bath
Mechanical Exhaust Required
Do Not Breathe Vapor
Avoid Contact with Eyes, Skin and Clothing
Wash Thoroughly After Handling
Irritant
Keep Tightly Closed
Keep Away From Heat and Open Flame
Store in a Cool Dry Place

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Colorless liquid

BOILING POINT: 188°C to 189°C

MELTING POINT: -66°C

FLASHPOINT: 151°F (66°C)

SPECIFIC GRAVITY: 0.868

SECTION X - STABILITY AND REACTIVITY

INCOMPATIBILITIES: Strong oxidizing agents, strong bases

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: Toxic fumes of carbon monoxide, carbon dioxide

SECTION XI - TOXICOLOGICAL INFORMATION

ACUTE EFFECTS: May be harmful by inhalation, ingestion, or skin absorption. Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract. Causes skin irritation. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS NO: MJ2087000
Heptanoic acid, ethyl ester

TOXICITY DATA: ORL-RAT LD50:>34640 MG/KG FCTXAV 2,327,64
SKN-RBT LD50:>5 GM/KG FCTXAV 19,247,81
Only selected registry of toxic effects of chemical substances (RTECS) data is presented here. See actual entry in RTECS for complete information.

SECTION XII - ECOLOGICAL INFORMATION

DATA NOT YET AVAILABLE.

SECTION XIII - DISPOSAL CONSIDERATIONS

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local environmental regulations.

ETHYL HEPTANOATE, 99%

SECTION XIV - TRANSPORT INFORMATION

Contact Aldrich Chemical Company for transportation information.

SECTION XV - REGULATORY INFORMATION

REVIEWS, STANDARDS, AND REGULATIONS:

NOHS 1974: HZD 83911; NIS 1; TNF 5; NOS 3; TNE 38

NOES 1983: HZD 83911; NIS 10; TNF 1486; NOS 30; TNE 15729; TFE 3573

EPA TSCA CHEMICAL INVENTORY, JUNE 1993

SECTION XVI - OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Aldrich shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

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ANNEX D
HAZARDOUS WASTE MANIFEST FORMS AND INSTRUCTIONS
AND OTHER TRANSPORTATION FORMS

ANNEX D
HAZARDOUS WASTE MANIFEST FORMS AND INSTRUCTIONS
AND OTHER TRANSPORTATION FORMS

The following pages provide the following forms and instructions to support the transportation and storage of chemical warfare materiel (CWM):

- Hazardous Waste Manifest Forms and Instructions
- DD Form 626 Motor Vehicle Inspection
- Interim holding facility (IHF) Inspection Checklist
- DD Form 1911, Materiel Courier Receipt
- DD Form 836, Shipping Paper and Emergency Response Information for Hazardous Materials Transported by Government Vehicles.

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Environmental Protection Agency

Pt. 262, App.

(b) If a waste is hazardous under paragraph (a) of this section and it appears on the amber or red list, it is subject to amber- or red-list requirements respectively;

(c) If a waste is hazardous under paragraph (a) of this section and it does not appear on either amber or red lists, it is subject to red-list requirements.

(d) The appropriate control procedures for hazardous wastes and hazardous waste mixtures are addressed in §262.82.

(e) The OECD Green List of Wastes (revised May 1994), Amber List of Wastes and Red List of Wastes (both revised May 1993) as set forth in Appendix 3, Appendix 4 and Appendix 5, respectively, to the OECD Council Decision C(92)39/FINAL (Concerning the Control of Transfrontier Movements of Wastes Destined for Recovery Operations) are incorporated by reference. These incorporations by reference were approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51 on July 11, 1996. These materials are incorporated as they exist on the date of the approval and a notice of any change in these materials will be published in the FEDERAL REGISTER. The materials are available for inspection at: the Office of the Federal Register, 800 North Cap-

itol Street, NW., suite 700, Washington, DC; the U.S. Environmental Protection Agency, RCRA Information Center (RIC), 1235 Jefferson-Davis Highway, first floor, Arlington, VA 22203 (Docket # F-94-IEHF-FFFFF) and may be obtained from the Organisation for Economic Co-operation and Development, Environment Directorate, 2 rue Andre Pascal, 75775 Paris Cedex 16, France.

APPENDIX TO PART 262—UNIFORM HAZARDOUS WASTE MANIFEST AND INSTRUCTIONS (EPA FORMS 8700-22 AND 8700-22A AND THEIR INSTRUCTIONS)

U.S. EPA Form 8700-22

Read all instructions before completing this form.

This form has been designed for use on a 12-pitch (elite) typewriter; a firm point pen may also be used—press down hard.

Federal regulations require generators and transporters of hazardous waste and owners or operators of hazardous waste treatment, storage, and disposal facilities to use this form (8700-22) and, if necessary, the continuation sheet (Form 8700-22A) for both inter and intrastate transportation.

Federal regulations also require generators and transporters of hazardous waste and owners or operators of hazardous waste treatment, storage and disposal facilities to complete the following information:

* * * * *

Please print or type. (Form designed for use on other (12-pitch) typewriter.) Form Approved OMB No. 2060-0039, Expires 9-88-91

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.	Manifest Document No.	2. Page 1 of	Information in this column is not required by Federal law.
3. Generator's Name and Mailing Address		4. Generator's Phone ()		A. State Manifest Document Number	
5. Transporter 1 Company Name		6. US EPA ID Number		B. State Transporter's ID	
7. Transporter 2 Company Name		8. US EPA ID Number		C. Transporter's Phone	
9. Designated Facility Name and Site Address		10. US EPA ID Number		D. State Transporter's ID	
				E. Transporter's Phone	
				F. State Facility's ID	
				G. Facility's Phone	
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		12. Containers		13. Total Quantity	14. Unit Wt/Vol
		No.	Type		
a.					
b.					
c.					
d.					
J. Additional Descriptions for Materials Listed Above		K. Handling Codes for Wastes Listed Above			
15. Special Handling Instructions and Additional Information					
<p>16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.</p> <p>If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.</p>					
Printed/Typed Name		Signature		Month Day Year	
17. Transporter 1 Acknowledgement of Receipt of Materials					
Printed/Typed Name		Signature		Month Day Year	
18. Transporter 2 Acknowledgement of Receipt of Materials					
Printed/Typed Name		Signature		Month Day Year	
19. Discrepancy Indication Space					
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.					
Printed/Typed Name		Signature		Month Day Year	

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

Environmental Protection Agency

Pt. 262, App.

The following statement must be included with each Uniform Hazardous Waste Manifest, either on the form, in the instructions to the form, or accompanying the form:

Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

GENERATORS

Item 1. Generator's U.S. EPA ID Number— Manifest Document Number

Enter the generator's U.S. EPA twelve digit identification number and the unique five digit number assigned to this Manifest (e.g., 00001) by the generator.

Item 2. Page 1 of —

Enter the total number of pages used to complete this Manifest, i.e., the first page (EPA Form 8700-22) plus the number of Continuation Sheets (EPA Form 8700-22A), if any.

Item 3. Generator's Name and Mailing Address

Enter the name and mailing address of the generator. The address should be the location that will manage the returned Manifest forms.

Item 4. Generator's Phone Number

Enter a telephone number where an authorized agent of the generator may be reached in the event of an emergency.

Item 5. Transporter 1 Company Name

Enter the company name of the first transporter who will transport the waste.

Item 6. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the first transporter identified in item 5.

Item 7. Transporter 2 Company Name

If applicable, enter the company name of the second transporter who will transport the waste. If more than two transporters are used to transport the waste, use a Continuation Sheet(s) (EPA Form 8700-22A) and list

the transporters in the order they will be transporting the waste.

Item 8. U.S. EPA ID Number

If applicable, enter the U.S. EPA twelve digit identification number of the second transporter identified in item 7.

NOTE: If more than two transporters are used, enter each additional transporter's company name and U.S. EPA twelve digit identification number in items 24-27 on the Continuation Sheet (EPA Form 8700-22A). Each Continuation Sheet has space to record two additional transporters. Every transporter used between the generator and the designated facility must be listed.

Item 9. Designated Facility Name and Site Address

Enter the company name and site address of the facility designated to receive the waste listed on this Manifest. The address must be the site address, which may differ from the company mailing address.

Item 10. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the designated facility identified in item 9.

Item 11. U.S. DOT Description [Including Proper Shipping Name, Hazard Class, and ID Number (UN/NA)]

Enter the U.S. DOT Proper Shipping Name, Hazard Class, and ID Number (UN/NA) for each waste as identified in 49 CFR 171 through 177.

NOTE: If additional space is needed for waste descriptions, enter these additional descriptions in item 28 on the Continuation Sheet (EPA Form 8700-22A).

Item 12. Containers (No. and Type)

Enter the number of containers for each waste and the appropriate abbreviation from Table I (below) for the type of container.

Table I—Types of Containers

DM=Metal drums, barrels, kegs
DW=Wooden drums, barrels, kegs
DF=Fiberboard or plastic drums, barrels, kegs
TP=Tanks portable
TT=Cargo tanks (tank trucks)
TC=Tank cars
DT=Dump truck
CY=Cylinders
CM=Metal boxes, cartons, cases (including roll-offs)
CW=Wooden boxes, cartons, cases
CF=Fiber or plastic boxes, cartons, cases
BA=Burlap, cloth, paper or plastic bags

Item 13. Total Quantity

Enter the total quantity of waste described on each line.

Item 14. Unit (Wt./Vol.)

Enter the appropriate abbreviation from Table II (below) for the unit of measure.

Table II—Units of Measure

G=Gallons (liquids only)
 P=Pounds
 T=Tons (2000 lbs)
 Y=Cubic yards
 L=Liters (liquids only)
 K=Kilograms
 M=Metric tons (1000 kg)
 N=Cubic meters

Item 15. Special Handling Instructions and Additional Information

Generators may use this space to indicate special transportation, treatment, storage, or disposal information or Bill of Lading information. States may not require additional, new, or different information in this space. For international shipments, generators must enter in this space the point of departure (City and State) for those shipments destined for treatment, storage, or disposal outside the jurisdiction of the United States.

Item 16. Generator's Certification

The generator must read, sign (by hand), and date the certification statement. If a mode *other than* highway is used, the word "highway" should be lined out and the appropriate mode (rail, water, or air) inserted in the space below. If another mode *in addition to* the highway mode is used, enter the appropriate additional mode (e.g., *and rail*) in the space below.

Primary exporters shipping hazardous wastes to a facility located outside of the United States must add to the end of the first sentence of the certification the following words "and conforms to the terms of the EPA Acknowledgment of Consent to the shipment."

In signing the waste minimization certification statement, those generators who have not been exempted by statute or regulation from the duty to make a waste minimization certification under section 3002(b) of RCRA are also certifying that they have complied with the waste minimization requirements.

Generators may preprint the words, "On behalf of" in the signature block or may hand write this statement in the signature block prior to signing the generator certifications.

NOTE: All of the above information *except* the handwritten signature required in item 16 may be preprinted.

* * * * *

TRANSPORTERS

Item 17. Transporter 1 Acknowledgement of Receipt of Materials

Enter the name of the person accepting the waste on behalf of the first transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

Item 18. Transporter 2 Acknowledgement of Receipt of Materials

Enter, if applicable, the name of the person accepting the waste on behalf of the second transporter. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

NOTE: International Shipments—Transporter Responsibilities.

Exports—Transporters must sign and enter the date the waste left the United States in item 15 of Form 8700-22.

Imports—Shipments of hazardous waste regulated by RCRA and transported into the United States from another country must upon entry be accompanied by the U.S. EPA Uniform Hazardous Waste Manifest. Transporters who transport hazardous waste into the United States from another country are responsible for completing the Manifest (40 CFR 263.10(c)(1)).

Owners and Operators of Treatment, Storage, or Disposal Facilities

Item 19. Discrepancy Indication Space

The authorized representative of the designated (or alternate) facility's owner or operator must note in this space any significant discrepancy between the waste described on the Manifest and the waste actually received at the facility.

Owners and operators of facilities located in unauthorized States (i.e., the U.S. EPA administers the hazardous waste management program) who cannot resolve significant discrepancies within 15 days of receiving the waste must submit to their Regional Administrator (see list below) a letter with a copy of the Manifest at issue describing the discrepancy and attempts to reconcile it (40 CFR 264.72 and 265.72).

Owners and operators of facilities located in authorized States (i.e., those States that have received authorization from the U.S. EPA to administer the hazardous waste program) should contact their State agency for

Environmental Protection Agency

Pt. 262, App.

information on State Discrepancy Report requirements.

EPA Regional Administrators

Regional Administrator, U.S. EPA Region I,
J.F. Kennedy Fed. Bldg., Boston, MA 02203

Regional Administrator, U.S. EPA Region II,
26 Federal Plaza, New York, NY 10278

Regional Administrator, U.S. EPA Region
III, 6th and Walnut Sts., Philadelphia, PA
19106

Regional Administrator, U.S. EPA Region
IV, 345 Courtland St., NE., Atlanta, GA
30365

Regional Administrator, U.S. EPA Region V,
230 S. Dearborn St., Chicago, IL 60604

Regional Administrator, U.S. EPA Region
VI, 1201 Elm Street, Dallas, TX 75270

Regional Administrator, U.S. EPA Region
VII, 324 East 11th Street, Kansas City, MO
64106

Regional Administrator, U.S. EPA Region
VIII, 1860 Lincoln Street, Denver, CO 80296

Regional Administrator, U.S. EPA Region
IX, 215 Fremont Street, San Francisco,
CA 94105

Regional Administrator, U.S. EPA Region X,
1200 Sixth Avenue, Seattle, WA 98101

Item 20. Facility Owner or Operator: Certification of Receipt of Hazardous Materials Covered by This Manifest Except as Noted in Item 19

Print or type the name of the person accepting the waste on behalf of the owner or operator of the facility. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

Items A-K are not required by Federal regulations for intra- or interstate transportation. However, States may require generators and owners or operators of treatment, storage, or disposal facilities to complete some or all of items A-K as part of State manifest reporting requirements. Generators and owners and operators of treatment, storage, or disposal facilities are advised to contact State officials for guidance on completing the shaded areas of the Manifest.

Please print or type. (Form designed for use on nine (12-pitch) typewriter) Form Approved OMB No. 2060-0039 Expires 6-30-97

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No.	Manifest Document No.	22. Page	Information in the shaded areas is not required by Federal law	
23. Generator's Name				L. State Manifest Document Number		
				M. State Generator's ID		
24. Transporter _____ Company Name		25. US EPA ID Number		N. State Transporter's ID		
				O. Transporter's Phone		
26. Transporter _____ Company Name		27. US EPA ID Number		P. State Transporter's ID		
				Q. Transporter's Phone		
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)		29. Containers		30. Total	31. Unit	R. Waste No.
		No.	Type	Quantity	Wt./Vol.	
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						
S. Additional Descriptions for Materials Listed Above				T. Handling Codes for Wastes Listed Above		
32. Special Handling Instructions and Additional Information						
TRANSPORTER	33. Transporter _____ Acknowledgement of Receipt of Materials				Date	
	Printed/Typed Name			Signature	Month	Day
FACILITY	34. Transporter _____ Acknowledgement of Receipt of Materials				Date	
	Printed/Typed Name			Signature	Month	Day
35. Discrepancy Indication Space						

EPA Form 8700-22A (Rev. 8-86) Previous edition is obsolete.

Environmental Protection Agency

Pt. 262, App.

INSTRUCTIONS—CONTINUATION SHEET, U.S. EPA FORM 8700-22A

Read all instructions before completing this form.

This form has been designed for use on a 12-pitch (elite) typewriter; a firm point pen may also be used—press down hard.

This form must be used as a continuation sheet to U.S. EPA Form 8700-22 if:

- More than two transporters are to be used to transport the waste;
- More space is required for the U.S. DOT description and related information in Item 11 of U.S. EPA Form 8700-22.

Federal regulations require generators and transporters of hazardous waste and owners or operators of hazardous waste treatment, storage, or disposal facilities to use the uniform hazardous waste manifest (EPA Form 8700-22) and, if necessary, this continuation sheet (EPA Form 8700-22A) for both inter- and intrastate transportation.

GENERATORS

Item 21. Generator's U.S. EPA ID Number—Manifest Document Number

Enter the generator's U.S. EPA twelve digit identification number and the unique five digit number assigned to this Manifest (e.g., 00001) as it appears in item 1 on the first page of the Manifest.

Item 22. Page —

Enter the page number of this Continuation Sheet.

Item 23. Generator's Name

Enter the generator's name as it appears in item 3 on the first page of the Manifest.

Item 24. Transporter — Company Name

If additional transporters are used to transport the waste described on this Manifest, enter the company name of each additional transporter in the order in which they will transport the waste. Enter after the word "Transporter" the order of the transporter. For example, Transporter 3 Company Name. Each Continuation Sheet will record the names of two additional transporters.

Item 25. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the transporter described in item 24.

Item 26. Transporter — Company Name

If additional transporters are used to transport the waste described on this Manifest, enter the company name of each additional transporter in the order in which they will transport the waste. Enter after the word "Transporter" the order of the transporter. For example, Transporter 4 Company

Name. Each Continuation Sheet will record the names of two additional transporters.

Item 27. U.S. EPA ID Number

Enter the U.S. EPA twelve digit identification number of the transporter described in item 26.

Item 28. U.S. DOT Description Including Proper Shipping Name, Hazardous Class, and ID Number (UN/NA)

Refer to item 11.

Item 29. Containers (No. and Type)

Refer to item 12.

Item 30. Total Quantity

Refer to item 13.

Item 31. Unit (Wt./Vol.)

Refer to item 14.

Item 32. Special Handling Instructions

Generators may use this space to indicate special transportation, treatment, storage, or disposal information or Bill of Lading information. States are not authorized to require additional, new, or different information in this space.

* * * * *

TRANSPORTERS

Item 33. Transporter — Acknowledgement of Receipt of Materials

Enter the same number of the Transporter as identified in item 24. Enter also the name of the person accepting the waste on behalf of the Transporter (Company Name) identified in item 24. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

Item 34. Transporter — Acknowledgement of Receipt of Materials

Enter the same number as identified in item 26. Enter also the name of the person accepting the waste on behalf of the Transporter (Company Name) identified in item 26. That person must acknowledge acceptance of the waste described on the Manifest by signing and entering the date of receipt.

* * * * *

OWNERS AND OPERATORS OF TREATMENT, STORAGE, OR DISPOSAL FACILITIES

Item 35. Discrepancy Indication Space

Refer to item 19.

Items L-R are not required by Federal regulations for intra- or interstate transportation. However, States may require generators and owners or operators of treatment, storage, or disposal facilities to complete some or all of items L-R as part of State manifest reporting requirements. Generators and owners and operators of treatment, storage, or disposal facilities are advised to contact State officials for guidance on completing the shaded areas of the manifest.

[49 FR 10501, Mar. 20, 1984, as amended at 51 FR 28685, Aug. 8, 1986; 51 FR 35192, Oct. 1, 1986; 53 FR 45091, Nov. 8, 1988]

PART 263—STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE

Subpart A—General

- Sec.
 263.10 Scope.
 263.11 EPA identification number.
 263.12 Transfer facility requirements.

Subpart B—Compliance With the Manifest System and Recordkeeping

- 263.20 The manifest system.
 263.21 Compliance with the manifest.
 263.22 Recordkeeping.

Subpart C—Hazardous Waste Discharges

- 263.30 Immediate action.
 263.31 Discharge clean up.
 AUTHORITY: 42 U.S.C. 6906, 6912, 6922, 6923, 6925, 6937, and 6938.
 SOURCE: 45 FR 33151, May 19, 1980, unless otherwise noted.

Subpart A—General

§ 263.10 Scope.

(a) These regulations establish standards which apply to persons transporting hazardous waste within the United States if the transportation requires a manifest under 40 CFR part 262.

NOTE: The regulations set forth in parts 262 and 263 establish the responsibilities of generators and transporters of hazardous waste in the handling, transportation, and management of that waste. In these regulations, EPA has expressly adopted certain regulations of the Department of Transportation (DOT) governing the transportation of hazardous materials. These regulations concern, among other things, labeling, marking, placarding, using proper containers, and reporting discharges. EPA has expressly adopted these regulations in order to satisfy its

statutory obligation to promulgate regulations which are necessary to protect human health and the environment in the transportation of hazardous waste. EPA's adoption of these DOT regulations ensures consistency with the requirements of DOT and thus avoids the establishment of duplicative or conflicting requirements with respect to these matters. These EPA regulations which apply to both interstate and intrastate transportation of hazardous waste are enforceable by EPA.

DOT has revised its hazardous materials transportation regulations in order to encompass the transportation of hazardous waste and to regulate intrastate, as well as interstate, transportation of hazardous waste. Transporters of hazardous waste are cautioned that DOT's regulations are fully applicable to their activities and enforceable by DOT. These DOT regulations are codified in title 49, Code of Federal Regulations, subchapter C.

EPA and DOT worked together to develop standards for transporters of hazardous waste in order to avoid conflicting requirements. Except for transporters of bulk shipments of hazardous waste by water, a transporter who meets all applicable requirements of 49 CFR parts 171 through 179 and the requirements of 40 CFR 263.11 and 263.31 will be deemed in compliance with this part. Regardless of DOT's action, EPA retains its authority to enforce these regulations.

(b) These regulations do not apply to on-site transportation of hazardous waste by generators or by owners or operators of permitted hazardous waste management facilities.

(c) A transporter of hazardous waste must also comply with 40 CFR part 262, Standards Applicable to Generators of Hazardous Waste, if he:

- (1) Transports hazardous waste into the United States from abroad; or
- (2) Mixes hazardous wastes of different DOT shipping descriptions by placing them into a single container.

(d) A transporter of hazardous waste subject to the Federal manifesting requirements of 40 CFR part 262, or subject to the waste management standards of 40 CFR part 273, or subject to State requirements analogous to 40 CFR part 273, that is being imported from or exported to any of the countries listed in 40 CFR 262.58(a)(1) for purposes of recovery is subject to this Subpart and to all other relevant requirements of subpart H of 40 CFR part

262, including, but not limited to, 40 CFR 262.84 for tracking documents.

[45 FR 33151, May 19, 1980, as amended at 45 FR 86968, Dec. 31, 1980; 61 FR 16314, Apr. 12, 1996]

EFFECTIVE DATE NOTE: At 61 FR 16314, Apr. 12, 1996, §263.10(d) was added, effective July 11, 1996.

§ 263.11 EPA identification number.

(a) A transporter must not transport hazardous wastes without having received an EPA identification number from the Administrator.

(b) A transporter who has not received an EPA identification number may obtain one by applying to the Administrator using EPA Form 8700-12. Upon receiving the request, the Administrator will assign an EPA identification number to the transporter.

§ 263.12 Transfer facility requirements.

A transporter who stores manifested shipments of hazardous waste in containers meeting the requirements of §262.30 at a transfer facility for a period of ten days or less is not subject to regulation under parts 270, 264, 265, and 268 of this chapter with respect to the storage of those wastes.

[45 FR 86968, Dec. 31, 1980, as amended at 48 FR 14294, Apr. 1, 1983; 51 FR 40637, Nov. 7, 1986]

Subpart B—Compliance With the Manifest System and Record-keeping

§ 263.20 The manifest system.

(a) A transporter may not accept hazardous waste from a generator unless it is accompanied by a manifest signed in accordance with the provisions of 40 CFR 262.20. In the case of exports other than those subject to subpart H of 40 CFR part 262, a transporter may not accept such waste from a primary exporter or other person if he knows the shipment does not conform to the EPA Acknowledgement of Consent; and unless, in addition to a manifest signed in accordance with the provisions of 40 CFR 262.20, such waste is also accompanied by an EPA Acknowledgement of Consent which, except for shipment by rail, is attached to the manifest (or shipping paper for exports by water

(bulk shipment)). For exports of hazardous waste subject to the requirements of subpart H of 40 CFR part 262, a transporter may not accept hazardous waste without a tracking document that includes all information required by 40 CFR 262.84.

(b) Before transporting the hazardous waste, the transporter must sign and date the manifest acknowledging acceptance of the hazardous waste from the generator. The transporter must return a signed copy to the generator before leaving the generator's property.

(c) The transporter must ensure that the manifest accompanies the hazardous waste. In the case of exports, the transporter must ensure that a copy of the EPA Acknowledgment of Consent also accompanies the hazardous waste.

(d) A transporter who delivers a hazardous waste to another transporter or to the designated facility must:

(1) Obtain the date of delivery and the handwritten signature of that transporter or of the owner or operator of the designated facility on the manifest; and

(2) Retain one copy of the manifest in accordance with §263.22; and

(3) Give the remaining copies of the manifest to the accepting transporter or designated facility.

(e) The requirements of paragraphs (c), (d) and (f) of this section do not apply to water (bulk shipment) transporters if:

(1) The hazardous waste is delivered by water (bulk shipment) to the designated facility; and

(2) A shipping paper containing all the information required on the manifest (excluding the EPA identification numbers, generator certification, and signatures) and, for exports, an EPA Acknowledgment of Consent accompanies the hazardous waste; and

(3) The delivering transporter obtains the date of delivery and handwritten signature of the owner or operator of the designated facility on either the manifest or the shipping paper; and

(4) The person delivering the hazardous waste to the initial water (bulk shipment) transporter obtains the date of delivery and signature of the water (bulk shipment) transporter on the

§ 263.20

40 CFR Ch. I (7-1-96 Edition)

manifest and forwards it to the designated facility; and

(5) A copy of the shipping paper or manifest is retained by each water (bulk shipment) transporter in accordance with §263.22.

(f) For shipments involving rail transportation, the requirements of paragraphs (c), (d) and (e) do not apply and the following requirements do apply:

(1) When accepting hazardous waste from a non-rail transporter, the initial rail transporter must:

(i) Sign and date the manifest acknowledging acceptance of the hazardous waste;

(ii) Return a signed copy of the manifest to the non-rail transporter;

(iii) Forward at least three copies of the manifest to:

(A) The next non-rail transporter, if any; or,

(B) The designated facility, if the shipment is delivered to that facility by rail; or

(C) The last rail transporter designated to handle the waste in the United States;

(iv) Retain one copy of the manifest and rail shipping paper in accordance with §263.22.

(2) Rail transporters must ensure that a shipping paper containing all the information required on the manifest (excluding the EPA identification numbers, generator certification, and signatures) and, for exports an EPA Acknowledgment of Consent accompanies the hazardous waste at all times.

NOTE: Intermediate rail transporters are not required to sign either the manifest or shipping paper.

(3) When delivering hazardous waste to the designated facility, a rail transporter must:

(i) Obtain the date of delivery and handwritten signature of the owner or operator of the designated facility on the manifest or the shipping paper (if the manifest has not been received by the facility); and

(ii) Retain a copy of the manifest or signed shipping paper in accordance with §263.22.

(4) When delivering hazardous waste to a non-rail transporter a rail transporter must:

(i) Obtain the date of delivery and the handwritten signature of the next non-rail transporter on the manifest; and

(ii) Retain a copy of the manifest in accordance with §263.22.

(5) Before accepting hazardous waste from a rail transporter, a non-rail transporter must sign and date the manifest and provide a copy to the rail transporter.

(g) Transporters who transport hazardous waste out of the United States must:

(1) Indicate on the manifest the date the hazardous waste left the United States; and

(2) Sign the manifest and retain one copy in accordance with §263.22(c); and

(3) Return a signed copy of the manifest to the generator; and

(4) Give a copy of the manifest to a U.S. Customs official at the point of departure from the United States.

(h) A transporter transporting hazardous waste from a generator who generates greater than 100 kilograms but less than 1000 kilograms of hazardous waste in a calendar month need not comply with the requirements of this section or those of §263.22 provided that:

(1) The waste is being transported pursuant to a reclamation agreement as provided for in §262.20(e);

(2) The transporter records, on a log or shipping paper, the following information for each shipment:

(i) The name, address, and U.S. EPA Identification Number of the generator of the waste;

(ii) The quantity of waste accepted;

(iii) All DOT-required shipping information;

(iv) The date the waste is accepted; and

(3) The transporter carries this record when transporting waste to the reclamation facility; and

(4) The transporter retains these records for a period of at least three years after termination or expiration of the agreement.

[45 FR 33151, May 19, 1980, as amended at 45 FR 86973, Dec. 31, 1980; 51 FR 10176, Mar. 24, 1986; 51 FR 28685, Aug. 8, 1986; 61 FR 16315, Apr. 12, 1996]

EFFECTIVE DATE NOTE: At 61 FR 16315, Apr. 12, 1996, §263.20(a) was revised, effective July

11, 1996. For the convenience of the reader, the superseded text is set out below:

§ 263.20 The manifest system.

(a) A transporter may not accept hazardous waste from a generator unless it is accompanied by a manifest signed in accordance with the provisions of 40 CFR 262.20. In the case of exports, a transporter may not accept such waste from a primary exporter or other person (1) if he knows the shipment does not conform to the EPA Acknowledgment of Consent; and (2) unless, in addition to a manifest signed in accordance with the provisions of 40 CFR 262.20, such waste is also accompanied by an EPA Acknowledgment of Consent which, except for shipment by rail, is attached to the manifest (or shipping paper for exports by water (bulk shipment)).

* * * * *

§ 263.21 Compliance with the manifest.

(a) The transporter must deliver the entire quantity of hazardous waste which he has accepted from a generator or a transporter to:

- (1) The designated facility listed on the manifest; or
- (2) The alternate designated facility, if the hazardous waste cannot be delivered to the designated facility because an emergency prevents delivery; or
- (3) The next designated transporter; or
- (4) The place outside the United States designated by the generator.

(b) If the hazardous waste cannot be delivered in accordance with paragraph (a) of this section, the transporter must contact the generator for further directions and must revise the manifest according to the generator's instructions.

§ 263.22 Recordkeeping.

(a) A transporter of hazardous waste must keep a copy of the manifest signed by the generator, himself, and the next designated transporter or the owner or operator of the designated facility for a period of three years from the date the hazardous waste was accepted by the initial transporter.

(b) For shipments delivered to the designated facility by water (bulk shipment), each water (bulk shipment) transporter must retain a copy of the shipping paper containing all the information required in §263.20(e)(2) for a period of three years from the date the

hazardous waste was accepted by the initial transporter.

(c) For shipments of hazardous waste by rail within the United States:

(1) The initial rail transporter must keep a copy of the manifest and shipping paper with all the information required in §263.20(f)(2) for a period of three years from the date the hazardous waste was accepted by the initial transporter; and

(2) The final rail transporter must keep a copy of the signed manifest (or the shipping paper if signed by the designated facility in lieu of the manifest) for a period of three years from the date the hazardous waste was accepted by the initial transporter.

NOTE: Intermediate rail transporters are not required to keep records pursuant to these regulations.

(d) A transporter who transports hazardous waste out of the United States must keep a copy of the manifest indicating that the hazardous waste left the United States for a period of three years from the date the hazardous waste was accepted by the initial transporter.

(e) The periods of retention referred to in this Section are extended automatically during the course of any unresolved enforcement action regarding the regulated activity or as requested by the Administrator.

[45 FR 33151, May 19, 1980, as amended at 45 FR 86973, Dec. 31, 1980]

Subpart C—Hazardous Waste Discharges

§ 263.30 Immediate action.

(a) In the event of a discharge of hazardous waste during transportation, the transporter must take appropriate immediate action to protect human health and the environment (e.g., notify local authorities, dike the discharge area).

(b) If a discharge of hazardous waste occurs during transportation and an official (State or local government or a Federal Agency) acting within the scope of his official responsibilities determines that immediate removal of the waste is necessary to protect human health or the environment, that official may authorize the removal of

§263.31

the waste by transporters who do not have EPA identification numbers and without the preparation of a manifest.

(c) An air, rail, highway, or water transporter who has discharged hazardous waste must:

(1) Give notice, if required by 49 CFR 171.15, to the National Response Center (800-424-8802 or 202-426-2675); and

(2) Report in writing as required by 49 CFR 171.16 to the Director, Office of Hazardous Materials Regulations, Materials Transportation Bureau, Department of Transportation, Washington, DC 20590.

(d) A water (bulk shipment) transporter who has discharged hazardous waste must give the same notice as required by 33 CFR 153.203 for oil and hazardous substances.

§263.31 Discharge clean up.

A transporter must clean up any hazardous waste discharge that occurs during transportation or take such action as may be required or approved by Federal, State, or local officials so that the hazardous waste discharge no longer presents a hazard to human health or the environment.

PART 264—STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES

Subpart A—General

Sec.

264.1 Purpose, scope and applicability.

264.2 [Reserved]

264.3 Relationship to interim status standards.

264.4 Imminent hazard action.

Subpart B—General Facility Standards

264.10 Applicability.

264.11 Identification number.

264.12 Required notices.

264.13 General waste analysis.

264.14 Security.

264.15 General inspection requirements.

264.16 Personnel training.

264.17 General requirements for ignitable, reactive, or incompatible wastes.

264.18 Location standards.

264.19 Construction quality assurance program.

40 CFR Ch. I (7-1-96 Edition)

Subpart C—Preparedness and Prevention

264.30 Applicability.

264.31 Design and operation of facility.

264.32 Required equipment.

264.33 Testing and maintenance of equipment.

264.34 Access to communications or alarm system.

264.35 Required aisle space.

264.36 [Reserved]

264.37 Arrangements with local authorities.

Subpart D—Contingency Plan and Emergency Procedures

264.50 Applicability.

264.51 Purpose and implementation of contingency plan.

264.52 Content of contingency plan.

264.53 Copies of contingency plan.

264.54 Amendment of contingency plan.

264.55 Emergency coordinator.

264.56 Emergency procedures.

Subpart E—Manifest System, Recordkeeping, and Reporting

264.70 Applicability.

264.71 Use of manifest system.

264.72 Manifest discrepancies.

264.73 Operating record.

264.74 Availability, retention, and disposition of records.

264.75 Biennial report.

264.76 Unmanifested waste report.

264.77 Additional reports.

Subpart F—Releases From Solid Waste Management Units

264.90 Applicability.

264.91 Required programs.

264.92 Ground-water protection standard.

264.93 Hazardous constituents.

264.94 Concentration limits.

264.95 Point of compliance.

264.96 Compliance period.

264.97 General ground-water monitoring requirements.

264.98 Detection monitoring program.

264.99 Compliance monitoring program.

264.100 Corrective action program.

264.101 Corrective action for solid waste management units.

Subpart G—Closure and Post-Closure

264.110 Applicability.

264.111 Closure performance standard.

264.112 Closure plan; amendment of plan.

264.113 Closure; time allowed for closure.

264.114 Disposal or decontamination of equipment, structures and soils.

264.115 Certification of closure.

264.116 Survey plat.

264.117 Post-closure care and use of property.

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)													
<i>(Read Instructions before completing this form.)</i>													
This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.					1. GOVERNMENT BILL OF LADING/TRANSPORTATION CONTROL NUMBER								
SECTION 1 - DOCUMENTATION				ORIGIN a.			DESTINATION b.						
2. CARRIER/GOVERNMENT ORGANIZATION													
3. DATE/TIME OF INSPECTION													
4. LOCATION OF INSPECTION													
5. OPERATOR(S) NAME(S)													
6. OPERATOR(S) LICENSE NUMBER(S)													
7. MEDICAL EXAMINER'S CERTIFICATE*													
8. <i>(X if satisfactory at origin)</i>							9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*						
a. MILITARY HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:		YES	NO	a. TRUCK/TRACTOR		YES	NO				
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*				b. TRAILER							
c. ROUTE PLAN		f. COPY OF 49 CFR PART 397											
SECTION II - MECHANICAL INSPECTION													
<i>All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.</i>													
10. TYPE OF VEHICLE(S)					11. VEHICLE NUMBER(S)								
12. PART INSPECTED <i>(X as applicable)</i>		ORIGIN (1)		DESTINATION (2)				ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
		SAT	UNSAT	SAT	UNSAT			SAT	UNSAT	SAT	UNSAT		
a. SPARE ELECTRICAL FUSES						k. EXHAUST SYSTEM							
b. HORN OPERATIVE						l. BRAKE SYSTEM*							
c. STEERING SYSTEM						m. SUSPENSION							
d. WINDSHIELD/WIPERS						n. COUPLING DEVICES							
e. MIRRORS						o. CARGO SPACE							
f. WARNING EQUIPMENT						p. LANDING GEAR*							
g. FIRE EXTINGUISHER*						q. TIRES, WHEELS, RIMS							
h. ELECTRICAL WIRING						r. TAILGATE/DOORS*							
i. LIGHTS AND REFLECTORS						s. TARPULIN*							
j. FUEL SYSTEM*						t. OTHER <i>(Specify)</i>							
13. INSPECTION RESULTS <i>(X one)</i> ACCEPTED <input type="checkbox"/>					REJECTED <input type="checkbox"/>								
<i>(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)</i>													
14. SATELLITE MOTOR SURVEILLANCE SYSTEM: <i>(X one)</i> ACCEPTED <input type="checkbox"/>					REJECTED <input type="checkbox"/>								
15. REMARKS													
16. INSPECTOR SIGNATURE <i>(Origin)</i>					17. INSPECTOR SIGNATURE <i>(Destination)</i>								
SECTION III - POST LOADING INSPECTION													
<i>This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.</i>								ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
								SAT	UNSAT	SAT	UNSAT		
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR													
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT													
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT													
21. PROPER PLACARDS APPLIED													
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS													
23. COPY OF DD FORM 626 FOR DRIVER													
24. SHIPPED UNDER DOT EXEMPTION 868													
25. INSPECTOR SIGNATURE <i>(Origin)</i>					26. DRIVER(S) SIGNATURE <i>(Origin)</i>								
27. INSPECTOR SIGNATURE <i>(Destination)</i>					28. DRIVER(S) SIGNATURE <i>(Destination)</i>								

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW Part 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract of lease is carried in all leased vehicles and is available for inspection. (Defense Transportation Regulation (DTR) requirement.)

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper may provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II (Continued)

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with two serviceable fire extinguishers with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher(s) must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

INSTRUCTIONS

SECTION II (Continued)

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83 and 396 Appendix G)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83 and 396 Appendix G)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 396 Appendix G)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 396 Appendix G)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 396 Appendix G)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 177.815(e)(1) and 398.94)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

SECTION II (Continued)

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 396 Appendix G)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. Shipper will instruct the driver to send a "test" emergency message to DTTS by having the driver activate the "emergency (panic) button". Shipper will contact DTTS at 1-800-826-0794 to verify that test message was received. Message must be received by DTTS for system to be considered operational.

SECTION III - POST LOADING INSPECTION

General Instructions.

All items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR Part 172 Subpart F.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR Part 172 Subpart C. For shipments transported by Government vehicle, shipping paper will be DD Form 836.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Exemption 868, ensure that shipping papers are properly annotated and copy of Exemption 868 is with shipping papers.

Interim Holding Facility Inspection Checklist

Period Covered: From _____ to _____

Inspector:
Date:
Time:

MON TUES WED THUR FRI SAT SUN

Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail

Outside

Signs posted on IHF entrance gate	<input type="checkbox"/>													
Area secure, gate closed and locked, IHF door closed and locked	<input type="checkbox"/>													

Storage Area

Building structurally sound	<input type="checkbox"/>													
Area clean of debris	<input type="checkbox"/>													
Aisle space adequate for emergency response	<input type="checkbox"/>													
All containers on pallets	<input type="checkbox"/>													
All containers sealed	<input type="checkbox"/>													
No leaks, spills, leaking containers, or residue	<input type="checkbox"/>													
Containers turned so that labels are visible	<input type="checkbox"/>													
Inspect container labels														
composition of waste	<input type="checkbox"/>													
quantity of waste	<input type="checkbox"/>													
generator	<input type="checkbox"/>													
date of acceptance	<input type="checkbox"/>													
Inspect secondary containment sumps	<input type="checkbox"/>													

Interim Holding Facility Inspection Checklist (Continued)

Period Covered: From _____ to _____

Inspector:
Date:
Time:

MON TUES WED THUR FRI SAT SUN

Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail Pass Fail

Equipment

Emergency shower/eyewash operable	<input type="checkbox"/>													
Absorbent available	<input type="checkbox"/>													
Inspect fire extinguishers	<input type="checkbox"/>													
Gloves available	<input type="checkbox"/>													
Eye protection available	<input type="checkbox"/>													
Respirators available	<input type="checkbox"/>													
Protective clothing available	<input type="checkbox"/>													
Spill kit available and complete	<input type="checkbox"/>													
Tool kit available and complete	<input type="checkbox"/>													
First aid kit available and complete	<input type="checkbox"/>													

Records/Reports

Waste logs complete, accurate and up-to-date	<input type="checkbox"/>													
Manifests logged and filed	<input type="checkbox"/>													
Copies of returned manifests	<input type="checkbox"/>													
Emergency Response Contingency Plan on file	<input type="checkbox"/>													
Sample records on file	<input type="checkbox"/>													
Discrepancy reports prepared and filed	<input type="checkbox"/>													
Incident reports for spills on file	<input type="checkbox"/>													

Comments:

Interim Holding Facility Inspection Checklist (Continued)

Corrective Action:

Mon:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Tue:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Wed:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Thur:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Fri:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Sat:	Item: _____ Date: _____	Action Taken: _____ Signature: _____
Sun:	Item: _____ Date: _____	Action Taken: _____ Signature: _____

MATERIEL COURIER RECEIPT		SHIPPER'S CONTROL/DOCUMENT NO.	PRIVACY ACT STATEMENT			
SHIPPER		SUPPLY ACCOUNT NUMBER	AUTHORITY 5 U.S.C., Sec 552a (PL 93 579) PRINCIPLE PURPOSES: To provide a receipt for transfer of controlled materiel. The use of the SSAN is required and is necessary to provide positive identification of the individuals receiving for the materiel. ROUTINE USES: To document transfer of materiel from a shipper to a courier, courier to courier and/or receiver. DISCLOSURE IS VOLUNTARY: Since the SSAN must be used, refusal to provide SSAN may be grounds for action to remove the individual concerned from duties involving the materiel transferred by use of this form.			
DESTINATION		SUPPLY ACCOUNT NUMBER				
I certify by my signature that I have received the materiel listed on this form and am aware of the applicable safety and security requirements.			SHIPMENT DESCRIPTION			
			LINE NUMBER	QUANTITY	SERIAL NUMBERS	REMARKS
SHIPMENT TRANSFERS						
FIRST	LOCATION OF TRANSFER		DATE (YR/MO/DAY)			
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
SECOND	LOCATION OF TRANSFER		DATE (YR/MO/DAY)			
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
THIRD	LOCATION OF TRANSFER		DATE (YR/MO/DAY)			
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
FOURTH	LOCATION OF TRANSFER		DATE (YR/MO/DAY)			
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				
FIFTH	LOCATION OF TRANSFER		DATE (YR/MO/DAY)			
RECIPIENT'S PRINTED NAME (LAST, FIRST, M.I.)		ORGAN. OR ACCOUNT NO.				
SIGNATURE		SOCIAL SECURITY NUMBER				

DD FORM 1911
82 MAY

PREVIOUS EDITION MAY BE USED UNTIL 31 DEC 82

DD Form 1911, Materiel Courier Receipt

INSTRUCTIONS FOR COMPLETING DD FORM 836

GENERAL

DD Form 836 shall be completed by a *qualified individual from a transportation office, unit or other organization offering hazardous material for transportation in areas accessible to the general public.

*An individual is considered qualified to complete and sign (certify) DD Form 836, only after having satisfactorily completed either a DoD authorized Hazardous Material Course from one of the DoD-approved schools listed in the Defense Transportation Regulation (DTR) or technical specialist training in accordance with DTR, Part II, Chapter 204, Para (E). This person shall be appointed in writing by the activity or unit Commander, to include scope of authority.

Item 1. If applicable, at the top of the page fill in the nomenclature, model number, TCN, and bumper number/serial number, of the vehicle/container.

Item 2a. Enter the place/date the hazardous material was certified (e.g., B, Company 1/8 CAV Motor Pool, Fort Hood, TX 1 AUG 1998).

Item 2b. Enter the date the hazardous material will move.

Item 2c. Enter the page number and total number of pages of the DD Form 836 for the vehicle carrying the hazardous material. Example: "Page 1 of 5 Pages". Leave blank if there are no continuation sheets.

Item 3. Cargo.

Item 3a. Enter the total number of packages by type.

Item 3b. Enter the type of package (e.g., box, pallet, drum, cylinder, container, etc.), the hazardous material is packaged in.

Item 3c. Enter the Proper Shipping Name of the hazardous material and if applicable include the technical name. (Enter additional information as required by 49 CFR, §172.203 - Example: RQ, Inhalation Hazard.)

Item 3d. Enter the Hazard Class/Division and, if applicable, the Compatibility Group.

Item 3e. Enter the Identification Numbers (e.g., UN, NA). The letters "UN" or "NA" must be noted.)

Item 3f. Enter the Packing Group (e.g. I, II, or III) of the hazardous material.

Item 3g. Enter the total Gross, Mass, or Net Quantity for non-explosive material in metric measure. U.S. measure may be added in parentheses.

Item 3h. Enter total Net Explosive Weight (NEW) for ammunition/explosives (Class I items). NEW information is found in the Joint Hazard Classification System (JHCS) in the column headed NEW (third explosive weight column).

Item 4a. Enter the Shipper's (e.g., unit name, agency, manufacturer, certifying person, etc.) address and telephone number where the hazardous material originated. Telephone number shall be monitored at all times (24 hour) until shipment is received by consignee. Telephone number is for **NOTIFICATION PURPOSES ONLY**. Emergency assistance shall be obtained from the appropriate **24 HOUR EMERGENCY ASSISTANCE TELEPHONE NUMBER**. Additional notification if needed can be annotated in block 5.

Item 4b. Enter the six-digit Department of Defense Activity Address Codes (DODAAC) and/or the in-the-clear geographical location of the ultimate receiver or consignee of the HAZMAT shipment (e.g. Ft. Irwin CA.). (If this is a unit move, the unit name will be the same as that for 4a.) Additional information if needed can be annotated in Block 5.

Item 4c. Enter the ERG #(s) for the materials being shipped. (For materials other than explosives attach a copy of the ERG page, unless the vehicle has a copy of a current ERG.)

Item 5. Additional handling instructions/information. Enter additional information if needed or required concerning the hazardous material or emergency response information. (Example: for materials that must be kept dry, add statement "Keep Away From Water".)

Item 6a and 6b. Certifying person must sign in writing (longhand) and must type or print name legibly in 6b.

Item 6c. Vehicle operator(s) signs to accept responsibility for the load.

Military Drivers: Ensure the operator's OF 346, U.S. Government Motor Vehicle (Operator's Identification Card, contains the appropriate HAZMAT training, vehicle trained on, IAW DoD and component regulations.)

Civilian Drivers: Ensure the operator has a current DOT Commercial Driver License (CDL) IAW Title 49 CFR, Part 383.

NOTES:

1. Units returning from exercise or firing range must have a certified or qualified person to ensure that all HAZMAT is properly repackaged and secured (i.e. blocked, braced, tied down) prior to being transported back to base.

2. Completion of a new DD Form 836 is not required. Original DD Form 836 may be used provided that:

a. Change Item 2a. (Date Prepared) and Item 2b. (Date of Travel) as appropriate.

b. Change Item 3. (Cargo):

(i) HAZMAT used shall be deleted from form by crossing out or lining through.

(ii) HAZMAT which remains, but is in different quantities shall have the correct amounts entered in the appropriate section(s).

EXCEPTION:

c. Change Item 6.a.:

(i) A qualified individual (if available) shall sign in writing (longhand). If a qualified individual is not available, then the Officer-In-Charge (OIC) or Non-Commissioned Officer-In-Charge (NCOIC) shall sign in writing (longhand) to verify that the above procedures have been performed for the return trip to base.

(ii) Cross out original signature if different certifier will be used.

1. NOMENCLATURE:
MODEL NO.:

TCN NUMBER:
SERIAL NO.:

BUMPER NO.

SHIPPING PAPER AND EMERGENCY RESPONSE INFORMATION FOR HAZARDOUS MATERIALS TRANSPORTED BY GOVERNMENT VEHICLES								
THIS VEHICLE IS TRANSPORTING HAZARDOUS MATERIALS								
2a. LOCATION AND DATE PREPARED				b. DATE OF TRAVEL			c. PAGE OF PAGES	
TO BE COMPLETED BY THE UNIT OR SHIPPER T.O. OFFICE.								
3. CARGO								
PACKAGES		PROPER SHIPPING NAME <i>(Include RQ, Technical Names, Additional Information per §172.203 as required.)</i>	HC	UN OR ID NO.	PG	NET TOTAL QTY.	TOTAL AMMO (NEW)	
NUMBER	KIND							
a.	b.	c.	d.	e.	f.	g.	h.	
4. EMERGENCY NOTIFICATION. IN ALL CASES OF ACCIDENT, INCIDENT, BREAKDOWN OR FIRE, PROMPT NOTIFICATION MUST BE GIVEN TO:								
a. SHIPPER'S ADDRESS AND TELEPHONE NO. <i>(List 24-hour telephone numbers):</i>					b. CONSIGNEE			
FOR SAFE HAVEN/REFUGE, IMMEDIATELY CALL APPROPRIATE MTMC AREA HOTLINE LISTED BELOW: EASTERN/WESTERN UNITED STATES: 1-800-524-0331 NEW JERSEY ONLY: 1-800-642-1381								
24-HOUR EMERGENCY ASSISTANCE TELEPHONE NUMBERS:								
DOD NON-EXPLOSIVE HAZARDOUS MATERIALS ONLY: 1-800-851-8061 TO CALL FROM A SHIP: 804-279-3166 (COLLECT)			DOD HAZARD CLASS 1 (EXPLOSIVES) ONLY CALL ARMY OPERATIONS CENTER - COLLECT 703-697-0218/0219 ASK FOR THE WATCH OFFICER			NATIONAL RESPONSE CENTER (NRC) 1-800-424-8802 TO CALL FROM A SHIP: 202-267-2675 (COLLECT) DOD RADIOACTIVE MATERIAL ONLY - COLLECT: 309-782-3510 ASK FOR STAFF DUTY OFFICER		
4c. COPY OF EMERGENCY GUIDE NUMBER(S) _____ ATTACHED.								
5. REMARKS								
6. CERTIFICATION THIS IS TO CERTIFY THAT THE HEREIN NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED, AND LABELED, AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION.								
a. SIGNATURE OF SHIPPER CERTIFIER					c. SIGNATURE(S) OF VEHICLE OPERATOR(S)			
b. PRINT NAME OF SHIPPER CERTIFIER								

EMERGENCY RESPONSE INFORMATION

Guide Numbers 112 and 114 from the U.S. Department of Transportation North American Emergency Response Guide Book (RSPA P 5800.7) are reproduced hereon. These guides are applicable to Hazard Class 1 Materials (Explosives).

Mark an X in the appropriate box:

USE GUIDE 112 FOR EXPLOSIVES:
(1.1), (1.2), (1.3), (1.5) or (1.6) Class A or B

USE GUIDE 114 FOR EXPLOSIVES:
(1.4) Class C

For all other hazardous materials or substances, annotate appropriate Emergency Response Guide Book Guide Number in the block below, and attach a copy of the guide number page or pages.

GUIDE 112	GUIDE 114
<p>POTENTIAL HAZARDS FIRE OR EXPLOSION: MAY EXPLODE AND THROW FRAGMENTS 1600 METERS (1 MILE) OR MORE IF FIRE REACHES CARGO.</p> <p>HEALTH HAZARDS: Fire may produce irritating, corrosive and/or toxic gases.</p> <p>PUBLIC SAFETY: CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.</p> <ul style="list-style-type: none"> - Isolate spill or leak area immediately for at least 500 meters (1/3 mile) in all directions. Move people out of line of sight of the scene and away from windows. - Keep unauthorized personnel away and stay upwind. - Ventilate closed spaces before entering. <p>PROTECTIVE CLOTHING: - Wear positive pressure self-contained breathing apparatus (SCBA), and Structural firefighters' protective clothing will only provide limited protection.</p> <p>EVACUATION: LARGE SPILL Consider initial evacuation for 800 meters (1/2 mile) in all directions.</p> <p>FIRE - If rail car or trailer is involved in a fire and heavily encased explosives such as bombs or artillery projectiles are suspected, ISOLATE for 1600 meters (1 mile) in all directions; also, initiate evacuation including emergency responders for 1600 meters (1 mile) in all directions.</p> <p>- When heavily encased explosives are not involved, evacuate the area for 800 meters (1/2 mile) in all directions.</p> <p>EMERGENCY RESPONSE: FIRE CARGO Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO! CARGO MAY EXPLODE!</p> <ul style="list-style-type: none"> - Stop all traffic and clear the area for at least 1600 meters (1 mile) in all directions and let burn. Do not move cargo or vehicle if cargo has been exposed to heat. <p>TIRE or VEHICLE Fires: - Use plenty of water - FLOOD it! If water is not available, use CO2, dry chemical or dirt. If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.</p> <p>- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.</p> <p>SPILL OR LEAK: - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).</p> <ul style="list-style-type: none"> - All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. - DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 METERS (330 feet) OF ELECTRIC DETONATORS. - DO NOT CLEAN UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST. <p>FIRST AID: - Move victim to fresh air. Call emergency medical care.</p> <ul style="list-style-type: none"> - Apply artificial respiration if victim is not breathing. - Administer oxygen if breathing is difficult. - Remove and isolate contaminated clothing and shoes. - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. - Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. 	<p>POTENTIAL HAZARDS FIRE OR EXPLOSION: MAY EXPLODE AND THROW FRAGMENTS 500 METERS (1/3 MILE) OR MORE IF FIRE REACHES CARGO.</p> <p>HEALTH HAZARDS: Fire may produce irritating, corrosive and/or toxic gases.</p> <p>PUBLIC SAFETY: CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, CALL CHEMTREC AT 1-800-424-9300.</p> <ul style="list-style-type: none"> - Isolate spill or leak area immediately for at least 100 meters (330 feet) in all directions. Move people out of line of sight of the scene and away from windows. - Keep unauthorized personnel away and stay upwind. - Ventilate closed spaces before entering. <p>PROTECTIVE CLOTHING: - Wear positive pressure self-contained breathing apparatus (SCBA), and Structural firefighters' protective clothing will only provide limited protection.</p> <p>EVACUATION: LARGE SPILL Consider initial evacuation for 250 meters (800 feet) in all directions.</p> <p>FIRE - If rail car or trailer is involved in a fire, ISOLATE for 500 meters (1/3 mile) in all directions; also, initiate evacuation including emergency responders for 500 meters (1/3 mile) in all directions.</p> <p>CARGO Fires: DO NOT FIGHT FIRE WHEN IT REACHES CARGO! CARGO MAY EXPLODE!</p> <ul style="list-style-type: none"> - Stop all traffic and clear the area for at least 500 meters (1/3 mile) in all directions and let burn. Do not move cargo or vehicle if cargo has been exposed to heat. <p>TIRE or VEHICLE Fires: - Use plenty of water - FLOOD it! If water is not available, use CO2, dry chemical or dirt. If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.</p> <ul style="list-style-type: none"> - Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready. <p>SPILL OR LEAK: - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).</p> <ul style="list-style-type: none"> - All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. - DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 METERS (330 feet) OF ELECTRIC DETONATORS. - DO NOT CLEAN UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST. <p>FIRST AID: - Move victim to fresh air. Call emergency medical care.</p> <ul style="list-style-type: none"> - Apply artificial respiration if victim is not breathing. - Administer oxygen if breathing is difficult. - Remove and isolate contaminated clothing and shoes. - In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. - Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. <p>SUPPLEMENTAL INFORMATION Packages bearing the 1.4S label contain explosive substances or articles that are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments; effects are usually confined to immediate vicinity of packages.</p> <p>If fire threatens cargo area containing packages bearing the 1.4S label, consider initial isolation of at least 15 meters (50 feet) in all directions. Fight fire with normal precaution from a reasonable distance.</p>

DD FORM 836 (BACK), SEP 1998

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ANNEX E
GLOSSARY OF TERMS

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CEHNC	<p>U.S. Army Engineering and Support Center, Huntsville: CEHNC is assisting CESAM in the remedial investigation of Fort McClellan (FTMC) CEHNC is conducting the investigation efforts at locations that may have buried munitions. This includes the sites where CWM may be recovered.</p>
CERCLA	<p>Comprehensive Environmental Response, Compensation, and Liability Act (1980): Also called Superfund; Federal law authorizing identification and remediation of abandoned hazardous waste sites; enforced by U.S. Environmental Protection Agency (USEPA).</p>
CESAM	<p>U.S. Army Corps of Engineers Mobile District: One of the U.S. Army Corps of Engineers geographic districts. CESAM is conducting the remedial investigation of sites at FTMC.</p>
CWM	<p>Chemical Warfare Materiel: Includes chemical weapons, containers, chemical agent identification set (CAIS), and any equipment that may contain or be contaminated with chemical agent.</p>
DHHS	<p>Department of Health and Human Services: Federal department; must approve all plans to destroy or transport chemical agents and munitions; the Centers for Disease Control and Prevention (of DHHS) provide support and guidance for chemical weapons programs.</p>

DoD	U.S. Department of Defense: Federal department responsible for administering military programs to protect the nation from external aggression; includes all of the military services, the Office of the Secretary of Defense, the Office of the Joint Chiefs of Staff, and several defense agencies.
DOT	U.S. Department of Transportation: Federal department; enforces regulations governing the transport of hazardous and nonhazardous materials.
ECBC	U.S. Army Edgewood Chemical Biological Center (formerly Edgewood Research, Development and Engineering Center): ECBC is part of SBCCOM. ECBC will participate in the recovery of CWM by conducting perimeter monitoring, providing laboratory services, and assisting TEU as necessary.
OSHA	Occupational Safety and Health Administration: Federal agency that oversees and regulates workplace health and safety.
PMCD	Program Manager for Chemical Demilitarization (formerly U.S. Army Chemical Demilitarization and Remediation Activity, or USACDRA) (formerly U.S. Army Chemical Materiel Destruction Agency, or USACMDA): Single Army agency responsible for all chemical warfare materiel destruction.
PMNSCM	Product Manager for Non-Stockpile Chemical Materiel: Provides centralized management and direction to Department of Defense program for the reclamation, recovery, and disposal of non-stockpile chemical materiel in a safe, environmentally sound, cost-effective manner; works for the PMCD.

RCRA	<p>Resource Conservation and Recovery Act (1976): Law regulating management and disposal of hazardous materials and wastes currently being generated, treated, stored, disposed, or distributed.</p>
SBCCOM	<p>U.S. Army Soldier and Biological Chemical Command: Army Materiel Command organization responsible for chemical and biological defense issues; includes Army experts in chemical munitions design, defense equipment, decontamination, monitoring, etc.</p>
TEU	<p>U.S. Army Technical Escort Unit: The TEU is part of SBCCOM. The TEU is responsible for escort of chemical surety materiel during transportation; has explosive ordnance disposal (EOD) and transportation expertise; can be used for emergency destruction of chemical ammunition and for emergency response to chemical agent events. The TEU will conduct recovery, transportation, and storage operations for CWM at FTMC.</p>
USEPA	<p>U.S. Environmental Protection Agency: The USEPA is the federal agency responsible for enforcing federal laws and promulgating regulations for protecting the environment. The USEPA ensures that regulations mandated by CERCLA, RCRA, Clean Air Act, etc. are followed.</p>

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ANNEX F
ACRONYMS/ABBREVIATIONS

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ADEM	Alabama Department of Environmental Management
AFFF	aqueous film forming foam
AOC	Area of Concentration
AR	Army regulation
ASP	Ammunition Supply Point
ASTM	American Society for Testing and Materials
BRAC	Base Realignment and Closure
CAI	chemical accident/incident
CAIS	chemical agent identification set
CEHNC	U.S. Army Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAM	U.S. Army Corps of Engineers, Mobile District
CFR	Code of Federal Regulations
CG	phosgene
CK	cyanogen chloride
CPR	cardiopulmonary resuscitation
CWM	chemical warfare materiel
DA	Department of the Army
DAAMS	Depot Area Air Monitoring System
DHHS	Department of Health and Human Services
DoD	Department of Defense
DOT	Department of Transportation

ECBC	Edgewood Chemical Biological Center
EOC	emergency operations center
EOD	explosive ordnance disposal
ERDEC	Edgewood Research, Development and Engineering Center
FTMC	Fort McClellan
GA	tabun
GB	sarin
GC	gas chromatograph
H	mustard
HA	hazard analysis
HD	distilled mustard
HN-1	nitrogen mustard
IDS	intrusion detection system
IHF	interim holding facility
L	lewisite
MCE	maximum credible event
mg/m ³	milligram per cubic meter
MIL-STD	Military Standard
MRC	multiple round container
MSDS	Material Safety Data Sheet
NFPA	National Fire Protection Association
NRT	near real-time
NSCM	non-stockpile chemical materiel
NSCMP	Non-Stockpile Chemical Materiel Project

OSHA	Occupational Safety and Health Administration
Pam	pamphlet
PAO	Public Affairs Office
PINS	portable isotopic neutron spectroscopy
PMCD	U.S. Army Program Manager for Chemical Demilitarization
PMNSCM	Project Manager for Non-Stockpile Chemical Materiel
POIO	Public Outreach and Information Office
PPE	personal protective equipment
PS	chloropicrin
RAC	risk assessment code
RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
SBCCOM	U.S. Army Soldier and Biological Chemical Command
SOP	standing operating procedure
SSHP	Site Safety and Health Plan
SSMP	System Safety Management Plan
TEU	U.S. Army Technical Escort Unit
TM	technical manual
TP	Technical Provision
TWA	time-weighted average
USACDRA	U.S. Army Chemical Demilitarization and Remediation Activity
USACMDA	U.S. Army Chemical Materiel Destruction Agency
UL	Underwriters Laboratories
USEPA	U.S. Environmental Protection Agency

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ANNEX G
REFERENCES

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ANNEX H
QUESTIONS AND ANSWERS FOR
FTMC IHF PLAN

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Q: What items might be recovered at Fort McClellan?

A: *The items that might be recovered include chemical warfare items that were used to train soldiers at Ft. McClellan. The types of items may include ampules or bottles containing small amounts of mustard agent, lewisite or nitrogen mustard, a drum containing up to 5 gallons of mustard agent, and a 155mm projectile or a 4.2-inch mortar round containing mustard agent, nerve agent, or the industrial chemical phosgene.*

Q: What were the items used for?

A: *The items were used to train soldiers to handle chemical munitions and to identify and decontaminate objects contaminated with chemical agent.*

Q: Why are the items being dug up?

A: *As part of the Army's efforts to clean up pollution caused by past activities and to make the land at Fort McClellan available for reuse after the installation closes, the Army is investigating locations where it is known or suspected that chemical agents may have been used. Any items containing chemical agents that are discovered during the investigation efforts will be recovered and stored in the interim holding facility.*

Q: Is there any danger to the public?

A: *There is very little danger to the public during the recovery, onsite transport, or storage of these items. The items are being recovered from isolated areas of the installation and will be packaged inside of containers specially designed to contain chemical agents before they are brought to the storage facility which will be located in a remote area and is surrounded by a fence.*

Q: What will happen to the items once they are recovered?

A: *As part of the recovery process, the Technical Escort Unit (highly trained experts in the handling of chemical agents) will assess the items to determine the contents. The assessment will be done using x-rays and other techniques that do not involve opening the items. Any items found to contain chemical agent will be packaged inside of leak-proof steel containers. The items will remain secured inside these containers for as long as they are stored at Fort McClellan.*

Q: How long will the recovered items be stored at Fort McClellan? Ultimately, what will happen to them?

A: *The ultimate disposition of the items is still being determined. The Army ultimately plans to destroy the items.*

Q: If the final disposition is not yet decided upon why are the items being dug up?

A: *Because Fort McClellan is being closed, the Army must clean up polluted areas of the installation to make them available for civilian use. It is considered safer to recover and store any chemical warfare materiel that is found than to leave it in the ground where people might accidentally come into contact with it.*

Q: What government organizations are involved in this project?

A: *In addition to Fort McClellan, five other Army organizations will play a significant role in this project. The U.S. Army Corps of Engineers, Mobile District is the cleanup contractor. They are conducting the investigation for FTMC. The U.S. Army Engineering and Support Center, Huntsville will be conducting the investigation of sites on FTMC where chemical warfare materiel may be found. The Program Manager for Chemical Demilitarization is in charge of ensuring that recovered chemical warfare materiel is handled, transported, and stored in a manner that is safe to the public and the environment. The U.S. Army Technical Escort Unit is the group of Army experts who will actually perform the work of recovering the chemical warfare materiel, packing it into leak proof containers, and transporting it to the storage facility. Finally, the U.S. Army Edgewood Chemical Biological Center, in addition to providing laboratory services, will, together with the Technical Escort Unit, conduct monitoring to ensure worker and public safety.*

Q: Who can we contact for more information?

A: *For questions about the remedial investigation, contact the Fort McClellan Public Affairs Office, Mr. Hershel Chapman, 256-848-5574, chapmanh@mcclellan-emhz.army.mil, the Engineering and Support Center, Huntsville, Public Affairs Office, Mr. Bob DiMichele, 256-895-1691. For information about the storage and transport of chemical warfare materiel, contact the Project Manager for Non-Stockpile Chemical Materiel, Public Outreach and Information Office, Mr. Bob Jones, 800-488-0648 or, or e-mail rjones@c-pmcd.apgea.army.mil.*

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