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MALATHION 57%
55 GAL DRUM

O-I-565B
April 4, 1973
SUPERSEDING
Fed. Spec. O-I-565a
May 27, 1968

FEDERAL SPECIFICATION

INSECTICIDE, MALATHION, EMULSIFIABLE CONCENTRATE

This specification was approved by the Commissioner, Federal Supply Service, General Service Administration, for use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers two classes of an emulsifiable concentrate containing malathion insecticide.

1.2 Classification. The emulsifiable concentrate shall be of the following classes as specified (see 6.2):

Class 1 - For indoor use.
Class 2 - For outdoor use.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein:

Federal Specifications:

VV-F-[illegible] - Fuel Oil, Diesel.
[illegible] - Adhesive, Paper Label, Water-Resistant.
PPP-B-[illegible] - Boxes, Wood, Wirebound.
PPP-B-[illegible] - Boxes, Shipping, Fiberboard.
PPP-[illegible] - Drums, Metal, 5 Gallon, (For Shipment of Non-corrosive Material).
[illegible] - Silverware, Germetic and Solid, Sheet Stock (Containers Grade), and Cut Shapes.
[illegible] - Pails, Metal (Shipping, Steel, 1 Through 12 Gallon).

[illegible]

Fed. Std. No. [illegible] - Marking for Domestic Shipment (Civil Agencies).

[illegible] 14 [illegible] FSC 6840

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration-Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specification:

MIL-I-51064 - Insecticide, Malathion.

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Laws and Regulations:

Federal Insecticide, Fungicide, and Rodenticide Act.

(The Federal Insecticide, Fungicide, and Rodenticide Act of 1947 is under the jurisdiction of the Environmental Protection Agency, Pesticides Office, Washington, DC 20250.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, Illinois 60606.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

American Chemical Society Specifications:

Reagent Chemicals - Fourth Edition

(Application for copies should be addressed to the American Chemical Society, 1155 Sixteenth Street, N.W., Washington, DC 20036.)

American Society for Testing and Materials (ASTM) Standards:

D86-67	-	Distillation of Petroleum Products.
D287-67	-	API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method).
D1193-70	-	Reagent Water.
D1310-67	-	Flash Point of Liquids by Tag Open-Cup Apparatus.
D1500-64	-	ASTM Color of Petroleum Products (ASTM Color Scale).
D1533-61	-	Water in Insulating Liquids (Karl Fischer Method).
E70-68	-	pH of Aqueous Solutions with the Glass Electrode.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. [illegible]

3.1 [illegible]. The [illegible] concentrate shall be a solution of [illegible]

3.1.1 Malathion insecticide. The malathion insecticide used to produce class 1 emulsifiable concentrate shall conform to grade A of MIL-I-51064. The malathion insecticide used to produce class 2 emulsifiable concentrate shall conform to grade B of MIL-I-51064.

3.1.2 Emulsifying agent. The emulsifying agent used to produce the emulsifiable concentrate shall be completely soluble in it and shall be stable in the presence of malathion insecticide.

3.1.3 Solvent. The solvent used to produce the emulsifiable concentrate shall be an aromatic petroleum derivative conforming to the characteristics of table I when tested as specified therein.

Table I. Characteristics of solvent

Characteristic	Requirement	Test method
Flash point, minimum	140° F	ASTM D1310
Distillation range:		
Initial boiling point, minimum	302° F	ASTM D86
Dry point, maximum	590° F	ASTM D86
ASTM color, maximum	2.0	ASTM D1500
Degrees API at 60° F	9 to 22	ASTM D287

3.2 Appearance. The emulsifiable concentrate shall be a clear, homogeneous solution which is free from foreign matter when tested as specified in 4.2.4.1.

3.3 Malathion content. The emulsifiable concentrate shall contain no less than 57.0 percent by weight malathion when tested as specified in 4.2.4.2.

3.4 Emulsion stability. The emulsifiable concentrate shall form stable 5-percent emulsions in both hard water and soft water and the emulsions shall have no oil separation and no more than 1 milliliter (ml) of creamy layer separation when tested as specified in 4.2.4.3.

3.5 Color. The emulsifiable concentrate shall have a color no greater than [illegible] when tested as specified in 4.2.4.4.

3.6 pH of aqueous emulsion. The pH of a 5-percent aqueous emulsion of the emulsifiable concentrate shall be no less than 8.5 and no greater than [illegible] when tested as specified in 4.2.4.5.

3.7 Water content. The emulsifiable concentrate shall contain no more than [illegible] percent by weight water when tested as specified in 4.2.4.6.

3.8 Iron content. The emulsifiable concentrate shall contain no more than 15 parts per million (ppm) iron when tested as specified in 4.2.4.7.

3.9 Compatibility with diesel fuel oil. A 5-percent solution of emulsifiable concentrate in diesel fuel oil shall show no evidence of phase separation or sedimentation when tested as specified in 4.2.4.8.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to specified requirements.

4.2 Quality conformance inspection.

4.2.1 Lotting. A lot shall consist of the emulsifiable concentrate produced by one manufacturer, at one plant, from the same lots of materials, and under essentially the same manufacturing conditions.

4.2.2 Sampling.

4.2.2.1 For examination of preparation for delivery. Sampling for examination of preparation for delivery shall be conducted in accordance with MIL-STD-105.

4.2.2.2 For test. Sampling for test shall be conducted in accordance with table II. A representative specimen of approximately 1 liter shall be removed from each sample container and placed in a suitable clean, dry container labeled to identify the lot and container from which it was taken.

Table II. Sampling for test

Number of unit containers in lot	Number of sample unit containers
2 to 25	2
26 to 150	3
151 to 1,200	5
Over 1,200	-

4.2.3 Inspection procedure.

4.2.3.1 For examination of preparation for delivery. The sample unit shall be one filled unit or shipping container, as applicable. Sample containers and the preparation for delivery thereof shall be examined for the following defects using an AQL of 1.5 percent defective:

(a) Contents per container not as specified
(b) Container not as specified
(c) Container closure not as specified
(d) Container damaged or leaking
(e) Container two-coat lining missing or not as specified
(f) Fiberboard partitions or pads missing, incorrectly positioned, or not as specified (where required)
(g) Marking incorrect, missing, or illegible*
(h) Labeling incorrect, missing, or illegible*
(i) Labels not entirety affixed to container*

*Examine after the container marking and labeling has been covered with water at a temperature of 75° ± 5° F for 4 hours and then dried.

4.2.3.2 For test. Each sample specimen taken in 4.2.2.2 shall be tested as specified in 4.2.4. Failure of any test by any specimen shall be cause for rejection of the lot represented.

4.2.4 Tests. Water in accordance with ASTM D1193 and reagent grade chemicals shall be used throughout the tests. Reagent chemicals shall comply with Reagent Chemicals, American Chemical Society Specifications when listed therein. Where applicable, blank determinations shall be run and corrections applied where significant. Tests shall be conducted as follows:

4.2.4.1 Appearance. Visually examine the specimen for clarity, homogeneity, and the presence of foreign matter.

4.2.4.2 Malathion content. (See 6.4). Use chloride-free water in all applications for this test. Standardize the silver nitrate solution potentiometrically and determine the inflection point in the same manner as described in (b) for the malathion determination.

(a) Ion exchange resin. Convert "Amberlite" IRA400 (chloride form, see 6.5), 5 to 5 percent cross-linked and 2 to 5 mesh size, to the nitrate form as follows: Transfer the resin to a large chromatographic column and pass approximately 4 liters of 4 N nitric acid through the resin bed until all chloride ion is exchanged. (To check completeness of

conversion, add 1 milliliter (ml) of 0.1N silver nitrate solution to 10 ml of the eluate. No turbidity should be observed.) Wash the resin bed with water until the pH of the eluated water is the same as that of the water used for washing. Wash the resin bed with four portions of anhydrous ethanol and allow the resin to air dry.

(b) Procedure. Weigh to the nearest 0.1 milligram (mg) approximately 3.35 ± 0.15 gram (g) of the specimen into a 50-ml volumetric flask and dilute to the mark with anhydrous ethanol. Shake well to mix. Add approximately 2.0 g of "Amberlite" IRA400 (nitrate form) prepared as specified in (a) to the flask and mix well by moderate shaking for 5 minutes. Allow the resin to settle and transfer a 25-ml aliquot of the supernatant liquid into a 1500-ml beaker. Add 20 ml of 0.5N ethanolic potassium hydroxide solution to the beaker and swirl for exactly 1 minute. Add 100 ml of water to the beaker and 2 drops of phenolphthalein indicator solution (1 g per 100 ml, in ethanol). While stirring mechanically with a magnetic stirring bar, add dropwise 1 to 1 nitric acid until the disappearance of the pink color. Adjust the final pH to 6.5 to 7.0 with 1 to 8 nitric acid or 0.5N ethanolic potassium hydroxide solution, as required, using a pH meter. Carefully add 900 ml of acetone. With mechanical stirring, slowly add, from a buret, 25 ml of 0.1N silver nitrate solution. Stir for 2 minutes. Continue the titration on an automatic recording titrimeter using a Beckman combination electrode, catalog number 39187, except the billet of the electrode shall not be electrolytically coated as specified in the Beckman instruction sheet; or equal (see 6.6). Deliver the silver nitrate solution at a rate no greater than 1 ml per minute until a millivoltage (mv) of -250 is reached. The delivery rate of 1 ml per minute shall be accomplished in small increments of approximately 0.2 ml; the pH meter shall be permitted to stabilize before reading; and the reading shall be recorded for each addition. (The electrode billet should be cleaned before each use by dipping it in a 10-percent aqueous solution of potassium cyanide.) NOTE: 1.000 g of 100-percent malathion consumes about 30.2 ml of 0.1N silver nitrate solution; 1.075 g of 57-percent emulsifiable concentrate consumes about 28.9 ml of 0.1N silver nitrate solution.

(c) Data plot. Plot the millivoltage (from about +30 to -250 mv) versus corresponding milliliters of 0.1N silver nitrate solution on linear graph paper. Determine the milliliters of 0.1N silver nitrate solution corresponding to the point of inflection of the plotted curve. If more than one inflection is observable, use the first inflection that occurs between -50 and -150 mv.

(d) Calculation. Calculate the percent by weight malathion in the specimen as follows:

$$\text{Percent malathion} = \frac{33.036\ AB}{W}$$

where: A = Milliliters of silver nitrate solution corresponding to the inflection point,
B = Normality of silver nitrate solution, and
W = Weight of specimen in the aliquot in grams.

4.2.4.3 Emulsion stability.

(a) Stirrer. Use a T-shaped stirrer made of metal or glass consisting of a rod 10 millimeters (mm) in diameter and 50 mm long which is attached at right angles to end of a 5-mm diameter shaft. When stirring, raise the stirrer off the bottom of the beaker just enough to permit free rotation.

(b) Hard water. Dissolve 0.3037 g of anhydrous calcium chloride and 0.1388 g of magnesium chloride, hexahydrate in sufficient water to make 1 liter of solution. This water has a hardness of 342 ppm calculated as calcium carbonate.

(c) Soft water. Prepare soft water by diluting 1 part of the hard water prepared as specified in (b) with 5 parts of water. This water has a hardness of 57 ppm calculated as calcium carbonate.

(d) Procedure. Place 95 ml of hard water prepared as specified in (b) having a temperature of 26.7° ± 5° C into a 250-ml Griffin low-form beaker (approximately 85 mm high and 65 mm in diameter). Using a stirrer as specified in (a), stir at 1000 ± 50 revolutions per minute. Add 5.0 ml of the specimen from a pipet and continue stirring for 1 minute. Pour the emulsion formed into a 100-ml glass-stoppered graduated cylinder. Note the time and set aside for 30 minutes. Immediately after this time period, examine the emulsion carefully under strong transmitted light (1[illegible] watts) for signs of oil separation and top or bottom creaming. Record the percent separation, if any, by volume. Allow the emulsion to stand at a temperature of 2[illegible] ± 5° C for 24 hours. Reform the emulsion by inverting and rotating the stoppered cylinder 30 times. Exactly 30 minutes after the emulsion has been reformed, re-examine the emulsion under strong transmitted light and record the results. Conduct a parallel test using soft water prepared as specified in (c) in place of the hard water in the procedure.

4.2.4.4 Color. Determine the color of the specimen in accordance with ASTM D1500.

4.2.4.5 pH of aqueous emulsion. Determine the pH of a 5-percent aqueous emulsion of the specimen in accordance with ASTM E70.

4.2.4.6 Water content. Determine the percent by weight water in the specimen in accordance with ASTM D1533.

4.2.4.7 Iron content.

(a) Standard iron solution. Dissolve 0.100 g of pure iron wire in 10 ml of 10-percent sulfuric acid and 3 ml of nitric acid. Cool, transfer to a 1-liter volumetric flask, and dilute to volume with water. Transfer a 10-ml aliquot to a 100-ml volumetric flask and dilute to volume. One ml of this standard iron solution contains 0.01 mg of iron.

(b) Standard graph preparation. By means of a buret, measure 0.5, 1.0, 2.0, 7.0, 10.0, 15.0, and 20.0 ml portions, respectively, of the standard iron solution into seven 100-ml volumetric flasks. Add to each 10 ml of 1 molar hydroxylamine hydrochloride solution. Heat to just boiling, cool, add a small piece of congo red paper, and add sufficient ammonium hydroxide solution to change the color of the congo red paper to a bluish-red. Add 10 ml of 0.1-percent 1,10-phenanthroline solution. Allow the color to develop for 10 minutes, dilute to volume with water, and mix. Place a blank of the reagents in a suitable spectrophotometer having a 525-millimicron filter and a 2-centimeter cell path. Adjust the instrument to zero. Record the dial readings for each of the above standards and plot them against the concentration in milligrams per 100 ml. Use the resulting graph for all subsequent iron determinations.

(c) Procedure. Weigh 2.0 ± 0.01 g of the specimen into a 100-ml silica evaporating dish which has previously been washed with hydrochloric acid. Using a hood, gently ignite using a small flame and avoiding application of excessive heat to the bottom of the dish. When the specimen ceases burning, heat gently with a meeker burner until easily combustible matter is destroyed. Transfer to a muffle furnace at 700° C. When the fumes cease, close the furnace door and leave the dish in the furnace 10 to 15 minutes to destroy the remaining carbon. Remove the dish and cool in a desiccator. Add 3 ml of hydrochloric acid and 3 ml of water. Cover with a clean watch glass and heat 30 minutes on a steam bath. Cool and filter through double acid washed dense texture filter paper. (If the filtrate is not clear, refilter using double paper if necessary.) Rinse the filter several times with small portions of water. Add 1 ml of 1 molar hydroxylamine hydrochloride solution and

proceed as in the preparation of the graph in (b). Zero the instrument with a reagent blank. Record the dial reading. From the graph prepared in (b), determine the milligrams of iron in 100 ml for the specimen.

$$\text{Iron, ppm} = \frac{1000\ A}{W}$$

where: A = Milligrams of iron and
W = Weight of specimen in grams.

4.2.4.8 Compatibility with diesel fuel oil. With all ingredients at 80° F (+5° or -0° F) add 5 ml of specimen to 5 ml of solvent conforming to 3.1.3. Mix thoroughly and then add to 90 ml of diesel fuel oil, conforming to grade DF-2 of VV-F-800 and having an aniline point no greater than 140° F, in a 100-ml glass-stoppered graduated cyliner. Stopper the cylinder and mix the contents thoroughly by inverting and righting the cylinder 30 times. Allow to stand for 10 minutes and then examine for phase separation and sedimentation. Store at 80° F (+5° or -0° F) for 24 hours and re-examine.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging for 1-gallon (gal) unit quantities shall be level A or C as specified (see 6.2).

5.1.1 Level A. One U. S. gal (+1.5 or -0 ounces) of class 1 emulsifiable concentrate shall be packaged in a nominal 1-gal capacity steel pail conforming to type I, class 4 of PPP-P-704. The pail shall be provided with a self-venting, extensible, flexible spout closure having a closure seal. The pail shall be lined with two coats of a high-baked resin which shall neither affect nor be affected by the emulsifiable concentrate (see 6.3).

5.1.2 Level C. One U. S. gal (+1.5 or -0 ounces) of class 1 emulsifiable concentrate shall be packaged in a manner to assure integrity of the container without alteration of contents. The container shall provide protection against seepage, spillage, and hazards under known favorable conditions during shipment, handling, and for a limited time of storage.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 Unit quantity. Four 1-gal pails, packaged as specified in 5.1.1, shall be packed in a V3c-fitting fiberboard wood box conforming to class 2, style 2 or 3, for type I, load not exceeding 65 pounds of

PPP-B-585. The box shall be provided with full pail height interlocking fiberboard partitions which shall form a close-fitting cell for each pail. Fiberboard pads shall be provided for all six inner faces of the box. Fiberboard partitions and pads shall be formed from material conforming to grade W5c of PPP-F-320. Sufficient padding shall be used to prevent motion of the contents within the box. The box shall be closed and strapped using galvanized strapping as specified in the appendix to PPP-B-585.

5.2.1.2 Five-gal quantity. Five U. S. gal (+8 or -0 ounces) of class 1 emulsifiable concentrate shall be packed in a nominal 5-gal capacity metal pail conforming to type I, class 4 of PPP-P-704. The pail shall be provided with a self-venting, flexible spout closure having a closure seal. The pail shall be lined with two coats of a high-baked resin which shall neither affect nor be affected by the emulsifiable concentrate (see 6.3).

5.2.1.3 Fifty-five-gal quantity. Fifty-five (+0.5 or -0) U. S. gal of class 2 emulsifiable concentrate shall be packed in a metal drum conforming to type I of PPP-D-729. The closure shall be provided with a closure seal. The drum and closure seal shall be lined with two coats of a high-baked resin which shall neither affect nor be affected by the emulsifiable concentrate (see 6.3). Alternatively, plastic closure seals which will neither affect nor be affected by the emulsifiable concentrate shall be permitted. Gaskets shall not be required if such plastic closure seals are so designed as to incorporate adequate closure as an integral part of the seal.

5.2.2 Level B, 1-gal quantity. Four 1-gal pails, packaged as specified in 5.1.1, shall be packed as specified in 5.2.1.1 except that the box shall conform to grade W3c of PPP-B-636 and shall be closed and reinforced as specified in PPP-B-636.

5.2.3 Level C. Emulsifiable concentrate shall be packed in a shipping container constructed to assure safe delivery to destination without leakage or alteration of contents. The container shall comply with the Uniform Freight Classification Rules, the National Motor Freight Classification Rules, or other carrier rules as applicable to the mode of transportation. Containers shall be sufficiently rigid to withstand transportation and shall be capable of being stacked in tiers at least 10 feet high without damaging the containers or contents. Containers shall not exceed the gross weight and size limitations of the applicable regulations and shall be closed or strapped as specified therein. Containers shall be acceptable for shipment at the most favorable rate of the applicable regulation provided that all requirements specified herein have been met.

5.3 Marking. Marking shall be in accordance with Fed. Std. No. 123 for civil agencies and in accordance with MIL-STD-129 for military activities.

5.3.1 Labeling. Each container shall be labeled to include manufacturer's lot number, identification marking, precautionary marking, and directions for use. The label shall comply with the Federal Insecticide, Fungicide, and Rodenticide Act and shall be accepted by and registered with the Environmental Protection Agency (EPA). The supplier's commercial label, accepted and registered with EPA and appropriately displaying the EPA registration number may be used. Other marking required by 5.3 may be contained on a supplemental label conforming to the applicable standard.

5.3.2 Military labeling. In addition to the requirements specified in 5.3.1, labels for military procurement shall include the following statements:

(a) "FOR MILITARY USE ONLY
NOT FOR RESALE UNDER THIS LABEL"

(b) "CAUTION: HARMFUL IF SWALLOWED, INHALED
OR ABSORBED THROUGH SKIN

Avoid breathing spray mist.
Use with adequate ventilation.
For external use only.
Avoid contact with skin and use gloves for handling.
Avoid wearing uniform again without laundering.
Use appropriate respirator (tested and found acceptable the U. S. Department of Agriculture).
Wash contaminated skin immediately with soap and warm water. Shower at the end of the day.

NOTE TO PHYSICIANS: Malathion causes cholinesterase inhibition. Intramuscular Atropine USP is the antidote."

Statement (a) shall be included in the identification marking portion of the label. The size of the type shall be no less than the size used to specify the ingredients and no greater than the size used to entitle the product. Statement (b) shall be included in the precautionary marking portion of the label. The size of type shall be no less than the size used to specify the other precautions.

5.3.3 Label affixation. Labels shall be securely affixed in place on the container with water-resistant label adhesive conforming to MIL-A-[illegible] and shall be water-proofed by coating the entire outer surface of the label with the same adhesive.

6. NOTES

6.1 Intended use. The emulsifiable concentrate is intended for use as spray and bait applications for the control of ants, bed bugs, cockroaches, fleas, soft-bodies insects, mites, scales, Japanese beetles, mosquitoes, and flies. Class 1 emulsifiable concentrate is intended for indoor application where odor may be a cause of objection. Class 2 emulsifiable concentrate is intended for outdoor application where odor is not a cause for objection.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Class of emulsifiable concentrate required (see 1.2).
(c) Unit quantity required.
(d) Level of packaging and packing required (see 5.1 and 5.2).

6.3 Container coatings. Two-coat lining systems that have been found satisfactory for use with the emulsifiable concentrate are as follows:

(a) American Can Company, Metal and Thermit Division - B124-17.
(b) Bradley Vrooman Company - A21846.
(c) "Heresite" - P413D.
(d) Inland Steel Container Company - IC-26.
(e) Interchemical Company - 14-474.
(f) Rheem Container Company - #970.

6.4 Malathion content. The determination of the malathion content of the emulsifiable concentrate is based on the consumption of silver by O,O-dimethyl phosphorodithicate of diethyl mercaptosuccinate. In the procedure, an ethanolic solution of malathion is treated with a strong anionic resin to remove free O,O-dimethyl phosphorodithioic acid and other strongly acidic organic phosphorous-sulphur impurities which may consume silver. The ethanolic solution of the insecticide is reacted briefly with alkali causing a quantitative cleavage of the malathion producing potassium O,O-dimethyl phosphorodithioate, potassium fumarate, and ethanol. The hydrolysis medium is neutralized to a given pH range and diluted with aqueous acetone. The resultant solution of O,O-dimethyl phosphorodithioic acid is titrated potentiometrically with standardized silver nitrate, using a silver-calomel electrode system. The potentiometric titration is plotted and the malathion concentration determined.

6.5 "Amberlite". "Amberlite" is a trade name of the Rohm and Haas Company. "Amberlite" IRA400 is available from most chemical supply houses.

6.6 Combination electrode. .is electrode incorporates the indicator (silver) electrode and the referenced (calomel) electrode into a single probe and eliminates the need for an agar salt bridge as formerly specified for the titration cell.

6.7 Military use. Items procured under this spec'.ication for military use are to be limited to the variety shown on the .p.licable military standard. Personnel of the military departments are requested to refer to the military standard for guidance.

6.8 Significant places. For the purpose of determining conformance with this specification, an observed or calculated value should be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of the Recommended Practices for Designating Significant Places in Specified Limiting Values (ASTM E29).

MILITARY INTEREST:

Custodians:

Army - MU
Air Force - 68

Review activities:

Army - MT, GL
Air Force - 68
DCA - GS

User activities:

Army - SM
Navy - MC, SH, YD

Preparing activity:

Army - MU(EA)

CIVIL AGENCY COORDINATING ACTIVITIES:

VA-DMS
EPA
GSA-FSS
HEW-FDA

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