
PREPARATION PROCEDURES FOR THE MASS TREATMENT OF UNIFORMS WITH PERMETHRIN ARTHROPOD REPELLENT

Ref: (a) DoD Inst 4150.7
(b) AFPMB Technical Information Memorandum No. 36 (<http://www.acq.osd.mil/afpmb/>)

Encl: (1) [Fact Sheet: Permethrin Arthropod Repellent](#)
(2) [Permethrin label](#)
(3) [Permethrin MSDS](#)

INTRODUCTION

Reference (a) directs heads of DoD components to ensure that Commanders of deployed forces enforce the use of arthropod repellents including Permethrin Clothing-applied Repellent. Navy Environmental and Preventive Medicine Unity No. 5 provides technical on-site assistance on the use of repellents and mass treatment of uniforms by deployable Navy and Marine Corps units within its area of responsibility (AOR).

PURPOSE

To provide procedures for deployable units in preparing for the mass treatment of field utility uniforms and other items with permethrin arthropod repellent.

BACKGROUND

Reference (b) provides technical information regarding permethrin and other personal protective measures against arthropods.

Permethrin can be applied to the following items:

- Field utility uniform blouses and trousers
- Other working clothing such as coveralls
- Insect repellent ("Deet") jackets (when liquid deet is not available)
- Canvas GP and CP tents
- Bed nets

Permethrin **should not** be applied to the following:

- Underwear
- Hats
- Waterproof materials including vinyl coated tents and waterproof tent flies
- Nomex flight suits
- Extreme cold weather gear ("goretex" material)
- MOPP gear

[Enclosure \(1\)](#) is an information sheet on permethrin. Permethrin is available in two formulations, a 6-oz aerosol and a 40% liquid concentrate formulation. The concentrate can only be applied by Preventive Medicine Technicians (PMT) or entomologists who are currently certified as DoD Category 8 (public health) pesticide applicators. There are several advantages to using the concentrate rather than the aerosol:

- it is a longer-lasting formulation (it is reported to be effective for over 50 washings of the uniform).
- it enables the unit commander to ensure that the uniforms are actually treated.
- it is more cost-effective; approximately one third of the cost of using aerosol cans.

- it eliminates the need to embark and dispose of aerosol cans.

Mass treatment of uniforms with the concentrate is the preferred method of application and is addressed in this document. Aerosol applications can be performed by any individual following the directions on the container label.

RESPONSIBILITIES

Requesting unit medical department representative (MDR)

- advise unit commander on the use of arthropod repellents and recommending application methods so that the commander can ensure unit compliance.
- ensure that the supply department procures sufficient quantities of permethrin for use during mass treatment
- coordinate a schedule and a appropriate site for treatment of uniforms
- coordinate any working parties involved in the lay out and post-treatment retrieval of uniforms
- ensure chemical proof gloves are worn by working party members
- request and coordinate with NEPMU-5 for technical support.

NEPMU-5

- provide technical assistance to the requesting unit
- provide additional certified applicators
- provide pesticide application equipment if requested
- provide PPE for applicators and unit working party personnel

REQUESTING ASSISTANCE AND COORDINATION

Written requests for assistance must be sent from the unit commander or senior medical department representative (SMDR) to NEPMU-5 via e-mail¹, message², or letter³. Once the request has been received and approved, the unit PMT or medical department representative (MDR) will coordinate the operation with the DPT. The DPT will ensure that the unit PMT or MDR is aware of their responsibilities and provide them with time, site, and working party requirements for the spray operations. The **site requirements** include:

- a flat, well-ventilated paved area (shaded, if possible) large enough to hold all the uniforms and other items to be treated
- a water source and mixing site close to the treatment site
- a shaded rest area for applicators and working party
- a site that is far enough from open bodies of water, drains, and buildings to prevent accidental contamination due to pesticide drift.
- an early start time that will ensure enough daylight hours to spray and allow uniforms to dry (up to 3 hours in dry weather) and to prevent heat injury among working party and applicators
- a working party large enough to put out, turn over and pick up the uniforms to be treated.

PERSONNEL

The requesting unit must provide a working party to layout, turn over, mark and retrieve uniforms to be treated before, during and after the operation. NEPMU-5 and other application personnel will only be involved in the mixing and application of the repellent.

EQUIPMENT AND SUPPLY PREPARATION

Permethrin will be supplied by the requesting unit. All other application and personal protective equipment (PPE) will be provided by NEPMU-5. They will also provide a chemical spill kit. All applicators must be respirator certified and fitted for a respirator. All pesticide application equipment and PPE are inspected and tested before each spray job.

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² NAVENPVNTMEDU FIVE SAN DIEGO CA

³ Officer in Charge, Attn: Entomology, Navy Environmental and Preventive Medicine Unit No. 5, 3235 Albacore Alley, San Diego, CA 92136-5199

TRAINING AND INFORMATION BRIEFS

The MDR should be prepared to provide training and/or information briefs regarding the operation. These briefs may be provided to unit commanders, working party personnel, non-PMT corpsmen, treatment site personnel, area S-4s, safety officers, etc. Review and be prepared to provide the following information:

- concept of operation
- purpose of spraying uniforms with permethrin
- potential hazards to humans
- potential hazards to the environment
- other MSDS information
- efficacy of permethrin treatment

Personnel should also be reminded not to dry clean the uniforms after treatment to prevent removing the repellent. When giving these briefs, have a copy of the label ([enclosure \(3\)](#)), a MSDS ([enclosure \(4\)](#)), and an information sheet ([enclosure \(1\)](#)) on hand.

CONCEPT OF OPERATIONS

Operations will not be conducted under the following conditions:

- Rain or other precipitation
- High wind (>10 mph)
- High temperature (operations should not be conducted when WBGT is at or above 89.9)

The operation will be conducted as follows:

1. The working party will lay out the uniforms at site prior to the arrival of the applicators. The uniforms should be placed in rows that allow the pesticide applicators to walk between them (Figure 1). The uniform items should be placed with nametapes down and close together to minimize overspray (Figure 2).
2. The applicators will apply the repellent to the uniforms taking care to prevent contamination of the surrounding environment. They will apply the chemical to one side of the uniform.
3. Once it is determined to be safe to do so, the working party will be directed to don protective gloves and turn over the sprayed uniforms. They should ensure that the uniforms are kept in rows and are placed close to each other.
4. The applicators will spray the other side of the uniforms. Care is taken by the applicator to avoid having left over chemical.
5. Once the application to both sides of the uniform are completed, the applicators will clean up the application gear. They will minimize the disposal of hazardous waste at the site by pouring rinsate into appropriate sinks or containers to transport for disposal off site. Other disposable items, such as coveralls and gloves, can be discarded in trashcans unless they are completely saturated with chemical due to a spill.



• Figure 0



• Figure 0

6. Applicators treat other side of uniforms. As the spraying nears completion, the operation supervisor should monitor how much more pesticide needs to be mixed to complete the job to prevent having an excess of spray mixture.
7. The uniforms should be allowed to dry completely (3 or more hours depending on temperature) before they are retrieved by the working party. Do not allow personnel to retrieve uniforms until they are completely dry. After the uniforms are dry, the working party should write a "P" with an indelible ink marker on the labels of each pair of trousers and blouse. This indicates that the uniform has been permanently treated with permethrin repellent.

FACT SHEET: PERMETHRIN ARTHROPOD REPELLENT

What is permethrin?

Permethrin arthropod repellent is a safe and effective insecticide registered by the EPA for use on clothing. When used with the skin-applied Deet repellent and the proper wearing of field uniforms, it provides the user with the most effective personal insect repellent system available.

How does permethrin work?

Permethrin is an insecticide that kills insects and other arthropods upon contact. Most biting arthropods that come into contact with the treated clothing die within seconds. After successive washing of the uniform, it loses its toxicity, but retains its repellency. It is effective against mosquitoes, ticks, fleas, mites, and lice, but does not provide protection against stinging insects such as bees and wasps.

How is permethrin used?

Permethrin is applied to field utility uniforms. It should not be applied to Nomex flight suits due to poor adherence of the chemical to the fabric. Permethrin can also be applied to bed nets and non-vinyl coated tentage.

How is permethrin applied?

Permethrin is available in an aerosol can or as a liquid concentrate. Ready-to-use aerosol cans can be distributed to and applied by military personnel to treat their personal uniforms. The liquid concentrate must only be applied by a certified pesticide applicator, because the chemical must be mixed with water and applied with bulk spray equipment. Preventive Medicine Technicians (PMT s) and entomologists are certified applicators. Uniforms are sprayed with permethrin and allowed to dry.

Is there an advantage to using the liquid concentrate over the aerosol?

The concentrate, when applied properly, will be effective for over 50 washings of the uniform; the aerosol is ineffective after five washings. Using the concentrate reduces the amount of waste (cans) that must be disposed. There is also a cost savings of over \$2 per uniform when using the concentrate.

Can permethrin be removed from the material?

Yes. Some dry cleaning solvents will remove permethrin. Treated uniforms should not be dry-cleaned. Starching does not reduce the effectiveness of the repellent. Normal washing with water and detergent will not remove permethrin.

Is permethrin safe?

Yes. Permethrin is a very safe insecticide. It's commercial equivalent has been sold in stores and used widely over the past several years without serious poisoning incidents. The repellent when applied to clothing contains only 0.5% of the insecticide and because it has a low vapor pressure, very little of the pesticide is absorbed through the skin. The wearing of undergarments also reduces the risk on absorption. If absorbed into the body, the insecticide is readily broken down and rendered harmless. Material safety data sheets and additional safety information is available from your supplier or from your preventive medicine unit.

What precautions should be taken when using permethrin?

- Do not spray undergarments, hats or PT gear.
- Avoid inhaling vapors and contact with skin when applying
- Do not apply to skin
- Do not wear treated uniforms until they are completely dry
- Do not eat, drink, or smoke while spraying uniforms

Ordering information

- Insect repellent, Clothing Application, aerosol (Permethrin Arthropod Repellent); NSN 6840-01-278-1336; Twelve 6-oz cans/box; UI: BX
- Insect repellent, Clothing Application, Permethrin, 40% liquid; NSN 6840-01-334-2666; Twelve 151 in] bottles/box; UI: BX

For more information call NEPMU-5 at comm: (619) 556-7070 or DSN: 526-7070 or
nepmu5@nepmu5.med.navy.mil
<http://www.spawar.navy.mil/usn/nepmu5/>

INSECT/ARTHROPOD REPELLENT FABRIC TREATMENT

FOR USE BY CERTIFIED OR TRAINED PERSONNEL ONLY
FOR MILITARY USE ONLY
OUTER CLOTHING AND BED NETTING TREATMENT ONLY

EPA Reg. No. 63120-1
EPA Est. 62828-SC-001

ACTIVE INGREDIENT:

Permethrin*.....40.00%

INERT INGREDIENTS:..... 60.00%

TOTAL 100.00%

*(3-phenoxyphenyl) methyl (\pm)cis-trans-3-(2,2 dichloroethenyl)-2,2-dimethyl-cyclopropane
carboxylate cis/trans isomers ratio: min 35% (\pm) cis and max 65% (\pm) trans

NET CONTENTS 5.1 fluid oz (151 ml)

WARNING

KEEP OUT OF REACH OF CHILDREN

SEE BACK PANEL FOR ADDITIONAL PRECAUTIONS

NSN 6840-01-334-2666
Military Specification: MIL-I-44411

Produced and Packaged For:
DEPARTMENT OF DEFENSE
DEFENSE GENERAL SUPPLY CENTER
RICHMOND, VIRGINIA 23297-5000

PRECAUTIONARY STATEMENTS HAZARD TO HUMANS AND DOMESTIC ANIMALS WARNING HARMFUL IF SWALLOWED OR INHALED CAUSES EYE IRRITATION DO NOT APPLY TO SKIN.

Keep away from food, mess gear, and water supplies. Thoroughly wash mess gear if contaminated with this product. Avoid breathing vapors or contact with face, eye, or skin. Wash thoroughly after handling fluid, container, or wet treated uniform and before eating and smoking. Wear protective gloves when mixing and applying.

STATEMENT OF PRACTICAL TREATMENT FOR EXPOSURE TO PERMETHRIN FLUID IN SMALL BOTTLES

If on skin: Wash affected areas with soap and water.

If in eyes: Flush eyes with plenty of water. Contact a physician if irritation persists.

If swallowed: Contact a physician or Poison Control Center immediately. Do not induce vomiting unless directed by a physician. Vomiting may cause aspiration pneumonia.

If inhaled: Remove person to well ventilated area. Apply artificial respiration if indicated.

ENVIRONMENTAL HAZARD This pesticide is extremely toxic to fish and other aquatic organisms. Do not apply directly to any body of water. Do not contaminate water by cleaning of equipment or disposal of equipment wastewaters.

DIRECTIONS FOR USE It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Treated uniform, netting and tentage provides protection to covered areas of body from bites of mosquitoes, ticks, chiggers, and human body lice.

Application Procedure: **TO AVOID INHALATION, APPLICATOR MUST WEAR RESPIRATOR.** Thoroughly clean 2-gallon field sprayer by triple rinsing with clean water. Add entire contents of permethrin container to two gallons of clean water in a 2-gallon field sprayer. Agitate and bring to a pressure of 55 psi. For clothing: Place each article of Battle Dress Uniform (jacket and trousers) on the ground and spray each side for 50 seconds at 55 psi. Hang the uniform for 3 hours or until dry. When dry, garment is ready to wear. Mark uniform with date of treatment. **DO NOT RE-TREAT UNIFORM;** one treatment is effective for life of the uniform. **DO NOT TREAT UNDERWEAR OR CAP.** For bednet: Spread netting on the ground and spray at a distance of 12-18 inches using a tan nozzle at 55 psi. Spray with a slow sweeping motion to completely cover the netting fabric without runoff

STORAGE AND DISPOSAL: Do not store below 32° F. Do not contaminate water, food, or mess gear by storage or disposal. Recap empty permethrin container place in plastic bag and put in trash.

COULSTON PRODUCTS -- INSECT-ARTHROPOD REPELLENT FABRIC TREATMENT - INSECT
REPELLENT,CLOTHING APPLICATION
MATERIAL SAFETY DATA SHEET
NSN: 6840013342666
Manufacturer's CAGE: 0C4A6
Part No. Indicator: A
Part Number/Trade Name: INSECT/ARTHROPOD REPELLENT FABRIC TREATMENT

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General Information
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Item Name: INSECT REPELLENT,CLOTHING APPLICATION
Company's Name: COULSTON PRODUCTS INCORPORATED
Company's Street: SUITE 212-201 FERRY STREET
Company's City: EASTON
Company's State: PA
Company's Country: US
Company's Zip Code: 18042-3662
Company's Emerg Ph #: 800-445-9927
Company's Info Ph #: 215-253-0167
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 007
Status: SE
Date MSDS Prepared: 25MAR92
Safety Data Review Date: 28MAY92
Supply Item Manager: CX
MSDS Serial Number: BKLMM
Specification Number: MIL-I-44411
Hazard Characteristic Code: T5
Unit Of Issue: BX
Unit Of Issue Container Qty: 12 X 151 ML
Type Of Container: PLASTIC BOTTL
Net Unit Weight: 4 LBS

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: PERMETHRIN
Ingredient Sequence Number: 01
Percent: 40.00
NIOSH (RTECS) Number: GZ1255000
CAS Number: 52645-53-1
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: RELATED COMPOUNDS, IN ACTIVE INGREDIENTS
Ingredient Sequence Number: 02
Percent: 3.48
NIOSH (RTECS) Number: 1001048RI
OSHA PEL: NOT ESTABLISHED.
ACGIH TLV: NOT ESTABLISHED.
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: HYDROTREATED LIGHT PETROLEUM DISTILLATE/AROMATIC PETROLEUM SOLVENT
Ingredient Sequence Number: 03
Percent: 48.00
NIOSH (RTECS) Number: 1002846HL
CAS Number: 64742-47-8
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

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Physical/Chemical Characteristics
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Appearance And Odor: VISCOUS, MEDIUM TO DARK AMBER - FAINT, MILD ODOR
Specific Gravity: 1.01
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: 0.5 (N-BUTYL ACETATE=1)
Solubility In Water: EMULSIFIABLE
pH: 6.5
Corrosion Rate (IPY): UNKNOWN

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Fire and Explosion Hazard Data
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Flash Point: 115F,46C MIN
Flash Point Method: TCC
Extinguishing Media: WATER SPRAY, CO2, FOAM/DRY CHEMICAL. WATER SPRAY MAY BE USED TO KEEP FIRE EXPOSED CONTAINERS COOL & FLUSH SPILLS AWAY.
Special Fire Fighting Proc: WEAR FULL PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE MODE.
Unusual Fire And Expl Hazrds: NONE

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Reactivity Data
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Stability: YES
Cond To Avoid (Stability): DO NOT STORE WHEN TEMPERATURE EXCEED 130F.
Materials To Avoid: STRONG OXIDIZERS
Hazardous Decomp Products: NONE
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE

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Health Hazard Data
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LD50-LC50 Mixture: ORAL LD50 (RAT) IS UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE- INHALATION/INGESTION: NONE. EYE: NON-IRRITATING. SKIN: MODERATELY IRRITATING. CHRONIC-NONE KNOWN.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: THIS PRODUCT'S INGREDIENTS ARE NOT LISTED BY IARC, NTP OR OSHA AS A CARCINOGEN.

Signs/Symptoms Of Overexp: INHALE: NONE. EYES: NONE. SKIN: MODERATE IRRITATING. INGEST: NONE.

Med Cond Aggravated By Exp: NONE KNOWN.

Emergency/First Aid Proc: EYE-FLUSH WITH PLENTY OF WATER. CONTACT A PHYSICIAN IF IRRITATION PERSISTS. SKIN-WASH EFFECTED AREA WITH SOAP & WATER. INGEST-CONTACT A PHYSICIAN OR POISON CONTROL CENTER. DO NOT INDUCE VOMITING UNLESS DIRECTED BY A PHYSICIAN. VOMITING MAY CAUSE ASPIRATION PNEUMONIA.

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Precautions for Safe Handling and Use
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Steps If Matl Released/Spill: KEEP PEOPLE AWAY. OPEN ALL WINDOWS & DOORS & VENTILATE AREA THOROUGHLY. ALLOW TO DISCHARGE SAFELY, AVOID BREATHING VAPORS. SOAK UP RESIDUES WITH ABSORBENT MATERIAL.

Neutralizing Agent: NOT APPLICABLE

Waste Disposal Method: DO NOT CONTAMINATE WATER, FOOD OR MESS GEAR BY STORAGE OR DISPOSAL. RECAP EMPTY PERMETHRIN CONTAINER, PLACE IN PLASTIC BAG AND PUT IN TRASH. DISPOSE OF ABSORBENT IN TRASH. NOTE: DISPOSE OF WASTE I/ A/W LOCAL, STATE AND FEDERAL REGULATIONS.

Precautions-Handling/Storing: STORAGE- DO NOT USE OR STORE NEAR HEAT OR OPEN FLAME. DO NOT STORE BELOW 32F. KEEP OUT OF REACH OF CHILDREN.

Other Precautions: DO NOT APPLY TO SKIN. KEEP AWAY FROM FOOD, MESS GEAR AND WATER SUPPLIES. AVOID BREATHING VAPORS OR CONTACT WITH FACE, EYES OR SKIN. WASH THOROUGHLY AFTER HANDLING FLUID CONTAINER OR WET TREATED UNIFORM AND BEFORE EATING OR DRINKING.

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Control Measures
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Respiratory Protection: NONE NORMALLY REQUIRED.

Ventilation: ADEQUATE

Protective Gloves: NEOPRENE

Eye Protection: SAFETY GLASSES, GOGGLES OR FACE SHIELD

Other Protective Equipment: EYE WASH STATION, QUICK DRENCH SHOWER AND IMPERVIOUS CLOTHING

Work Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. DO NOT WEAR CONTAMINATED CLOTHING OR FOOTWEAR.

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Transportation Data
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Trans Data Review Date: 92149

DOT PSN Code: GJL

DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.

DOT Class: 3

DOT ID Number: UN1993

DOT Pack Group: III

DOT Label: FLAMMABLE LIQUID

IMO PSN Code: HIA

IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o

IMO Regulations Page Number: 3345

IMO UN Number: 1993

IMO UN Class: 3.3

IMO Subsidiary Risk Label: -

IATA PSN Code: MCA
IATA UN ID Number: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MCA
AFI Prop. Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
AFI Class: 3
AFI ID Number: UN1993
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
MMAC Code: NR
N.O.S. Shipping Name: CONTAINS PERMETHRIN AND AROMATIC PETROLEUM SOLVENT

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Disposal Data
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Label Data
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Label Required: NO
Label Status: X
Common Name: LABEL COVERED UNDER EPA REGS - HAZCOM LABEL NOT AUTHORIZED

