

Soldiers can still field treat their ACU's with permethrin using these standard military clothing repellent products: aerosol spray (NSN 6840-01-278-1336) or IDA kit (NSN 6840-01-345-0237)

U.S. Army Public Health Command (Provisional)
formerly U.S. Army Center for Health Promotion and Preventive Medicine

18-072-0310

March 2010

Just the Facts...

Permethrin Factory-Treated Flame Resistant ACU's

The key to preventing diseases transmitted by insects (such as malaria by mosquitoes and leishmaniasis by sand flies) and other arthropods (such as Lyme disease with ticks) is the simultaneous use of all elements of the DOD Insect Repellent System. Wearing permethrin-treated uniforms is a key component of this system. Beginning in 2010, all deploying soldiers will be issued Flame-Resistant Army Combat Uniforms (FR ACU's) that have been factory-treated with permethrin. A single factory treatment with this repellent offers significant benefits to the FR ACU wearer including increased safety and improved effectiveness, protecting against the bites of mosquitoes, flies, midges, ants, ticks, and chiggers for the life of the uniform.

Q. Why is it so important that all the FR ACU's worn by deployed soldiers are treated with permethrin?

A. The Army's policy is to provide the best protection for our soldiers' health and well-being. More active military service days have been lost to diseases, many of them transmitted by mosquitoes, flies, ticks, and mites, than to combat. In the least, these biting arthropods are a nuisance and are a source of stressful distraction in the field. More importantly, these blood feeders are capable of spreading diseases that could have serious short and long term effects on soldiers' health, including permanent scarring, and possibly death. Wearing permethrin-treated uniforms is a key component of the **DOD Insect Repellent System**. This system uses a combination of personal protective measures, including application of permethrin to the uniform, use of DEET repellent on exposed skin, and proper wear of uniform (trousers tucked into boots, sleeves worn in down position). For over 20 years, the **DOD Insect Repellent System** has been unbeatable in preventing biting insects from becoming an annoyance or making soldiers sick.



The **DOD Insect Repellent System** is a proven strategy used to prevent diseases transmitted by mosquitoes, flies, ticks, and other biting arthropods. It is implemented through the combined use of skin and clothing repellents and properly worn uniforms.

Q. How safe is permethrin? Could I get sick from wearing a permethrin-treated uniform every day?

A. The effects of permethrin on human health have been extensively researched. Permethrin is a type of insecticide called a synthetic pyrethroid. Although poisonous to insects and other arthropods, it is one of the safest pesticides to humans. The Army has used permethrin for over 20 years to treat soldiers' uniforms with "no observed or anecdotal reports of adverse reactions" (source: Department of the Army, Office of the Surgeon General memorandum, DASG-PPM-SA, "Permethrin Treated Uniforms", 8 April 2008). Independent agencies, including the National Academy of Science-Committee on Toxicology, the Food and Drug Administration, the Occupational Safety and Health Administration, the World Health Organization, the United Nations Food and Agriculture Organization, and the U.S. Environmental Protection Agency, all agree that soldiers who wear uniforms treated with permethrin at doses approved for factory treatment (fabric impregnation concentration of 0.52% weight of permethrin/weight of fabric) are unlikely to experience adverse health effects.



Transmission of cutaneous leishmaniasis occurs via the bite of infected sand flies. There is no vaccine to protect against this disease. For optimum protection, soldiers need to employ both skin repellent and proper wear of a permethrin-treated uniform.

Q. Is factory treatment of FR ACU's with permethrin an improvement?

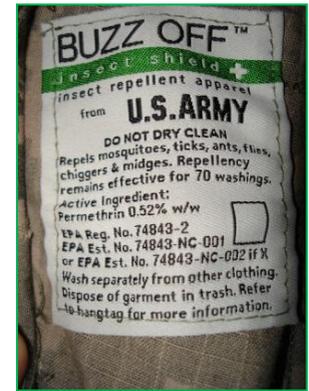
A. Issuing every deployed soldier permethrin factory-treated FR ACU's represents not only an improvement but it is also a necessity. Field treatment of uniforms can result in over-treatment of uniforms, providing no additional benefit to the wearer. It can also result in under treatment, which puts the wearer at greater risk for bites and subsequent disease. The unique fabric construction of FR ACU's, including flame retardant materials, does not retain enough permethrin, when applied using field application techniques, to adequately protect the wearer from insect bites after repeated launderings. The factory treatment process uses special binders to ensure that enough permethrin is retained in FR ACU's to protect against insect bites for the lifetime of the uniform.

Q. How will deploying soldiers know if their FR ACU's have been permethrin factory-treated?

A. Treated and untreated FR ACU's will look identical on the outside. The permethrin treatment is invisible, odorless and colorless, and does not change the feel of the uniform. Testing confirms that the permethrin treatment does not reduce the flame retardant properties of the uniform. FR ACU's that have been treated with permethrin can be distinguished by looking for labels sewn on the inside of the blouse and trousers.

Q. Why does the permethrin factory-treated FR ACU label state "dispose of garment in trash"?

A. This indicates that permethrin-treated FR ACU's can simply be deposited in the trash and require no special disposal process when the uniform is no longer serviceable. Since permethrin-impregnated FR ACU's are treated at a dose approved by the USEPA for use with civilian outerwear, it is permissible for soldiers to donate or sell their unserviceable uniforms.



Labels on the inside of FR ACU's identify which garments have been factory-treated with permethrin.

Q. Are there any special instructions for taking care of permethrin factory-treated uniforms?

A. Following factory treatment, the permethrin is so tightly bound to fabric fibers that FR ACU's will provide effective protection from insect bites through 50 launderings (= the estimated combat life of a uniform). Treated FR ACU's can be put in the dryer or pressed without affecting the repellency. Permethrin-treated FR ACU's should not be dry-cleaned, however. Even a single dry cleaning will remove most, but not all of the permethrin, and significantly reduce the bite protection. Dry cleaning will also fade the FR ACU and weaken the fiber strength, causing it to become unserviceable sooner.

Q. Will the permethrin wash off my factory-treated FR ACU and transfer to other clothes if I launder them together?

A. With the modern technology used to factory-treat FR ACU's with permethrin, only a very small amount of repellent will leave the uniform when laundered. In studies conducted to date, only tiny amounts of permethrin residues have been transferred to untreated clothing during laundering. However, just as you would be reluctant to wash work coveralls with undergarments or non-duty apparel, permethrin factory-treated FR ACU's should be laundered separately.



A properly worn, permethrin-treated uniform is a soldier's first line of defense against non-flying disease vectors such as ticks. Forced to crawl on the outside of the fabric, ticks will be exposed to lethal doses of permethrin and die before reaching the skin.

Q. Should I be concerned about wearing my permethrin-treated FR ACU around my children and other family members?

A. Research confirms the safety of permethrin, even on children. Permethrin has been used in the United States as a USEPA-approved product since 1977, after successfully completing a registration process that evaluated whether a chemical will have adverse effects on people or the environment. Permethrin is the only pesticide that is USEPA-registered to pre-treat fabrics. It has accumulated an excellent safety record applied as a repellent to clothing since the early 1990's. As regulated by the FDA, permethrin is considered safe enough for use in lice shampoos for children. As recently as 2007, the USEPA conducted risk assessments with permethrin, focusing on the special sensitivities of infants and children to pesticides. One risk assessment investigated toddlers and youth wearing clothing treated with permethrin at the levels (0.52%w/w) identical to the rate used for permethrin factory treatment of FR ACU's. The USEPA concluded that all of the health risks, including cancer and non-cancer risks, were below even the most conservative level of concern.

Q. What about if I am pregnant or nursing; will wearing a permethrin-treated FR ACU harm my baby?

A. In 2003, an independent panel of toxicologists, working together as the Subcommittee to Review Permethrin Toxicity from Military Uniforms investigated the possible reproductive and developmental toxicity of permethrin. After reviewing the results of studies conducted on a variety of mammal species, this subcommittee concluded that exposure to permethrin from wearing treated uniforms is unlikely to cause harmful effects to fetuses or newborns. The USEPA agreed with these findings, and beginning in 2003, approved commercial sale of outdoor clothing treated with permethrin for children of all ages and pregnant women.

Q. Are there concerns with side effects that permethrin may cause to people with hypersensitive skin or allergies?

A. When used at the dose to factory-treat FR ACU's, permethrin is unlikely to cause major skin irritation. Although some individuals are more sensitive than others, reports from soldiers indicate that hypersensitive reactions to permethrin factory-treated uniforms occur with no greater frequency or severity than what occurs with soldiers who are sensitive to some laundry detergents or new, unwashed, untreated uniforms. Another advantage of permethrin factory treatment is that the binder system used retains more permethrin in the fabric, resulting in soldiers being exposed to a much lower level of permethrin touching the skin compared to field-treated uniforms.