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MILITARY STANDARD

PROTECTIVE COMPOUNDS (FOR PERSONNEL)

FSC 6850

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DEPARTMENT OF DEFENSE
Washington, D.C. 20301

Protective Compounds (For Personnel)

MIL-STD-1221A

1. This Military Standard is approved for use by all Department and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research and Development Command, Attn: DRDAR-TSC-S, Aberdeen Proving Ground, MD 21010, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FOREWORD

This book format standard on protective compounds (for personnel) is approved for use by all departments and agencies of the Department of Defense in the selection of items for application. It is intended to prevent the entry of unnecessary items (sizes, types, varieties) into the Department of Defense logistics system. This is not a procurement document.

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1. SCOPE

1.1 Coverage. This standard is a presentation of nomenclature, symbols, physical and chemical properties and requirements, military and typical commercial uses, directions for use, packaging data, labeling, general safety precautions, storage information, disposal data, toxicity data and shelf life of all military standard protective compounds (for personnel). This standard does not necessarily include all classifications of the items represented by the title or those which are commercially available. It does contain items preferred for use in the selection of protective compounds (for personnel) for application by the Department of Defense. This standard covers the following items:

NAME	NO. OF ITEMS
ANTISETTING COMPOUND, DECONTAMINATING SLURRY, M2	1
DECONTAMINATING AGENT	1
DECONTAMINATING AGENT, STB	1
DECONTAMINATING AGENT, DS2	2
DECONTAMINATING AGENT, ETHYLENE OXIDE	1
IMPREGNITE	1
SKIN PROTECTIVE COMPOUND	1

1.2 Application. Items listed herein accommodate essential requirements of the military and defense agencies and will effect continued economies, in all logistic functions when properly employed in new applications.

2. REFERENCED DOCUMENTS

The issue of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

Federal Specifications

O-T-236	Tetrachloroethylene (Perchloroethylene) Technical Grade
P-S-411	Skin Protective Compound, Chemical Barrier
VV-B-231	Benzene, Technical
VV-C-846	Cutting, Fluid, Emulsifiable Oils
VV-C-850	Cutting Oil, Sulfurized-Fatty-Mineral
VV-G-76	Gasoline Automotive
VV-O-251	Oil; Cutting, Mineral-Fatty-Oil-Blend
PPP-C-300	Chemicals, Liquid, Packaging and Packing of
PPP-C-301	Chemicals, Dry and Paste, Packaging and Packing of

Military Specifications

MIL-A-51027	Antisetting Compound, Decontamination Slurry, M2

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MIL-C-7907	Cleaning Compound, Decontaminating
MIL-C-15203	Coating Compound, Bituminous, Emulsion Type, Coal Tar Base
MIL-D-12468	Decontaminating Agent, STB
MIL-D-14258	Drum, Fiber, 20-Gallon Capacity, For Chemicals
MIL-D-22365	Decontaminating Agent, Ethylene Oxide
MIL-D-50030	Decontaminating Agent, DS2
MIL-I-00285	Impregnite, Unstabilized and Stabilized
MIL-P-15011	Pallet, Material Handling, Wood, Post Construction, 4-Way Entry

Military Standards

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized and Containerized Unit Loads 40 Inch x 48 Inch Pallets, Skids, Runners or Pallet Type Base

Supply Bulletins

SB 3-30-226	Decontaminating Agent, STB, Serviceability Standard
SB 3-30-282	Commercial Chemicals Serviceability Standard

Other Publications

The Aldrich Catalog Handbook of Fine Chemicals
Handbook of Chemistry and Physics
Dangerous Properties of Industrial Materials - N. Irving Sax
Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment

Rules and Regulations

TB MED 223	Respiratory Protection Program

3. GLOSSARY

3.1 Definitions.

Centistoke - One one-hundredth of a stoke. Stoke, the kinematic unit of viscosity, is equal to the viscosity in poises divided by the density of the fluid in grams per cubic centimeter, both measured at the same temperature.

Fire point - The temperature to which a substance must be heated under specific conditions to burn continuously when the mixture of vapor and air is ignited by a specified flame.

Flash point - The temperature to which a substance must be heated under specific conditions to give off sufficient vapor to form a mixture with air that can be ignited momentarily by a specified flame.

Miscible - The property of liquids which enable them to be mixed in all proportions.

Sublimation - The changing of a solid to a vapor without a liquid phase.

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3.2 Abbreviations. The same abbreviation is used for all tenses, the possessive case and the singular and plural forms of a given work.

ACS - American Chemical Society

C - Celsius

DOT - Department of Transportation

cp - centipoises

F - Fahrenheit

g - gram

max - maximum

min - minimum

NO. - Number

oz - ounce

Porm - Plus or Minus

SB - Supply Bulletin

4. GENERAL REQUIREMENTS

4.1 Chemical and physical requirements. All values given in the tables of chemical and physical requirements and formulations are in maximum percent by weight unless otherwise indicated.

4.2 Nomenclature. Department of Defense item names, as used throughout this standard are in capital letters. Other names, that are sometimes used commercially, are in small letters immediately beneath.

4.3 Packaging data and labeling. All chemicals included in this standard shall be packaged in accordance with Federal Specification PPP-C-300 and PPP-C-301 and all applicable documents mentioned in this specification.

4.4 Safety Personal Protective Measures. a. Respiratory Protection. Respirators approved by NIOSH for the particular substance being used, should be used for intermittent exposure or for supplementing other control measures (refer to TB MED 223). b. Skin Protection. Personnel should be provided with and required to use impervious gloves, sleeves, aprons and goggles when indicated. Protective creams and ointments commonly known as "barrier creams", may be of value. For more specific information on personal protective measures and environmental controls, contact the appropriate safety or medical authorities.

4.5 Shelf life. Factors such as moisture, temperature, type and condition of container, exposure to sunlight, and the atmosphere cause variations in shelf life. Ideal storage conditions are outlined for each item. An approximate period of time after which the material will no longer be suitable

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for its intended use is also presented. Where definite shelf life has been established the approximate period of stability is shown. For instance decontaminating agent STB has a shelf life of approximately 12 years from the date of manufacture, and impregnite XXCC3 is given at approximately 25 years. The balance of the compounds have an indefinite shelf life which is generally related to the rate of deterioration of the containers and closures. It is recommended that SB 3-30-282, Commercial Chemicals Serviceability Standard, be followed. Where moisture, humidity, or temperature extremes are factors, these are listed as precautions, which if not followed, will contribute to a more rapid deterioration of the product. Periodic examinations of the material should be made more frequently when storage conditions vary from the ideal.

4.6 Temperature. If the temperature at which a property was determined is not specified, it is understood to be room temperature (20 to 30°C or 68 to 80°F).

4.7 Use data. Typical military and commercial uses are given.

4.8 Pollution potential. All items described in this MIL-STD should be assumed to have a pollution potential, however, to minimize this potential, use, storage and disposal instructions must be strictly observed.

4.9 Disposal. Disposal guidelines in section 5 will be limited to spills and leaks of issue. For assistance on large spills that grossly contaminate the environment call, toll free, the Chemical Transportation Emergency Center (CHEMTREC) at 800-424-9300. Before applying the disposal methods for each section, it should be coordinated with the installation's Environmental Coordinator for the applicability to state and local requirements. In all cases where the wastes are to be collected, stored, transported and disposed of at a state or local permitted disposal facility, every effort must be made to retain the identity of the waste. Should excess or unserviceable material occur, dispose of the material as outlined in the Defense Utilization Manual, DOD 4140.34-M or the Defense Disposal Manual, DOD 4160.21M. Prior to initiating disposal procedures as outlined in each part of this MIL-STD, the items should be reported to the local Property Disposal Office (PDO) as outlined in DOD 4160.21-M.

4.9.1 Ultimate disposal. Contact the installation's Environmental Coordinator on the appropriate method to use. The options available are:

4.9.1.1 Land burial. Use a permitted chemical waste landfill, designed, constructed and operated in accordance with the rules and regulations promulgated under the Authority of the Resource Conservation and Recovery Act (PL 94-580, Subtitle C, Hazardous Waste Management).

4.9.1.2 Neutralization. Neutralize to pH 6-8 using a neutralizing solvent as specified by the Environmental Coordinator. Dilute as appropriate with clean tap water and discharge to the sanitary sewer in accordance with the requirements in section 402 of the Clean Water Act (PL 95-500), titled National Discharge Elimination System (NPDES).

4.9.1.3 Incineration. Disposal operations involving the atomization of materials into an incinerator should be coordinated with the appropriate facility's engineering and safety offices. Care should be taken to eliminate or minimize exposure to toxic materials as well as fire or explosion hazards. Proper atomization equipment and controls should be employed to insure that incinerator design temperatures are not exceeded.

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4.9.1.4 Container disposal. All containers shall be emptied and punctured before incineration to prevent explosion.

4.9.1.5 Spill cleanup of liquid mixtures. To preclude additional problems from spilled or leaking liquids, dike around the item with an inert, dry absorbent (e.g. clay, sawdust or vermiculite). Segregate salvagable materials away from the spill area and initiate waste cleanup operations immediately. Cover the residue with dry absorbent and let stand until contaminated dry absorbent and contaminated containers can be safely handled and transported to an approved disposal site. Packaging, labeling, transportation and recordkeeping requirements for this waste material are determined by the State. It is recommended therefore, that all activities involving disposal preparation and transportation be properly coordinated with the appropriate state office(s) responsible for health and environmental aspects of hazardous materials.
NOTE: It is imperative that the description of the waste and the exact chemical identity from the original label accompany at all times the packaged waste. Final disposal of the waste item should be accomplished at a facility permitted by the appropriate state office to incinerate, bury, or recycle the specific chemical wastes.

4.10 DISCLAIMER. RECOMMENDED DISPOSAL INSTRUCTIONS IN SECTION 5 ARE FORMULATED FOR USE BY ELEMENTS OF THE DEPARTMENT OF DEFENSE. THE UNITED STATES OF AMERICA IN NO MANNER WHATSOEVER EITHER EXPRESSLY OR IMPLIEDLY WARRANTS, STATES OR INTENDS SAID INSTRUCTION, TO HAVE ANY APPLICATION, USE OR VIABILITY BY OR TO ANY PERSON OR PERSONS OUTSIDE THE DEPARTMENT OF DEFENSE OR ANY PERSON OR PERSONS CONTRACTING WITH ANY INSTRUMENTALITY OF THE UNITED STATES OF AMERICA AND DISCLAIMS ALL LIABILITY FOR SUCH USE. ANY PERSON USING THESE INSTRUCTIONS WHO IS NOT A MILITARY OR CIVILIAN EMPLOYEE OF THE UNITED STATES OF AMERICA SHOULD SEEK COMPETENT PROFESSIONAL ADVICE TO VERIFY AND ASSUME RESPONSIBILITY FOR THE SUITABILITY OF THESE INSTRUCTIONS TO THEIR PARTICULAR SITUATION REGARDLESS OF SIMILARITY TO A CORRESPONDING DEPARTMENT OF DEFENSE OR OTHER GOVERNMENT SITUATION.

5. DETAIL REQUIREMENTS

5.1 Name. ANTISETTING COMPOUND, DECONTAMINATING SLURRY, M2

5.1.1 Specifications. MIL-A-51027, Antisetting Compound, Decontamination Slurry, M2.

5.1.2 Technical description. Antisetting compound, decontaminating slurry shall be a thoroughly blended mixture of citric acid, anhydrous, sodium tripolyphosphate and calcium oxide in the quantities shown in Table I.

TABLE I. - Formulation of Antisetting Compound, Decontaminating Slurry, M2

Ingredients	Percent by Weight
Calcium oxide	3.0±0.2
Citric acid (anhydrous)	46.5±1.0
Sodium tripolyphosphate	50.5±1.0

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5.1.3 Use data. Antisetting compound agent is intended for military use in retarding settling and setting in decontaminating agent slurry mix. In cold weather, the M2 antiset prevents the slurry from settling and setting in the lines and tank.

5.1.4 Packaging data and labeling. For military use decontaminating agent, M2 will be packaged in 12½ lb ± 2 oz (5670 ± 57 g) heat sealable bags fabricated from barrier material conforming to class 1 of MIL-B-131 except that the heat-sealable ply in contact with the contents shall be restricted to polyethylene. In addition to any special marking required by the contract or order, unit packages shall be marked in accordance with MIL-STD-129.

5.1.5 Safety precautions. When antiset material comes in contact with skin, wash it off with water for at least 15 minutes. For additional precautions see section 4.4.

5.1.6 Storage data. Antiset material is a powder packaged in a polyethylene bag which is further contained in a fiber can. There are no temperature restrictions in the storage of this material. The containers must be kept dry or deterioration of the product may occur. When stored in this manner, the shelf life is indefinite.

5.1.7 Disposal. For appropriate disposal procedures contact the installation's Environmental Coordinator (see section 4.9). Items requiring ultimate disposal should be transferred to an installation or municipality with a sewage treatment plant capable of phosphate removal.

5.2 Name. DECONTAMINATING AGENT

5.2.1 Specifications. MIL-C-7907, Cleaning Compound, Decontaminating.

5.2.2 Technical description. This compound is a formulation of ingredients, shown in Table II. It is soluble in water, hard water and sea water. It causes no discoloration, corrosive chemical attack or other deterioration in decontaminating and cleaning, finished and unfinished aircraft surfaces.

TABLE II. - Typical Formulation of Decontaminating Agent

Ingredient	Percent by Weight
Alkyl aryl polyether alcohol	10
Borax (sodium borate)	10
Carboxymethylcellulose	5
Sodium hexametaphosphate ($Na_6P_6O_{18}$ technical)	10
Sodium tripolyphosphate (anhydrous, $Na_5P_3O_{10}$ technical)	30
Sodium xylenesulfonate	5
Tetrasodium pyrophosphate (anhydrous)	10
Trisodium phosphate	20

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5.2.3 Use data. This compound is intended for military use in the general cleaning and decontaminating of metallic surfaces including aircraft, and is primarily intended for use in solutions of water of any hardness, as well as sea water.

5.2.4 Packaging data and labeling. Unless otherwise specified 50 pounds (22,700 g) of the cleaning compound shall be packaged in a metal pail. Unit packages shall be durably and legibly marked in accordance with MIL-STD-129. In addition each unit container shall be marked with the following:

(a) Manufacturer's directions for use.
(b) Consult NAVWEPS 01-1A-506, Aircraft Maintenance Cleaning, for additional decontaminating procedures.
(c) The lot number and date of manufacture.

5.2.5 Safety precautions. This material is not poisonous nor is it flammable. If the cleaning compound should come in contact with skin, wash it off with water for at least 15 minutes. For additional precautions see section 4.4.

5.2.6 Storage data. This cleaning compound consists of finely ground powders that will remain stable and which are not subject to any abnormal change with age providing the sealed containers remain intact. Care must be observed to store this item in dry warehouses where protection from precipitation and other moisture is afforded.

5.2.7 Disposal. For appropriate disposal procedures contact the installation's Environmental Coordinator (see section 4.9). Items requiring ultimate disposal should be transferred to an installation or municipality with a sewage treatment plant capable of phosphate removal.

5.3 Name. DECONTAMINATING AGENT, STB

5.3.1 Specifications. MIL-D-12468, Decontaminating Agent, STB.

5.3.2 Technical description. STB (supertropical bleach) decontaminating agent shall be prepared by mixing calcium oxide with bleaching powder (chlorinated lime). The bleaching powder shall have a maximum moisture content of 3.0 percent. Calcium hypochlorite (high test hypochlorite) shall not be used as a substitute for the bleaching powder.

TABLE III. - Physical and Chemical Requirements of Decontaminating Agent, STB

Property	Limits, Percent Min.	Max.
Available chlorine	28.0	---
Calcium oxide	3.0	6.0
Iron as ferric oxide	---	0.2
Loss of available chlorine	---	4.0
Moisture	---	1.0
Particle size through No. 14 sieve	98.0	---
Particle size through No. 30 sieve	60.0	---

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5.3.3 Use data. Decontaminating agent, STB is intended for military use in destroying or converting certain chemical warfare agents into harmless or less toxic compounds. It is a decontaminant for biological warfare agents. STB is used in the dry state by spreading it over contaminated surface. More effective decontamination results when a slurry of 40 parts bleach and 60 parts water (by weight) is sprayed or swabbed on contaminated surfaces. When used in dry form, STB should be mixed with earth in the proportions of two parts of STB and three parts of earth, thoroughly mixed. When applied to liquid mustard gas, the reaction is so violent that the liquid mustard bursts into flames and the heat generated causes a high concentration of mustard vapor in the area.

5.3.4 Packaging data and labeling. The material shall be packaged in 50 pound (22,700 g) unit quantity (8 gallon) (30.4 l) olive green enamel drums. The head and shell of each container shall be marked in yellow for identification of the contents as follows:

DECONTAMINATING AGENT, STB
FOR STORAGE IN ALL CLIMATES

In addition each container head shall be marked as follows:

a. Date of Manufacture_____.
b. Store in a dry place. Inspect periodically for breaks in paint film. Clean bare spots and paint with acid-proof black paint.

Each container shall be marked between the rolling hoops with the following instructions:

DECONTAMINATING AGENT, STB
MIXING INSTRUCTIONS

FOR BUCKET MIXTURE - Dissolve one measuring cup (3 ounces) (84 g) antiset M2 (MIL-A-51027) in a 2¼ gallons (18 pounds) (8.5 l) of water. Add three shovelfuls (18 pounds) (8,172 g) of STB. Mix thoroughly. Apply with swab or broom.

FOR EARTH MIXTURE - Add two shovelfuls of STB to three shovelfuls of earth or sand. Mix thoroughly. Apply with shovel.

FOR POWER DRIVEN DECONTAMINATING APPARATUS - Complete mixing directions are included in manual furnished with the apparatus.

In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with MIL-STD-129.

5.3.5 Safety precautions. Personnel working with decontaminating agent, STB should be adequately protected against the destructive effects of the material. This material is dangerous to both eyes and lungs. If it comes in contact with eyes or skin, wash with copious amounts of water and call a physician immediately. Do not allow this material to come in contact with acids, non-mineral or easily burnable material. STB is not combustible but it evolves chlorine and at high temperatures, oxygen. For additional precautions see section 4.4.

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5.3.6 Storage data. STB is a powder which will cake when exposed to excessive moisture. It is not affected greatly by temperature variations provided the containers are properly sealed and the paint on the outside of the containers remains intact. STB should be stored where the greatest protection from moisture is afforded. Serviceability standards and surveillance inspection are contained in the Department of Defense SB 3-30-226. However, if this material is stored under adverse climatic conditions surveillance shall be reduced to six months. Provided containers and closures are not broken or corroded, this material will remain in serviceable condition 10 or more years from the date of manufacture.

5.3.7 Disposal. For the appropriate disposal methods contact the installation's Environmental Coordinator (see section 4.9). One method of disposal is to neutralize the mixture with an appropriate neutralizing agent. Dilute as appropriate with clean tap water and discharge to the sanitary sewer in accordance with the requirements in section 402 of the Clean Water Act (PL 95-500), titled National Pollution Discharge Elimination System (NPDES).

5.4 Name. DECONTAMINATING AGENT, DS2
(HAZARDOUS)

5.4.1 Specifications. MIL-D-50030, Decontaminating Agent, DS2.

5.4.2 Technical description. Decontaminating Agent, DS2 is a homogeneous mixture of the materials specified in Table IV.

TABLE IV. - Composition of DS2

Material	Conforming to	Percent by Weight
Diethylenetriamine (specific gravity 0.950 g/cm^3)	D-D-1271	69.0 to 71.0
Sodium hydroxide, ACS grade except that sodium carbonate content shall be no greater than 0.5% by weight	----	1.90 to 2.10
Ethylene glycol monomethyl ether	D-E-780	Remainder

TABLE V. - Physical and Chemical Properties of Decontaminating Agent, DS2

Form	Solution
Flash point, min	168°F (76°C)
Reactivity, mg of chloroform, min	350
Specific gravity (25/25°C) g/cm^3	0.970 to 0.980
Suspended matter, max	
Before heating	0.15 percent by volume
After heating	0.20 percent by volume
Viscosity, cps at -30°C, max	420

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5.4.3 Use data. The material covered by this standard is intended for use as a decontaminating agent for rendering persistent chemical agents harmless.

5.4.4 Packaging data and labeling. This material is packaged for military use in one and one-third quart (1.3 l) unit quantity round metal cans and 5 gallon (19 l) unit quantity pails. Unit packages and shipping containers shall be marked in accordance with MIL-STD-129. In addition, each container shall be conspicuously marked as follows:

CAUTION-CAUSTIC LIQUID
Avoid inhaling vapors.
Avoid contact with skin or clothing.
In case of contact, blot off with rag
and flush with water.

Instructions:

This solution is to be used for filling hand decontamination apparatus. Solution can be applied directly to contaminated surfaces with swab, brush or broom.

5.4.5 Safety precautions. Decontaminating agent, DS2 is a caustic material. Avoid contact with skin and clothing. If contact should occur, blot off the area with a rag and flush with copious amounts of water for at least 15 minutes. Avoid inhaling the vapors. For additional precautions, see section 4.4.

5.4.6 Storage data. Store packages of decontaminating agent, DS2 in a protected warehouse where the packages are not subject to extreme heat or exposure to 168°F (76°C). The solution has a flash point of 168°F (76°C) and is a caustic liquid. Moisture will deteriorate the metal containers, so it is imperative that they be kept dry. Leaking or broken containers should be withdrawn when discovered. Store this product carefully to avoid damage to the containers. The shelf life is indefinite provided the containers and closures remain intact.

5.4.7 Disposal. For appropriate disposal procedures, contact the installation's Environmental Coordinator (see section 4.9). If a DS2 spill or leak should occur, it should be handled like an oil spill. Open buring is prohibited. To preclude further contamination by the spilled or leaking liquids dike around the item with an inert dry absorbent (e.g. clay, sawdust or vermiculite). Segregate salvagable materials away from the spill area and initiate waste cleanup operations immediately. Cover the residue with dry absorbent and let stand until the liquid is completely absorbed and package all contaminated dry absorbent and contaminated containers in such a manner that the waste item can be safely handled and transported to an approved disposal site. Packaging, labeling, transportation and record keeping requirements for this waste material are determined by the State. It is recommended therefore, that all activities involving disposal preparations and transportation be properly coordinated with the appropriate state office(s) responsible for health and environmental aspects of hazardous materials.
NOTE: It is imperative that the description of the waste and the exact chemical identity of the original label accompany at all times, the packaged

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waste. Final disposal of the waste should be accomplished at a facility approved by the appropriate federal, state or local regulatory agency to incinerate, utilizing an afterburner and be accomplished in accordance with the installation's Spill Contingency Plan. Examples of approved regulatory agencies are: Federal - EPA; State - Bureau of Sanitation, AZ; Air Quality and Solid Waste Program, SD; Solid Waste Administration, DC; and Solid Waste Management Service, GA. Before a disposal procedure is initiated, the possibility of reutilization must be considered.

5.5 Name. DECONTAMINATING AGENT, ETHYLENE OXIDE (HAZARDOUS)

5.5.1 Specifications. MIL-D-22365, Decontaminating Agent, Ethylene Oxide, (In 12 ounce Dispenser, Aersol Type, M10).

5.5.2 Technical description. Ethylene oxide is a colorless liquid which is soluble in water. Also present in the dispenser is a propellant mixture of dichlorodifluoromethane and trichlorofluoromethane as specified in Table VI. The moisture in the solution shall not be more than 0.05 percent.

TABLE VI. - Formulation of Ethylene Oxide, 12 Ounce (0.36 l) Dispenser

Ingredients	Conforming to	Percent by Weight
Ethylene oxide	MIL-E-52171	12.0 porm 0.2
Propellant mixture		
55 percent dichlorodifluoromethane	BB-F-1421, type 500	
45 percent trichlorofluoromethane	BB-F-1421, type II	88 porm 0.2

5.5.3 Use data. Decontaminating agent, ethylene oxide in a 12 ounce (0.36 l) aerosol dispenser is used primarily for decontaminating clothing exposed to biological agents. It is designed for use in a gas tight sealed bag where clothing is placed together with the dispenser.

5.5.4 Packaging data and labeling. For military use 405 g porm 5 g of the decontaminating agent shall be packaged in a metal 12 ounce (0.36 l) aerosol type dispenser having a break-off valve. Exterior shipping containers shall be marked in accordance with MIL-STD-129. In addition the exterior shipping containers shall also be marked with the month and year of filling and the following:

> Contents: Nonflammable mixture of ethylene oxide, dichlorodifluoromethane and trichlorofluoromethane. DO NOT STORE IN TEMPERATURES OVER 54°C (130°F).

The following applicable information shall be legibly lithographed, embossed, roller coated or stamped on the container body using weather-resistant, noncorrosive enamel, lacquer or ink. Marking shall be registered as required by the Federal Insecticide, Fungicide and Rodenticide Act.

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DECONTAMINATING AGENT, ETHYLENE OXIDE (IN 12 OUNCE DISPENSER AEROSOL TYPE)

Stock No._____
Specification No._____
Net and Gross Weights_____
Month and Year of Filling_____

For use in Gas Tight Sealed Bag for Decontamination of Clothing Exposed to Biological Agents.

ACTIVE INGREDIENT

Ethylene Oxide.....12.0 Percent by Weight

INACTIVE INGREDIENT

Propellant Mixture.....88.0 Percent by Weight
(55 Percent Dichlorodifluoromethane)
(45 Percent Trichlorofluoromethane)

CAUTION!

"Vapor Harmful. May cause burns. Keep away from heat, sparks and flames.
Avoid breathing vapor. Avoid contact with skin, eyes and clothing.
In case of contact, immediately remove all contaminated clothing including shoes, and flush skin or eyes with water for at least 15 minutes; for eyes get medical attention."

DIRECTIONS FOR USE -

Place all clothing except the gas mask and cannister into a gas tight 6 mil polyethylene bag. Care should be taken to place the clothing in the bag in a loose manner. Place the dispenser inside the bag. Seal the bag by twisting and tying. Break off stem of dispenser valve releasing the ethylene oxide and allow the bag to remain sealed for at least 6 hours at 21 degrees C (70 degrees F) or above. Clothing may then be removed and aired for 1 to 2 hours. Plastic, rubber, and leather components should be aired for 24 hours prior to use. Plastic materials should not be exposed to direct discharge of the dispenser. The decontamination operation should not be performed in temperatures lower than 21°C (70°F), unless unavoidable, since the effectiveness of the decontaminating agent is reduced at lower temperatures.

Name of Supplier:_____
Contract No:_____

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5.5.5 Safety precautions. Liquid ethylene oxide, concentrated or diluted, when exposed to the skin can cause severe delayed burns. Short exposures produce mild first degree burns, but prolonged exposures produce second degree burns with the formation of large blisters. Exposure to the vapor results in systemic manifestations and irritation to the respiratory system. Inhalation of ethylene oxide vapors, if prolonged, results in severe systemic poisoning with the symptoms of nausea, vomiting, headache and diarrhea. The anesthetic properties are similar to cloroform, but with pronounced undesirable side and after effects. The TLV for ethylene oxide is 90 mg/m^3.

5.5.6 Storage data. Do not store this product in areas where the temperature will exceed 130°F (54°C). Copper or other acetylide forming metals such as silver, magnesium, and alloys of such metals should not be used to handle or store ethylene oxide because of the danger of the possible presence of acetylene. In the presence of certain catalyst liquid ethylene oxide forms a polycondensate. The reaction will produce heat. If the heat of the reaction is sufficient, it will cause the containers to burst. Acid salts, such as stannic chloride and zinc chloride, and bases such as alkali metal hydroxides and tertiary amines are effective catalysts. It is therefore, imperative that the concentration of such contaminants be kept at a minimum when transporting or storing sizable quantities of ethylene oxide. The specified quantities of chlorofluorohydrocarbons shown in Table VI materially reduce the explosion hazard. Control storage of the cartons containing the dispensers so that the height of the stacks will not exceed safe limits and cause the bottom containers to be crushed. Provided the containers are not deteriorated and temperatures below 130°F (54°C) are maintained, this item has an indefinite shelf life.

5.6 Name. IMPREGNITE
(HAZARDOUS)

5.6.1 Specifications. MIL-I-00285, Impregnite, Unstabilized and Stabilized.

5.6.2 Technical description. There are two compositions of impregnites. Impregnite (CC2) is unstabilized. Impregnite XXCC3) is stabilized and contains the same ingredients plus the addition of zinc oxide.

TABLE VII. - Chemical Characteristics of CC2, Impregnite

Characteristic	Percent by Weight Minimum	Maximum
Volatile matter	---	0.20
Chloroform insoluble (dry basis)	---	4.25
Chlorides as NaCl (dry basis)	---	0.50
Active chlorine (dry, chloroform-soluble basis)	14.2	14.6
Hydrolytic stability (loss of active chlorine)	---	5
Water soluble active chlorine compounds (as micrograms per ml of iodine released)	---	1.5

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TABLE VIII. - Chemical Characteristics of XXCC3 Impregnite

Characteristic	Percent by Weight Minimum	Maximum
Volatile matter	---	0.18
Active chlorine (dry, chloroform-soluble basis)	14.2	14.6
Zinc oxide content	8.1	10.1
Chloroform insolubles (dry basis, including zinc oxides)	8.1	13.9

5.6.3 Use data. Unstabilized (CC2) impregnite is intended for military use in the preparation of stabilized impregnite. Stabilized (XXCC3) impregnite is intended for military use in the impregnation of clothing for protection against the action of vesicant type chemical agents.

5.6.4 Packaging data and labeling. For military use CC2 impregnite and XXCC3 are both packaged in 75 pound (34,050 g) drums conforming to specification MIL-D-14258. Each container shall be marked in accordance with MIL-STD-129 and applicable Interstate Commerce Commission regulations. Each drum shall be marked as shown on drawing C6-16-1 and as follows:

a) Using 2 inch high letters, place the marking "DO NOT STORE ABOVE 120°F (49°C)" in three locations on the drum, approximately 4 inches above the regular marking, diametrically opposite, and on the top of the drum.

b) Using letters of 1 inch minimum height, mark the drum as follows: "KEEP AWAY FROM OPEN FIRES AND ALL HEATED SURFACES; AVOID INHALATION OF FUMES".

c) The precautionary marking specified in (a) and (b) shall not interfere or obscure other marks on the drum.

5.6.5 Safety precautions. Impregnite has the hazardous property of generating heat transfer when containers are stored within 6 inches of each other. Proximity to open fires and temperatures in excess of 120°F (49°C) should be avoided. Inhalation of the fumes should be avoided. For additional precautions see section 4.4.

5.6.6 Storage data. Prolonged storage of impregnite without proper ventilation is conducive to spontaneous combustion. Thermal decomposition of XXCC3 impregnite is easily initiated and if it is packed in thin walled containers and compactly stored in a closed room, the heat transferred from one container to the next is sufficient to propagate the decomposition, thereby causing a storage hazard. In order to minimize storage hazards the following precautions shall be observed:

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(a) Railroad cars of XXCC3 impregnite should not be allowed to stand in the general vicinity of the micronizing plant.

(b) Filled drums of XXCC3 impregnite shall be placed on a pallet with the drums positioned so that they will be no less than six inches apart and no less than six inches from a wall.

(c) If loaded pallets of XXCC3 impregnite are stacked in tiers, the vertical space between drums should be alternately 6 inches and 24 inches, with six inches between drums in the first and second tiers. Supports should be provided for the pallets so that no tier of containers will support more than one tier of containers stacked above it.

(d) Place a placard carrying a warning to keep the XXCC3 impregnite away from open fire and all heated surfaces on or near each exposed side of storage area.

(e) When specified in the contract or order, drums shall be palletized in accordance with the requirements for load type XIII of MIL-STD-147 utilizing pallets conforming to MIL-P-15011.

5.6.7 Disposal. For appropriate disposal procedures, contact the installation's Environmental Coordinator (see section 4.9). One method of disposal is to take the waste to a permitted chemical waste landfill.

5.7 Name. SKIN PROTECTIVE COMPOUND, CHEMICAL BARRIER

5.7.1 Specifications. P-S-411, Skin Protective Compound, Chemical Barrier.

5.7.2 Technical description. The ingredients used in the manufacture of skin protective compounds furnished under this specification shall conform to the standards set forth in the Federal Food, Drug and Cosmetic Act. The product shall be homogeneous, soft in texture and free from grit. It shall be such consistency that at temperatures of 40°F (4°C) to 100°F (37.8°C), it will apply readily to the skin to form a flexible, adhering film which shall not be sticky, stiff or greasy. The compound shall be readily removable from the skin with soap and warm water. It shall present no objectionable odor during and after application to the skin. Skin protective compounds are divided into four separate areas in order to afford a more encompassing range of protection. There is a water dispersible preparation containing no fats or oils, for protection against staining and adhering compounds; a water miscible preparation for protection against hydrocarbons, oils and solvents; a water insoluble preparation for protection against dilute acids, alkalies and other water miscible chemicals; and water soluble preparation for protection against dilute acids, alkalies and other miscible chemicals. Skin protective compounds shall be nonirritating, not harmful, and nonsensitizing by normal standards.

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TABLE IX - Specific Challenging Agents

Protective Compound	Challenging Material	Specification Number	Indicator	Color
For water dispersible preparation	Bituminous emulsion coating	MIL-C-15203	None	Black or Brown
For water miscible preparation	Gasoline automotive	VV-G-76	None	Color of challenging fluid
	Tetrachloroethylene (Perchloroethylene)	O-T-236	Sudan red	Red
	Benzol	VV-B-231	Sudan red	Red
	Cutting oil, soluble	VV-C-846	Sudan red	Red
	Cutting oil, sulfurized-fatty-mineral	VV-C-850	Sudan red	Red
	Oil, cutting, mineral-fatty-oil-blend	VV-O-251	Sudan red	Red
For water insoluble preparation	Hydrochloric acid (ACS) (0.25N)	--------	Bromophenol blue	Yellow
	Sodium hydroxide (ACS) (0.25N)	--------	Phenolphthalein	Red
For water soluble preparation	Dilute acids, alkalies and other miscible chemicals	--------	--------	-------

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5.7.3 Use data. Skin protective compounds are intended for military use on human skin to protect against injury from contact with specified types of harmful agents (see table IX).

5.7.4 Packaging data and labeling. For military use each type of skin protective compound shall be packaged in a one pound jar or as otherwise specified in the contract or order. Each container of skin protective compound shall be clearly and legibly labeled. The label shall be a light color, printed on opaque paper stock in black with an ink which is legible after immersion in water at 70°F (21°C) to 80°F (27°C) for one hour. Labels shall be securely affixed in place with water-resistant label adhesive as specified in section 3 of MIL-STD-129 and shall be waterproofed by coating the entire outer surface of the label with the same adhesive. The label data shall be as follows:

SKIN PROTECTIVE COMPOUND
Type
For protection against_____
Contents

Warning: Do not depend on use of this product for absolute protection. Following an accidental exposure of the skin to harmful chemicals, the skin should be thoroughly washed and the protective compound should be reapplied. Wash skin thoroughly with soap and water before eating or leaving the job. DO NOT use this product for protection against any material not named above without first consulting your foreman.

DIRECTIONS FOR USE

To apply or reapply compound, wash and dry skin thoroughly before applying compound, then rub on enough compound to cover skin with a thin, even film. Let film dry.

To remove compound, thoroughly wash compound coated areas of skin with soap and warm water at the prescribed hours during and at the end of your work shift.

Report promptly to the dispensary whenever you have any skin irritation.

5.7.5 Safety precautions. Skin protective compounds should not be used around the eyes.

5.7.6 Storage data. The sealed jar or contents are not affected by moisture or temperature extremes. However, the packing containers will deteriorate when exposed to moisture. Store in covered warehouses protected from precipitation and moisture. These compounds will remain stable under storage conditions at temperatures from minus 60°F (16°C) to plus 125°F (52°C). These materials have a maximum shelf life of 2 years from the date of manufacture and should be checked after 1 year of storage from the date manufactured.

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5.7.7 Disposal. Chemical barrier creams are non-toxic substances that pose no threat to the environment. If a spill or leak should occur, simply wipe up the spill and dispose of in accordance with regular trash removal procedures.

Assignee: GS

Custodians:
Army - EA
Navy - YD
Air Force - 68,

Review activities:
Army - GL, MI
Navy - SH

User activities:
Navy - MC

Preparing activity:
Army - EA

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