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SUBJECT: Pest Control

3 April 1964

TO: ADC      AAC      AFIC      ACIC      CONAC      USAFSS  
ATC      SAC      MATS      AU      USAFA      HQ COMD  
TAC      AFSC      AFCS      PACAF      USAFE      USAFSOUTHCOM

(Civil Engineering)

Attached for the information and guidance of the entomologist, your headquarters, is a copy of the revised Armed Forces Pest Control Board Technical Information Memorandum No. 6, "Current Pest Control Recommendations."

FOR THE CHIEF OF STAFF

  
THOMAS J. BUNTIN  
Directorate of Civil Engineering

1 Atch  
Tech Info Memo No. 6

TECHNICAL INFORMATION MEMORANDUM NR. 6

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CURRENT PEST CONTROL RECOMMENDATIONS

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THE ARMED FORCES PEST CONTROL BOARD

Revised  
December 1963

This Memorandum is produced and distributed to provide current technical information for the use of the professional personnel of the military services who are responsible for the direction, supervision or guidance of pest control operations. Conditions of military use are assumed throughout, and the Board assumes no responsibility for any other usage of the material contained herein. Recipients of this Memorandum are invited to forward comments and suggestions for additions or deletions for the next edition. It is not a policy document.

CURRENT PEST CONTROL RECOMMENDATIONS

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## CURRENT PEST CONTROL RECOMMENDATIONS

### 1. PURPOSE:

The continued spread of resistance to insecticides, and the development of new pesticides necessitates frequent changes in pest control recommendations. Current recommendations are summarized in this memorandum. It does not provide a complete discussion of applicable control measures for the various pests listed, but may be used in conjunction with the tri-service manual, "Insect and Rodent Control" (TM 5-632; NAVDOCKS TP-Pu-2; AFM 85-7). For convenience, recommendations included herein are keyed to corresponding pages of the manual.

### 2. MOSQUITOES:

#### Temporary Control Methods (Cl. 04, page 44)

Resistance to insecticides in mosquitoes is widespread, not only in species which are disease vectors, but also in those chiefly important from an annoyance standpoint. In the United States resistance to chlorinated hydrocarbon insecticides has been detected in at least twelve species of mosquitoes (Aedes aegypti, A. dorsalis, A. nigromaculis, A. sollicitans, A. taeniorhynchus, Anopheles crucians, A. quadrimaculatus, Culex pipiens, C. quinquefasciatus, C. tarsalis, Psorophora confinnis, and P. discolor). In general the substitution of organophosphorus compounds for chlorinated hydrocarbon toxicants has provided effective control for resistant strains although in several localities resistance to the organic phosphates has also appeared. Laboratory tests (see TIM Nr. 3) should be conducted annually to determine the resistance or susceptibility of local mosquitoes in order to select the proper insecticide to use in a control program. Laboratory tests should be confirmed by field observations and it should be remembered that DDT is still the insecticide of choice where resistance has not developed.

a. Ground Larviciding (page 45). If mosquitoes are proved to be resistant to the chlorinated hydrocarbon insecticides by laboratory tests, malathion at the rate of 0.2 to 0.5 lb. of toxicant per acre may be applied and has given good control of most species. However, in California, Culex tarsalis larvae and adults have developed resistance to malathion and Aedes nigromaculus larvae have developed resistance to parathion and malathion in a few areas. Malathion may be used at from 0.2 to 0.5 lb. per acre without harm to most kinds of wildlife but temporary reduction in some species of fish, such as gambusia and shellfish, may occur at these dosages. Paris

green granular formulations have been found to be highly effective against salt marsh mosquitoes in the southeastern United States. They are recommended for larviciding in order to minimize the development of resistance where there is extensive use of malathion as an adulticide.

b. Aerial Larviciding (page 47). In the event mosquitoes are resistant to the chlorinated hydrocarbons, malathion can be substituted. An application rate of 0.5 lb. of toxicant per acre, either as a liquid spray or in granules has given good control of most species.

c. Residual Sprays (page 47). Adult mosquito populations resistant to DDT can be effectively controlled by a residual application of malathion at 200 mg/sq ft. In recent tests with A. quadrimaculatus, malathion applied at that rate gave excellent control for 4 to 5 months.

d. Outdoor Control (page 48). Where DDT resistance has been encountered, malathion at 0.1 to 0.5 lb. per acre has given satisfactory temporary results applied as fogs, mists, or dusts.

### 3. FLIES:

#### Control of Houseflies and Blowflies (C2.03, page 52).

The almost universal development of resistance to the chlorinated hydrocarbon insecticides by houseflies, and the increasing spread of resistance to the organic phosphates re-emphasizes the necessity for good sanitation in fly control. The development of resistance also emphasizes the necessity for continuing laboratory testing of flies from each installation to determine their susceptibility to specific insecticides so that the development of resistance can be detected before the insecticide in use fails in the field.

a. New Insecticides: Resistance to all of the organic phosphates is not common as yet in most areas and one or more of several registered insecticides will be found effective in most cases, that is, Diazinon, ronnel,\* malathion, DDVP and Dibrom. Recommended application methods, dosages and restrictions are detailed in the 1962 Report from the Communicable Disease Center, Public Health Pesticides, March 1962 issue, Pest Control Magazine.

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\*The Communicable Disease Center indicated ronnel (Korlan) is very satisfactory for local preparation of fly-cords using normal precautions for handling concentrates.



## b. Treatment of Breeding Areas

(1) Larvicides (page 53). There are indications that insecticide applications to fly breeding areas for larval control may speed up the development of resistance in houseflies. Therefore, the elimination of fly breeding by good sanitation should be emphasized and larvicides used only as an emergency or occasional measure. Diazinon applied at the rate of 100 mg per sq. ft. appears to give better larval control than malathion or Dipterex. A solution or emulsion containing 0.25% Diazinon should be applied at the rate of 10 gallons per 1000 square feet.

(2) Pit Latrines (page 53). The Public Health Service has found that treatment of privies, including the pit contents, with dieldrin, BHC and chlordane resulted in an increase in housefly production in treated privies, and has recommended that these insecticides not be used. Human excrement in privies does not usually produce many houseflies. Untreated privies normally show prolific breeding of the soldier fly (Hermetia illucens) in a semi-liquid medium, a condition fostered by the presence of the soldier fly larvae. Such media are not conducive to housefly propagation. However, if the above insecticides are applied, the soldier fly infestation is destroyed, the media becomes semi-solid in nature and suitable for breeding of houseflies. The latter usually being resistant to the chlorinated hydrocarbon insecticides, are not affected by treatment, and an increase in the prevalence of houseflies results.

## 4. GNATS AND OTHER DIPTERA:

a. Sand Flies (C3.02, pages 56-58). Larvicides are no longer recommended for use against the salt marsh sand fly because their larvae may become resistant to the chlorinated hydrocarbons after a few applications as indicated by observations in Florida and Panama and control of the adults becomes more difficult and expensive. Fogging with malathion, painting of insect screening with 0.1% lindane solution which apparently continues to repel, and the use of deet as a skin repellent, are recommended control measures.

b. Black Flies (C3.03, page 58). Where there are large numbers of breeding locations that are inaccessible from the ground aerial larviciding (either with conventional or rotary-wing aircraft) or aerial pretreatment of snow with DDT has been used successfully. Control has also been obtained through the use of Plaster of Paris blocks impregnated with DDT (5-1/2 lb. 25% DDT, 11 lb. plaster, 2-3/4 pt. water). One 3" x 12" x 3/4" block will control larvae in a flowing stream 30' x 1-1/2' x 1 mile. Because of the

long flight range of blackflies and heavy population pressure in areas surrounding the control area, aerosols or mist sprayers cannot be depended upon to give effective control for any significant period of time. Standard repellents will provide protection from blackfly bites for several hours.

## 5. BEDBUGS:

### Control Methods (C4.02, pages 60-62)

The insecticide resistance of bedbugs in the United States has so far been confined to DDT, and such insecticides as BHC (or lindane) and malathion are being used successfully as substitutes. Lindane may be used at 0.5% strength for treatment of baseboards and other hiding places but no stronger than 0.1% on mattresses. Similarly, malathion may be used at 1.0% on baseboards and walls but no stronger than 0.5% on beds. Only a light application of either insecticide should be made to mattresses and upholstery, and bedding used by infants should not be treated. Mattresses and furniture should not be retreated in less than two weeks.

The common bedbugs, Cimex lectularius and C. hemipterus, have also been reported resistant to DDT in many other areas, and resistance to BHC, dieldrin, chlordane, and methoxychlor has been reported in some areas, indicating the need for tests to determine susceptibility prior to large scale control operations.

## 6. LICE:

### Control (C5.03, pages 63-67).

Resistance to DDT in body lice is becoming generally more prevalent. Resistance to lindane is also increasing, and a few reports have been received of significant resistance to pyrethrum. Recent field trials indicate that a 1% malathion dust is even more effective than lindane and is safe for personnel dusting. It is now recommended for use where DDT and linedane resistance occurs. In reserve another formulation is available that has proven to be effective. This contains 0.2% pyrethrins, 2% sulfoxide as a synergist, 2% of 2,4-dinitroanisole as an ovicide, and 0.1% Phenol S (isopropyl cresols) as an antioxidant.

## 7. FLEAS:

### Control Measures (C6.02, page 69)

Resistance in fleas has been difficult to prove in the laboratory, but repeated control failures provide rather conclusive proof that cat and dog fleas are frequently resistant to the chlorinated hydrocarbons in the United States.

Control of resistant fleas on dogs and cats can be obtained through the use of a dust containing 4 to 5% malathion, or a 0.5% malathion spray. Rotenone or pyrethrum dusts may also be used.

Infestations inside buildings may be controlled through the use of 1.0% malathion emulsion spray or the 4 to 5% dust. In recent trials a 1% emulsion of Diazinon applied to infested yards at a rate of 1 gallon per 1000 sq. ft. gave almost complete control for the 63 day observation period. A 4 to 5% malathion dust applied at a rate of 1 to 2 lbs per 1000 sq. ft. has also given good control.

Personnel should insure that lack of control is not due to inadequate coverage or improper application techniques prior to changing insecticides.

## 8. TICKS:

### Control Measures (C7.03, pages 71-72)

a. Methods of Personal Protection. Diethyltoluamide, now available in standard stock, is a very effective tick repellent for application to the skin and to clothing. However, it readily leaches from clothing and must be re-applied after the clothing becomes soaked from heavy rain or wading.

b. Control on Animals. Recent information received from the U. S. Department of Agriculture indicates that the 2% DDT wash or dip previously recommended for controlling ticks on dogs may be too strong. A 0.5% DDT dip is now recommended. A 0.5% malathion emulsion is effective as a spray or dip, or a 4% malathion dust may be used.

c. For treatment of infested areas. A spray containing 1 or 2 percent malathion applied at the rate of 1-2 gallons/1000 square feet or Diazinon

as a 0.5% emulsion or solution as a spot application will control brown dog ticks that have developed resistance to the chlorinated hydrocarbon insecticides (TIM Nr. 2, revised 1961).

## 9. TERMITES, WOOD BORERS, AND FUNGI:

a. Prevention of Termite Damage (C9.04, pages 80-82). Termite shields are not recommended. The expense involved in fabrication and maintenance of metal shields, and their relative ineffectiveness as compared with results obtained from the use of chemically treated soil and impregnated wood make the use of termite shields obsolete.

b. Control Measures (C9.05, pages 82-86). Insecticides added to the soil have proved highly effective in preventing termite attack in new military construction and in controlling infestations in existing buildings. These chemicals should be applied just prior to placing concrete floor slabs for structures with slab-on-ground constructions and while or subsequent to back filling around foundations for structures with basements or crawl spaces. Water emulsions of any of the following materials can be used effectively and without danger of harming the roots of shrubs and trees at the concentrations indicated:

Benzene hexachloride - 0.8% gamma isomer  
Chlordane - 1.0%  
Dieldrin - 0.5%  
Aldrin - 0.5%  
Heptachlor - 0.5%

Applications should be as follows:

(1) Under slabs on fill. 1-1/2 gallons per 10 square feet for over-all treatment. In critical areas, such as at expansion joints, around utility openings for pipes, conduits, and ducts, 2 gallons per 5 linear feet. Along the exterior perimeter of the slab, 2 gallons per 5 linear feet in a strip one foot wide in shallow trench.

(2) Foundation walls of structures with basements. Two gallons per 5 linear feet, per foot of depth, from finished grade to top of footings, in a trench one foot wide. Apply one-third of the application near level of top of footings before any back fill is placed, one-third when half of the back fill is placed, and the remainder when the trench is virtually filled. Two gallons per 5 linear feet should be applied under the basement slab next to perimeter footings, and an over-all treatment as

mentioned under slab-on-ground construction, to avoid entry if cracks develop.

(3) Foundation walls of structures with crawl space. Two gallon per 5 linear feet in a strip 1 foot wide in trench on exterior, with one-half of the application near level of top of footings before any backfill is placed, and the remainder when the trench is virtually filled. Two gallons per 5 linear feet should be applied in a strip 1 foot wide in shallow trench adjacent to the interior of the foundation. On sloping ground, where the footing may be deep in places, the volume of chemical required should be estimated on the same basis as for structures with basement.

Soil chemicals should be applied for the protection of all structures in which the materials or contents are subject to termite attack. Where required by climatic conditions, porosity of soil treated, or heavy infestations of termites the dosage rates for soil treatment should be increased to that which local experience has demonstrated to be most effective. Any variation in rate of application, materials or concentrations should be specifically recommended by the Army, Navy or Air Force entomologist serving the area in which the installation is located. Water emulsifiable chemicals should normally be used. Oil solutions in the same concentration may be used when recommended by appropriate technical authority. They should not be used against surfaces which have been waterproofed or dampproofed with asphaltic or other materials subject to deterioration by oil. Oil used for solutions should not be heavier than No. 2 fuel oil.

## 10. COCKROACHES:

### Control Measures (C10.02, pages 94-97)

The resistance of German cockroaches to chlordane continues to become more prevalent but where control can still be obtained with this insecticide it should still be used. When resistance to chlordane has been proven by laboratory tests, there is little value in switching to other chlorinated hydrocarbons such as lindane and dieldrin because resistance to them will develop rather rapidly. The most desirable alternate insecticides are Diazinon or malathion applied as a solution, emulsion or dust. However, these do not provide the long residual effect of chlordane and applications must be more thorough than with chlordane. Second applications may be required one month after the

first treatment in order to kill individuals which escaped and others which hatch after the first treatment. Subsequent applications at three month intervals should control infestations. If resistance to both Diazinon and malathion develops significantly in field operations, it is important that this be reported promptly with a request for recommendation of an alternate insecticide. Recent studies at Orlando indicate that treatments which utilize both 0.5% Diazinon spray and a 2% Diazinon dust in appropriate areas provides the most complete and lasting control. The use of "flushing agents", that is, materials such as pyrethrum, in sprays, are useful in two ways. They cause the cockroaches to move about and contact the insecticides more frequently thus offsetting to some extent any tendency to avoid the toxic material. They also reveal the presence of cockroaches and encourage the operator to give particularly thorough treatments to infested areas.

#### 11. ANTS:

##### Control Measures (C11.02, page 98)

The Imported Fire Ant has become a serious problem in nine southeastern states, and control has been initiated by the U. S. Department of Agriculture in cooperation with the affected states and landowners, including military installations. If the Imported Fire Ant appears on an installation, a report should be sent to the headquarters of the appropriate military department with a request for assistance. Arrangements will then be made with the U. S. Department of Agriculture for assistance in surveys, the procurement of pesticides, and actual control operations at and adjacent to the installation. The insecticide generally used is a Mirex bait applied as directed by the U. S. Department of Agriculture.

#### 12. STORED PRODUCT INSECTS:

##### Control of Storage Pests - Use of Insecticides and Fumigants (C12.03, pages 106-110).

A plastic coated tarpaulin fumigation kit may be used advantageously for the control of stored product insects. Such a kit is under development at the Engineer Research and Development Laboratories, Fort Belvoir, Virginia. The tarpaulin will inclose approximately 2000 cu. ft., which is sufficient for the treatment of one half carload of commodities, and is light enough to be handled easily by two men. Fumigation can be

done on any gas tight surface such as a concrete floor, asphalt pavement, or on the ground. Sand snakes or loose soil may be used to hold the tarp tightly against this solid surface to prevent escape of the gas. A concentration of 1 to 1-1/2 lbs. of methyl bromide per 100 sq. ft. should be maintained for 24 hours for the fumigation of most foodstuffs, fabrics and other stored products at a temperature of 60°F. or higher. The kit may also be used for soil fumigation in order to kill insects, nematodes and weed seeds in the soil. For this purpose, a dosage of 1 lb. of methyl bromide per 100 sq. ft. should be applied and maintained for a period of 24 to 48 hours. Details concerning the fumigation kit may be obtained from the Sanitary Engineering Branch, Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

Insecticide, DDT and lindane, Indoor Fogging, is not to be used for the treatment of warehouses if they contain food not packaged in glass or tin.

### 13. INSECTS ATTACKING GRASSED AREAS:

#### Control Measures (C13.02, pages 112-116)

a. Nematodes. In recent years it has been found that nematodes infest many species of plants. Some of them attack the root system while others attack the portions above ground. Serious damage is inflicted to a number of agricultural crops, including potatoes, wheat, strawberries, soy beans, tomatoes, okra, and beans. The control measures for agricultural crops consist primarily of the treatment of the soil with materials such as Nemagon, D-D or ethylene dibromide. These applications are usually made with tractor-drawn equipment. At military installations, there is usually little need to control nematodes which infest agricultural crops, but there is a growing realization that nematode control is desirable for producing healthy nursery stock. Such nurseries may include improved grasses, shrubbery, shade trees, or forestry planting stock. Large areas may be treated with the toxicants previously named. The soil in small nurseries may be fumigated with methyl bromide as discussed in Section 12.

b. Rhodes Grass Scale. This insect occurs in Texas, Louisiana, and Florida, and attacks Bermuda grass and St. Augustine grass. The adult is about 1/8 inch in diameter, globular, dark purplish brown, and covered with a white cottony secretion. The nymphs move around at first, then settle down to feed, and secrete a wax which covers them.

There may be five generations per year. Damage consists of sucking the juice from the plant crowns, causing the plants to turn brown and die. Damage is usually most severe during dry periods. Control of this grass pest is best undertaken by watering and fertilizing the lawn area to provide a good healthy growth of grass, and chemical control on a repetitive basis with malathion and summer oil sprays. The recommended chemical control for this scale is 5 pounds of malathion and 2-1/2 gallons of summer oil spray concentrate in at least 400 gallons of water per acre of lawn. Three applications should be made at three week intervals to completely control the scale. If there appears to be a burning effect on grass after the first application, the summer oil spray concentrate should be omitted from the second application, but it should be included again in the third application.

c. Ground Pearls. The adult female scale insect secretes a white waxy sac, in which she places about 100 pinkish-white eggs. The nymphs suck the juice from rootlets of Bermuda grass in the South and Southwest and from centipede grass in the South. The grass turns brown in the summer and dies in the fall. The nymphs cover themselves with hard globular shells about 1/8 inch in diameter and are called ground pearls due to their resemblance to pearls. No satisfactory control measure is known.

d. Chinch Bugs. Lawns in the East are sometimes attacked by the hairy chinch bug (Blissus hirtus). The nymphs hatch in the spring and infest lawns until late fall. The adults hibernate during the winter.

In Florida and other southern areas, St. Augustine grass is attacked and sometimes severely damaged by Blissus leucopterus insularis. The bugs are active during the winter except on the coldest days. There are 3 to 5 generations per year in Florida. Damage can be kept to a minimum by adequate fertilization and watering, and by avoiding close mowing during dry weather. However, with severe infestations, insecticides are required for control. Damage usually occurs in patches which increase in size as the bugs move outward into living grass. The insecticide should be applied to the yellowing grass surrounding the dead patches. While the degree of control obtained is often unsatisfactory, the lawn may be saved from complete destruction. The quantity of insecticide per treatment is shown on the following page, with the higher dosages being recommended for Florida.



<u>Quantity Per Acre</u>	<u>Form</u>
4-8 lb. Diazinon	Emulsion
10-30 lb. chlordane	Emulsion
10 lb. Sevin	Emulsion
10 lb. ronnel	Emulsion

The insecticide should be watered in after application with large amounts (600 to 1200 gallons per acre) of water. This is important in view of the extremely heavy dosages applied in order to prevent contacts with surface residues by children or pets. These dosages present great hazard to wildlife and the relative value of the lawn versus desirable species, if present, must be considered. Two or three treatments may be required at 10 day intervals to control the infestation.

#### 14. INSECTS DAMAGING SHRUBS, SHADE TREES, AND FORESTED AREAS

##### Control Measures (C14.02, pages 117-121)

Many insects which damage shrubs or trees can be controlled with malathion. If DDT or other commonly used insecticides prove unsatisfactory, the following formulations are recommended:

a. Two pints of 57% malathion emulsifiable concentrate per 100 gallons water.

Azalea scale	Oak kermes
Birch leaf miner	Oyster shell scale
Boxwood leaf miner	Pine leaf scale
Euonymus scale	Potato leafhopper
European pine shoot moth	Rose leafhopper
Four-lined leaf bug	Scurfy scale
Japanese beetle adult	Tarnished plant bug
Magnolia scale	Thrips

b. Two pints of 57% malathion emulsifiable concentrate or 4 lbs. of 25% wettable malathion powder per 100 gallons water.

Aphids	Spider mites
Lace bug	Whitefly
Mealybugs	

c. Two and 1/2 pints of 57% malathion emulsifiable concentrate or 6 lbs. of 25% wettable malathion powder per 100 gallons water.

Bagworms  
Black scale crawlers  
Fletcher scale  
Florida red scale  
Tent Caterpillar

Juniper scale  
Monterey pine scale  
Pine needle scale  
Soft scale

15. RATS:

Rat Control (Dl. 04, page 125)

Resistance to available poisons has not become a problem in rat control. While no one rodenticide meets all requirements under all conditions, in general the slow acting anticoagulants are preferred because of their general effectiveness and low degree of toxic hazard to humans and useful animals. The lowest bait concentration consistent with effective control should be used at military installations for economy and safety.

A number of anticoagulants have been developed which have given satisfactory results in laboratory tests and field use. It is anticipated that two items will be available in supply at a later date: (1) Rodenticide, Bait, Anticoagulant, a ready-to-use oatmeal plus anticoagulant formulation, and (2) Rodenticide, Anticoagulant, Universal Concentrate, a formulation of a sodium or calcium salt of an anticoagulant, versene, sodium benzoate and sugar for use in preparing solid or liquid baits.

Each item will contain biologically equivalent concentrations of either diphacinone, fumarin, pival, PMP or warfarin. Pending availability of these items in military supply, the following recommendations for use are made:

Solid baits - Fumarin, pival and warfarin should be used at a concentration of 0.025% (0.25 mg/gm) active ingredient by weight; diphacinone at 0.005% (0.05 mg/gm); PMP at 0.05% (0.5 mg/gm). These concentrations should be used regardless of the species of rats involved. These concentrations are also effective against house mice.

Liquid baits - Liquid (water) baits may be more effective than solid baits under certain conditions, such as where water is scarce or where

a variety of foods are available. They may be used separately or in combination with solid baits. The sodium salts of warfarin, pival or fumarin should be used at a strength of 0.006% acid equivalent and PMP at 0.015%. Five percent sugar should be added to the solution as an attractant.

16. PESTICIDES AND EQUIPMENT RECOMMENDED FOR USE IN MILITARY OPERATIONS:

All military and civilian personnel engaged directly or indirectly in pest control activities at military installations should be acquainted with the pesticides and equipment recommended for military use which are tabulated on the following pages.

Pesticide items listed are those which have been recommended for listing in the Military Supply Standards, MSS-6840-5 for Insecticides, MSS-6840-7 for Insect Repellents, and MSS-6840-1 for Rodenticides, currently being coordinated.

Upon approval and publication of these standards by the Department of Defense their use is mandatory on all activities in the selection of items for new procurement in connection with repetitive use. The pesticides listed have been carefully selected for military use and should be utilized to the maximum extent possible. Provisions have been made, of course, for local purchase of other items having only limited or highly localized application. Proposed substitutions at installations should be reviewed by the appropriate major military commands.

The supply standards include pest control chemicals justified for central procurement and stocking according to either of the following criteria:

(a) Requirements are widespread and annual dollar volume is significant. (Example: 75% water dispersible DDT powder; 57% water emulsifiable malathion concentrate).

(b) The item is needed primarily for emergency situations or is not obtainable locally. Although actual use may be quite infrequent and dollar volume low, nevertheless the emergency requirement may make any procurement delay unacceptable. Limited quantities of such items are held at selected locations under special issue controls. (Example: DDT-lindane fogging solution, use restricted by AR 420-78; benzyl benzoate (clothing repellent)).

Other materials needed in relatively small quantities or for localized requirements are obtained through routine local procurement. (Examples: lime sulphur; nicotine sulphate).

Standard stock pesticide items are listed in the Department of Defense Section, Federal Supply Catalog, Chemical Materiel, FSC Group 68, published by the Defense Petroleum Supply Center. The insecticide, rodenticide and repellent items currently recommended as the Military Supply Standard are listed on the following pages.

Also listed is dispersal equipment in the Military Supply Standard and the numbers assigned. This equipment meets the majority of needs at military installations, and the procurement of substitute items should be carefully controlled.

These lists will be revised as new pesticides and equipment become available or the needs of the services change.

Standard respirators are not listed at this time because current stock numbers do not assure that respirators procured will be suitable for protection against all insecticides. Until insecticide respirators are standardized the manufacturer's numbers for models, filters and chemical cartridges must be checked against the current U. S. Department of Agriculture's list of tested items. ("Respiratory Devices for Protection Against Inhalation Hazards of Dusts, Mists, and Low Vapor Concentrations of Certain Pesticides", U. S. Department of Agriculture Supplement No. 1, dated April 1963). This document has been distributed to military entomologists by the cognizant military service agencies and supersedes all previous releases.

The control categories indicated in the following tables are as follows:

I. Ready to use items - no issue control.

II. For use only by installation engineer (or public works) employees with a valid certificate of training in pest control operations, or under the supervision of certified personnel of the medical services.

III. Items to be issued only on approval of the Surgeon General.

Requisitions for all nonstandard items require approval by the major military commands (Army Commands, Naval Districts, major Air Force Commands).

TITLE: PEST CONTROL EQUIPMENT - FSC 3740

STANDARD ITEMS

INDEX NUMBER	FIIN	ITEM NAME AND DESCRIPTION	REFERENCE DATA	USING SERVICE
1-010	281-1510	Container, bait, rodent, paper, 18 ML $\pm$ 2, 3 in dia, 1-3/4 in dia, 17/32 O/A, with imprinted "Poison" warning, 100 unit quantity, carton	MIL-C-3305	MC
1-015	132-5935	Duster, manually operated rotary fan, strap carried, w/feed control, 1 to 20 lb per acre output range, w/blower, w/rotatable outlet, hopper capacity 5 to 10 lb, steel, 1 discharge nozzle, w/two extension tubes, nonflexible, straight type, 14 in lg, and 1 nonflexible curved type, 10 in lg	FED-RR-D-780 Type II, Size 1	AF, N, A
1-020	132-5936	Duster, manually operated tubular pump, manually carried, steel container, non-removable, 7-3/8 in lg approx. pump data, 2-3/4 in max dia, 9-3/8 in lg approx, w/discharge nozzle, fixed dust pattern, pattern A/A, w/extension tube, flexible	FED-RR-D-780 Type I, Class B Style 6 Size II	A, N
1-025	267-4802	Duster, manually operated tubular pump, manually carried, aluminum container, removable, 5 lb capacity, pump data, 3-3/4 in max dia, 14 in lg approx, w/discharge nozzle, fixed dust pattern, wide spreading dust pattern, w/extension tube, flexible w/foot holding pedal	American Cynamid Company New York, N. Y. CODE No. 70361 MODEL No. 50	N, AF, A

INDEX NUMBER	FIIN	ITEM NAME AND DESCRIPTION	REFERENCE DATA	USING SERVICE
1-039	818-6648	Fog generator, insecticide, 5 gal per hr min discharge, w/formulation liquid metering valve, calibrated to give particle sizes in microns, fog outlets are designed to enable pointing in any direction, not equipped for attaching fog hose, gasoline engine data A/A, compressor or blower data, nonpositive displacement, max capacity in CFM A/A, blast air temp working range A/A, w/formulation tank, W/O agitator, agitation formed by pump action in suction and return line of manifold	MIL-F-898B Size 2	N
1-035	691-1776	Sprayer, insecticide, manually carried, manually operated, pressure type, continuous spray, liquid container data, 1 qt capacity, steel, rust resistant interior, plunger type pump, w/discharge valve, 1 discharge nozzle, nonadjustable spray	FED-RR-S-626 Type 111, Class 1 Size 2	A, N, AF GSA
1-040	141-3285	Sprayer, insecticide, manually carried, manually operated, pressure type, intermittent spray, liquid container data, 32 oz capacity, steel, removable, plunger type pump, w/discharge valve, 2 discharge nozzles, adjustable spray, w/removable top	Idico Products New York, N. Y. CODE No. 99440 MODEL NO. Sure-shot	AF, N, A
1-045	641-4719	Sprayer, insecticide manually carried, manually operated, pressure type, continuous spray, liquid container data, 2 gal capacity, steel, rust resistant interior, plunger type pump, w/discharge valve, w/2 discharge nozzles, nonadjustable spray, w/carrying strap, 1 carrying strap, w/discharge hose, oil resistant treated, w/removable top	MIL-S-14102B	A, N, AF, GSA

INDEX NUMBER	FIIN	ITEM NAME AND DESCRIPTION	REFERENCE DATA	USING SERVICE
1-050	836-8106	Sprayer, insecticide, manually carried, power driven, electric motor hp rating A/A, AC 115 V 60 cycles, single phase, w/toggle switch, steel container, 4 qt capacity, rust resistant, w/dischage valve, 1 discharge nozzle, adjustable spray, w/carrying handle, 1 carrying handle, w/removable top	MIL-S-22308	N, AF
1-055	542-4866	Sprayer, insecticide, pushcart mounted, power operated by gasoline engine, rated hp A/A, 2 wheels, rubber tired, semi-pneumatic type, designed to be hand pushed, W/O solution tank, rotary type pump, min rate 0.5 GPM at 25 PSI, w/pressure regulator, 1 spray gun, 4 discharge nozzles, adjustable spray, w/dischage control valve, w/2 discharge hoses, O/A lg A/A	MIL-S-52066 ENG DWG D-11080 1 THRU 18	A, AF, N
1-060	772-0090	Sprayer, insecticide, frame mounted, gasoline engine driven 1-1/2 rated hp, W/O air blower piston type pump, 180 GPH at 300 PSI, 1 spray gun, 24 in min lg, interchangeable nozzle tips, discharge nozzle adjustable spray, w/dischage control	MIL-S-12511B B/P 13200E5970 3740-0023	AF, A, N
1-065	625-9989	Sprayer, insecticide, skid mounted, gasoline engine driven, fog type, 40 GPH, w/air blower, gear pump, pneumatic atomizing nozzles, with vertically and horizontally spray manifold, w/controls and accessories	MIL-S-52185 B/P 13200E5340	AF, N, A, MC

INDEX NUMBER	FIIN	ITEM NAME AND DESCRIPTION	REFERENCE DATA	USING SERVICE
-070	565-6076	Fumigation Kit-Portable	MIL-F-54000	A, N, AF, MC
-075	224-8636	Delouser Outfit, Power Driven, Gasoline Engine	MIL-D-2457C	A, N, AF
-080	Unassigned	Sprayer and Duster, Insecticide, Power Driven Gasoline Engine aircooled, trailer mounted, 2 wheels rubber tired, pneumatic type, turbine type, 12000 CFM @ 150 MPH, rated air discharge @ rated velocity, 50 gal capacity solution tank 4 cu ft capacity dust hopper, w/turntable	MIL-D-2457C	A, N
			MIL-D-2457C	1-082
			MIL-D-2457C	1-082
			MIL-D-2457C	1-082



INDEX NO.	CONTROL CATEGORY	ITEM NAME	CONTAINER	SPECIFICATION	FIIN
1.	II	Rodenticide, Anticoagulant Bait, Ready-to-Use	5 Pound Can	0-R-00500	753-4973
2.	II	Rodenticide, Anticoagulant Concentrate (Water-Soluble) (In Cereal Baits, to be Diluted 1:9)	1 Pound Can	0-R-497	753-4972
3.	II	Rodenticide, Calcium Cyanide	5 Pound Can	0-R-501	264-6684
4.	II	Rodenticide, Zinc Phosphide	1 Ounce Bottle	0-R-511	285-7091
5.	I	Insecticide, DDT, Residual Type Spray (5 Percent DDT)	5 Gallon Can	0-I-531	253-3892
6.	II	Insecticide, DDT (20 Percent Solution)	55 Gallon Drum	0-I-509	281-3462
7.	II	Insecticide, DDT-Lindane, Indoor Fogging (10 Percent DDT and 2 Percent Lindane)	5 Gallon Drum	MIL-I-12262	285-4307
8.	I	Insecticide, Diazinon (0.5 Percent Diazinon)	1 Gallon Can	MIL-I-21177	844-7355
9.	II	Insecticide, Chlordane Water-Emulsifiable Concentrate (72 Percent Chlordane)	5 Gallon Pail	0-I-515	270-8262
10.	II	Insecticide, Diazinon, Powder (2 Percent Diazinon)	25 Pound Pail	MIL-I-22772	753-5038

INDEX NO.	CONTROL CATEGORY	ITEM NAME	CONTAINER	SPECIFICATION	FIIN
11.	II	Insecticide, DDT, Water-Emulsifiable Concentrate (25 Percent DDT)	5 Gallon Drum	0-I-558	246-643
12.	II	Insecticide, Dieldrin, Water Emulsifiable Concentrate (15 Percent Dieldrin)	5 Gallon Drum	0-I-522	264-9043
13.	II	Insecticide, Lindane, Water Emulsifiable Concentrate (12 Percent Lindane)	5 Gallon Drum	0-I-533	242-4213
14.	III	Insecticide, Malathion, Powder dusting (1 Percent Malathion)	25 Pound Pail	MIL-I-51063	823-7945
15.	II	Insecticide, Malathion, Water Emulsifiable Concentrate (57 Percent Malathion)	1 Gallon Can	MIL-I-40025	655-9222
16.	II	Insecticide, Malathion, Water Emulsifiable Concentrate (57 Percent Malathion)	5 Gallon Drum	MIL-I-40025	685-5438
17.	II	Insecticide, Malathion, Water Emulsifiable Concentrate (57 Percent Malathion)	55 Gallon Drum	MIL-I-40025	685-5437
18.	II	Insecticide, DDT, Water Dispersible Powder (75 Percent DDT)	15 Pound Pail	0-I-568	264-6692
19.	I	Insecticide, Pyrethrin Aerosol	12 Ounce Each	0-I-507 Type I Size 1	823-7849

INDEX NO.	CONTROL CATEGORY	ITEM NAME	CONTAINER	SPECIFICATION	FIIN
20.	II	Insecticide, Chlordane, Dust (5 Percent Chlordane)	5 Pound Pail	MIL-I-21036	543-7825
21.	I	Insecticide, DDT, Powder, Dusting (10 Percent DDT)	2 Ounce Can	0-I-578	274-5415
22.			25 Pound Pail	0-I-578	252-3002
23.	I	Insecticide, Lindane, Powder Dusting (1 Percent Lindane)	2 Ounce Can	MIL-I-11490	242-4217
24.			25 Pound Drum	MIL-I-11490	242-4219
25.	II	Insecticide, Methyl Bromide (100%)	150 Pound Cylinder	0-I-566 Type II	281-8245
26.	II	Insecticide, Methyl Bromide (98%) (Odorized)	1 Pound Can	0-I-566 Type I	823-7946
27.	II	Insecticide, Methyl Bromide (98%) (Odorized)	150 Pound Cylinder	0-I-566 Type I	680-0142
28.	II	Insect Repellent Clothing Application (Formula M1960)	1 Gallon Can	MIL-R-12123	270-6200
29.	I	Insect Repellent Personal Application (75 Percent Diethyltoluamide)	2 Ounce Poly- ethylene Bottle	0-I-503 Type II Solution A	753-4963
30.	II	Insect Repellent, Clothing Application (90 Percent Benzylbenzoate)	1 Gallon Can	MIL-I-51022	281-2062

INDEX NO.	CONTROL CATEGORY	ITEM NAME	CONTAINER	SPECIFICATION	FIN
31.	III	Insect Repellent, Clothing Personal Application (75 Percent Diethyltoluamide)	1 Gallon Can	0-I-503 Type II Solution A	864-5430
32.	I	Insect Repellent Personal Application (75 Percent Diethyltoluamide Pressurized Spray)	6 Ounce Pressurized Dispenser Can	0-I-503 Type III Size 2	382 2541
33.	II	Fungicide, Pentachlorophenol (5%) Moisture Retardant	55 Gallon Drum	TT-W-572 Type II Comp. A	597-3606