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ATC  
O-H-201a

July 1, 1965

SUPERSEDING

Int. Fed. Spec. O-H-00201 (Navy-Docks)

May 22, 1964

FEDERAL SPECIFICATION

**HERBICIDE, DMPA (O-(2,4-DICHLOROPHENYL)  
O-METHYL ISOPROPYLPHOSPHORAMIDOTHIOATE)**

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

**1. SCOPE AND CLASSIFICATION**

**1.1 Scope.** This specification covers two types of pre-emergence and post-emergence herbicides which are formulated with O-(2,4-dichlorophenyl) O-methyl isopropylphosphoramidothioate, and inert ingredients, as either an emulsifiable liquid or as a granular product. The emulsifiable liquid is applied in water suspension as a spray for the selective control of crabgrass, knotweed, and nimblewill in established turf. The granular product is applied directly for the selective control of crabgrass and knotweed in established turf. The O-(2,4-dichlorophenyl) O-methyl isopropylphosphoramidothioate will be referred to hereinafter in this specification as DMPA, which is the designation for this chemical adopted by the Weed Society of America. Further information on use is contained in section 6 of this specification.

**1.2 Classification.**

**1.2.1 Types.** The herbicide shall be of the following types as specified (see 6.2).

Type I—Emulsifiable liquid (3 pounds of DMPA per gallon concentration).

Type II—Granular product (4.4 percent by weight DMPA concentration).

**2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS**

**2.1 Specifications and standards.** The following specifications and standards, of the issues 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:*

RR-S-366—Sieves, Standard, for Testing Purposes.

PPP-D-705—Drum; Metal Shipping, Steel (Over 12 and under 55 Gallon).

PPP-D-723—Drums, Fiber.

PPP-D-729—Drums, Metal, 55-Gallon (For Shipment or Noncorrosive Material).

PPP-P-704—Pails, Shipping, Steel (1 Through 12 Gallon).

*Federal Standards:*

Fed. Std. No. 102—Preservation, Packing, and Packing Levels.

FSC 6840

Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).

(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, D.C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(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 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.)

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

*Code Of Federal Regulations:*

7 CFR 362—Agriculture, Regulations for the Enforcement of the Federal

Insecticide, Fungicide, and Rodenticide Act.

(Copies of part of the Code of Federal Regulations may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

*American Society For Testing and Materials (ASTM) Publications:*

D 56-57—Test for Flash Point by Tag Closed Tester.

D 97-57—Test for Cloud and Pour Points.

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

*Official Classification Committee Publication:*

Uniform Freight Classification Ratings, Rules and Regulations.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York, N.Y. 10016.)

### 3. REQUIREMENTS

#### 3.1 Type I. Emulsifiable liquid.

**3.1.1 Composition.** The type I herbicide shall be a liquid concentrate formulation that is readily emulsified when mixed with water at the concentration specified in the directions for use. The finished herbicide shall be composed of such active ingredients, inert ingredients, emulsifying agents, and solvents as are specified herein.

**3.1.1.1 Active ingredient.** The active ingredient shall be O-(2,4-dichlorophenyl) O-methyl isopropylphosphoramidothioate (DMPA). It shall be in the minimum concentration of 3 pounds per gallon, when tested as specified in 4.5.1.1.

**3.1.1.2 Inert ingredients.** The inert ingredients shall include related impurities, and such diluting, modifying, and conditioning agents as are needed to meet the requirements of this specification.

**3.1.2 Emulsion stability.** The herbicide shall contain the necessary emulsifying agents and solvents to form an emulsion with hard or soft water such that, when tested as specified in 4.5.1.2, there shall be no more than slight creaming (0.25 ml. maximum) of the emulsion, and no apparent free oil present.

**3.1.3 Sedimentation.** The herbicide shall be a clear liquid containing not more than 0.01 percent of sediment or crystalline solids by volume when tested as specified in 4.5.1.3.

**3.1.4 Flash point.** The flash point (Tag Closed Tester) of the herbicide shall be not less than 33°C., when tested as specified in 4.5.1.4.

## 3.2 Type II. Granular product.

**3.2.1 Composition.** The type II herbicide shall be a granular formulation composed of such active ingredients and inert ingredients as are specified herein. It shall be a relatively free-flowing granular product which shall be dry, loose, nondusty, non-gritty, and free from lumps and foreign matter. The herbicide shall be prepared by impregnation of an absorbent granular carrier with a solution of the active ingredient in methylene chloride. The finished herbicide shall be essentially in the form of dry granular aggregates that can be broken down by weathering to further the distribution of the herbicide after application to the soil. Before being packaged, the finished herbicide shall be cured for a sufficient time to allow full absorption of the solution of the active ingredient.

**3.2.1.1 Active ingredient.** The active ingredient shall be O-(2,4-dichlorophenyl) O-methyl isopropylphosphoramidothioate

(DMPA). It shall be in the concentration by weight of not less than 4.4. percent, when tested as specified in 4.5.2.1.

**3.2.1.2 Inert ingredients.** The inert ingredients shall consist of (1) the granular carrier, (2) the unevaporated solvent remaining permanently as part of the dry finished product, and (3) any impurities in the active ingredient used in preparation of the herbicide.

**3.2.1.2.1 Carrier.** The carrier shall be ground corncobs, vermiculite, perlite, granular diatomaceous earth, or granular dried sewage sludge. It shall be of such density that it can be spread satisfactorily in moderate breezes, and of such bulk that it will cover adequately. It shall produce a stable formulation with the active ingredient either with or without a deactivator, and also have sufficient absorptive capacity to inhibit agglomeration, caking, and lumping.

**3.2.2 Chemical stability.** Not more than 10 percent of the concentration of DMPA specified in 3.2.1.1 shall be lost from the herbicide, when tested as specified in 4.5.2.2.

**3.2.3 Reaction.** The acidity of the herbicide shall be not greater than 2 percent calculated as  $H_2SO_4$ , and the alkalinity shall be not greater than 2 percent calculated as NaOH, when tested as specified in 4.5.2.3.

**3.2.4 Grain size distribution.** The grain size distribution of the herbicide shall meet the requirements in table I. It shall be determined by the dry sieve test specified in 4.5.2.4.

TABLE I. Grain size distribution (dry sieve)

Sieve		Percent passing	
Micron size	U.S. No.	Minimum	Maximum
2000	10	99.8	—
590	30	—	10
250	60	—	1.5

**3.3 Labeling.** The herbicides shall be registered and labeled in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act. The following additional information shall also be included in the labeling:

Federal Stock No. ....

Specification No. ....

Type .....

**3.4 Workmanship.** The herbicides shall be free from any defects which would impair their intended use.

#### 4. SAMPLING, INSPECTION, AND TEST PROCEDURES

**4.1** 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, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

##### 4.2 Lot.

**4.2.1 Herbicide.** For purposes of inspection, a lot for each type of herbicide shall consist of all herbicide produced by one manufacturer under essentially the same conditions and process, within the following limitations. In the event the herbicide is produced by a continuous-run process, the lot shall contain herbicide produced in a period of not more than 24 hours. In the event the herbicide is produced by a batch process, each batch shall constitute a lot. If the herbicide cannot be identified to a particular 24-hour period or to a particular batch, all herbicide to be offered for delivery at one time under a contract or order shall be considered a lot.

**4.2.2 Filled containers.** For purposes of inspection, a lot of filled containers shall consist of all specified containers filled with one type of herbicide which are to be offered for delivery at one time, under a contract or order.

##### 4.3 Sampling.

**4.3.1 Sampling for examination (type II only) and for tests of herbicide.** When herbicide is sampled from a continuous-run process, three separate 1-quart or 1-pound samples, as applicable, shall be taken from each inspection lot, and shall represent, respectively, the first part, the middle part, and the last part of the run which constituted the lot. When herbicide is sampled from a batch process, for type I herbicide, a one 1-quart sample shall be taken from each batch and shall be representative of all portions of the batch; for type II herbicide, three separate 1-pound samples shall be taken at different locations within each batch. When herbicide is sampled from an inspection lot consisting of all herbicide to be offered for delivery at one time, three separate 1-quart or 1-pound samples, as applicable, shall be taken at random from the lot.

**4.3.2 Sampling for examination of filled containers.** A random sample of filled containers shall be selected from each lot in accordance with MIL-STD-105, at inspection level I, and an AQL of 2.5 percent defective.

##### 4.4 Examination.

**4.4.1 Herbicide (type II only).** Prior to conducting the tests specified in 4.5.2, the samples of herbicide selected in accordance with 4.3.1 shall be visually examined for conformance to the appearance requirements of 3.2.1. If any one of the samples fails to pass the examination, the lot represented therein shall be rejected. Rejected lots may be re-examined provided the manufacturer has corrected all defects. The manufacturer

shall furnish to the Government full particulars concerning the rejection and the action taken to correct the defects.

ard. (Dow Chemical Company, Midland, Michigan).

#### 4.5.1.1.2 Apparatus.

- (a) Infrared spectrophotometer, Perkin-Elmer, single beam or double beam, sodium chloride prism or equivalent.
- (b) Infrared cell, 0.1 mm. sodium chloride windows.
- (c) Shaker, wrist action, Burrell or equivalent.

#### 4.5.1.1.3 Calibration.

- (1) Weigh 2000 mg. of the DMPA standard into a 50-ml. volumetric flask. Add approximately 25 ml. of carbon disulfide, stopper the flask, and shake to dissolve the compound. Dilute to volume with additional carbon disulfide, and mix the solution thoroughly.
- (2) Obtain the infrared spectrum of the standard solution from 5 to 15 microns, and measure the absorbance at 10.9 microns, using a base line drawn horizontally through the point of minimum absorbance at 10.2 microns.

**4.5.1.1.4 Procedure.** Prepare a solution of the herbicide sample as in 4.5.1.1.3 (1), except that the amount of the sample shall be 5000 mg., scan the spectrum, and measure the absorbance at 10.9 microns as in 4.5.1.1.3 (2).

#### Calculation:

$$\frac{\text{Sample absorbance}}{\text{Standard absorbance}} \times \frac{\text{mg. of standard}}{\text{mg. of sample}} \times 100 = \text{Percent DMPA}$$

**4.4.2 Filled containers.** Each sample filled container selected in accordance with 4.3.2 shall be examined for any defects of the container and the container closure, for evidence of leakage, and for illegible, incorrect, or missing marking. Each sample filled container shall also be weighed to determine conformance to the quantity (net weight) requirement. Any filled container having one or more defects shall be considered a defective unit.

**4.5 Tests.** Samples of herbicides selected in accordance with 4.3.1 shall be subjected separately to the tests specified herein. If any one of the samples fails to pass any one of the tests specified, the lot represented therein shall be rejected. Rejected lots may be reinspected provided the manufacturer has corrected all defects. The manufacturer shall furnish to the Government full particulars concerning the rejection and the action taken to correct the defects.

#### 4.5.1 Type I. Emulsifiable liquid.

**4.5.1.1 Concentration of DMPA.** The concentration of DMPA is determined by the infrared spectrophotometric method of analysis. The herbicide sample is dissolved in carbon disulfide and the concentration is determined by comparing the infrared absorbance of this solution with that of a solution of a standard at a wavelength which is characteristic of DMPA.

##### 4.5.1.1.1 Reagents.

- (a) Carbon disulfide, infrared grade.
- (b) DMPA, pure spectrographic stand-

**4.5.1.2 Emulsion stability.** One percent (by volume) samples of herbicide in water of known hardness are agitated mechanically under controlled conditions. The emulsions formed are immediately transferred to an ASTM long-form centrifuge tube and examined at the end of 30 minutes for the degree of creaming and for the presence of free oil.

**4.5.1.2.1 Reagents.** Use three types of water for these tests.

- (1) Standard hard water, having a total hardness equivalent to 342 p.p.m. of calcium carbonate. It is made by dissolving the following salts in distilled water:

Calcium chloride, 0.304 gram  
anhydrous

Magnesium chloride, 0.139 gram  
hexahydrate

Distilled water to 1 liter  
make

- (2) Average water, having a total hardness equivalent to 115 p.p.m. of calcium carbonate. Mix one volume of hard water with two volumes of distilled water. This concentration represents the greatest degree of hardness expected from municipal water-treating systems.
- (3) Soft water, having a total hardness equivalent to 35 p.p.m. of calcium carbonate. Mix one volume of hard water with nine volumes of distilled water. This concentration represents a reasonable value for falling rainwater and could be assumed to represent average cistern water.

**4.5.1.2.2 Apparatus.**

- (a) Eberbach Variable Speed Mechanical Shaker No. 5109 or equivalent.

(b) Bottles, round jar with metal screw cap and aluminum foil liners, 8-ounce size, approximately 2 inches x 5 $\frac{1}{8}$  inches.

(c) Centrifuge tubes, ASTM long form type, 100 ml capacity.

(d) Centrifuge tube rack.

(e) Lamp, microscope substage with 15-watt bulb and daylight glass filter.

(f) Syringe, 2-ml. capacity, Luer, resistance glass.

(g) Thermometer.

**4.5.1.2.3 Procedure.** Into an 8-oz. round jar, pour 99 ml. of hard water at a temperature of 18° to 24° C. By means of a 2-ml. glass syringe without needle, add 1 ml. of the herbicide sample to the water at the rate of 1 ml. in 5 to 10 seconds.

Hold the outlet of the syringe 1 inch above the water surface and direct the flow of the concentrate towards the center (away from the side) of the jar. Cap the jar immediately. Invert and right the jar once and observe for dispersibility.

Immediately place the test jar and dispersed emulsion on a mechanical shaker with the long dimension of the jar parallel to the direction of movement. Agitate for 3 minutes at 2 cycles per second and with a stroke travel of 1 $\frac{1}{4}$  inch of the shaker bed.

Pour the emulsion immediately into a centrifuge tube supported in a rack.

**Conclusions:**

Observe and record the condition of the emulsion at the end of 30 minutes, noting the location and volume of any creaming or the presence of free oil. Inspect the emulsion by placing the microscope lamp behind the centrifuge tube to be observed.

*Note:* Creaming is a well-defined layer of concentrated emulsion occurring either at the top or bottom of the tube.

Repeat the procedure with average and soft water.

Following each use, thoroughly clean all jars centrifuge tubes, etc., to remove all traces of emulsifier. Finally, rinse at least three times with distilled water and dry in an oven at 105°C.

**4.5.1.3 Sedimentation.** Thoroughly shake the herbicide sample in its container, turning from top to bottom. Pour 100 ml. into a 100-ml. graduated cylinder and allow to stand for 24 hours. The herbicide shall be observed at the end of this period for evidence of sediment or crystalline solids, and the percent determined.

**4.5.1.4 Flash point.** The flash point (Tag Closed Tester) of the herbicide shall be determined in accordance with ASTM D 56-57.

#### 4.5.2 Type II. Granular product.

**4.5.2.1 Concentration of DMPA.** The concentration of DMPA is determined by the infrared spectrophotometric method of analysis. The herbicide sample is dissolved in carbon disulfide, and the concentration is determined by comparing the infrared absorbance of this solution with that of a solution of a standard at a wavelength which is characteristic of DMPA.

**4.5.2.1.1 Reagents.** The reagents are the same as those specified in 4.5.1.1.1.

**4.5.2.1.2 Apparatus.** The apparatus is the same as that specified in 4.5.1.1.2.

##### 4.5.2.1.3 Calibration.

(1) Weigh 2.2 g. of the DMPA standard into a 4-ounce narrow-mouthed bottle. Add by pipette 100 ml. of

carbon disulfide. Seal the bottle and shake to dissolve the compound.

(2) Obtain the infrared spectrum of the standard solution from 5 to 15 microns, and measure the absorbance at 10.9 microns, using a base line drawn horizontally through the point of minimum absorbance at 10.2 microns.

**4.5.2.1.4 Procedure.** Weigh 50 g. of the herbicide sample into an 8-ounce narrow-mouthed bottle. Add by pipette 100 ml. of carbon disulfide. Seal the bottle and shake for two hours. Scan the spectrum at the end of this period, and measure the absorbance at 10.9 microns as in 4.5.2.1.3 (2).

*Calculation:*

$$\frac{\text{Sample absorbance}}{\text{Standard absorbance}} \times \frac{\text{mg of standard}}{\text{mg of sample}}$$

$$\times 100 = \text{Percent DMPA}$$

**4.5.2.2 Chemical stability.** This test is intended for the determination of any chemical breakdown of the granular herbicide when stored at high temperature.

##### 4.5.2.2.1 Apparatus.

(a) Oven, regulated to maintain 55° ± 2°C.

(b) Storage jars, glass, approximately 60 to 120 ml., with screwcaps and aluminum inserts in caps.

**4.5.2.2.2 Procedure.** Load a clean dry storage jar approximately half full of the herbicide sample without compaction. Close the jar tightly with the aluminum-insert cap, and store in the oven at 55° ± 2°C. for 14 days.

Remove the jar from the oven and cool to room temperature. Tumble the sample in the jar to redistribute the dust uniformly among the granules. Weigh out a 1.0 g. sample, and analyze for DMPA as described in 4.5.2.1. Calculate the loss, if any, in percent of DMPA originally present.

#### 4.5.2.3 Reaction.

##### 4.5.2.3.1 Acidity.

**4.5.2.3.1.1 Procedure.** Weigh exactly 10 g. of the herbicide sample and disperse in 100 ml. of distilled water, stirring frequently for ½ hour. Filter and titrate the filtrate immediately with 0.02 N sodium hydroxide (NaOH), using methyl red as indicator. Carry out a blank determination on 100 ml. distilled water with 0.02 N NaOH.

#### Calculation:

$$\text{Acidity as H}_2\text{SO}_4 \text{ (percent)} = 0.0098 \times (a-b)$$

where a = volume in ml. of 0.02 N NaOH used for the sample

b = volume in ml. of 0.02 N NaOH used for the blank

*Note:* The blank may take the form of a small titre with 0.02 N HCl, in which case

$$\text{Acidity as H}_2\text{SO}_4 \text{ (percent)} = 0.0098 \times (a+c)$$

where a = volume in ml. of 0.02 N NaOH used for the sample

c = volume in ml. of 0.02 N HCl used for the blank

Alternatively, the end-point may be determined electrometrically.

##### 4.5.2.3.2 Alkalinity.

**4.5.2.3.2.1 Procedure.** Weigh exactly 10 g. of the herbicide sample and disperse in

100 ml. of distilled water, stirring frequently for ½ hour. Filter, and titrate the filtrate immediately with 0.02 N hydrochloric acid (HCl), using methyl red as indicator. Carry out a blank determination on 100 ml. of distilled water with 0.02 N NaOH.

#### Calculation:

$$\text{Alkalinity as NaOH (percent)} = 0.008 \times (d+e)$$

where d = volume in ml. of 0.02 N HCl used for the sample

e = volume in ml. of 0.02 N NaOH used for the blank

*Note:* The blank may take the form of a small titre with 0.02 N HCl, in which case

$$\text{Alkalinity as NaOH (percent)} = 0.008 \times (d-f)$$

where d = volume in ml. of 0.02 N HCl used for the sample

f = volume in ml. of 0.02 N HCl used for the blank

Alternatively, the end-point may be determined electrometrically.

#### 4.5.2.4 Grain size distribution.

**4.5.2.4.1 Sieves.** Sieves used in this test shall conform to RR-S-366. Mesh sizes are 2000-micron (U.S. No. 10), 590-micron (U.S. No. 30), and 250-micron (U.S. No. 60). Sieve frame is 8-inch diameter, either full height (inside depth 2 inches) or half height (inside depth 1 inch).

**4.5.2.4.2 Sample preparation.** Each time any portion is removed from the stock sample, extreme care must be taken to include the proportionate amount of dust with the granules, in order that both the withdrawn sample and the remaining stock be

representative in dust content. This necessity is the basis for the following procedure, to be followed in every instance.

- (a) Determine the weight of the stock sample.
- (b) Tumble the stock sample end-over-end at approximately 30 r.p.m. for 1 minute in a jar whose volume is about twice the apparent volume of the sample.
- (c) Separate a 20 to 25 g. portion as a test sample by turntable sampling as follows: A sieve receiver pan, 8-inch diameter, 2-inch depth, is secured in a centered position on a 45 r.p.m. turntable (see 6.3). It is recommended that the drive mechanism for any speeds other than 45 r.p.m. be inactivated to prevent their inadvertent use. A sheet-metal receiver cup, with plain thin unflanged rim, is placed within the pan. A 60° glass funnel is adjusted on a support so that the outlet tip just clears the top of the cup, and the funnel and cup are set off-center with respect to the turntable by such an amount that the arc projected by the funnel tip across the cup in rotation of the table will bear the same ratio to the complete circle as the weight of the desired test sample bears to the weight of the whole stock sample. The bore diameter of the funnel stem should be just sufficient to provide free flow for the granular material being treated. With the turntable rotating at 45 r.p.m. the entire stock sample is poured through the funnel so as to be delivered continuously in a steady stream. In case of clogging or bridging, normal flow is restored (the table still turning) by probing with a stout wire flattened on the lower end. The portion for test falls in the

cup, while the remainder falls in the pan outside the cup. The cup is removed, any dust clinging to the outside surfaces is brushed back into the pan, and the cup with its load is weighed for determination of the best sample weight; the remainder in the pan is returned to the stock jar.

**4.5.2.4.3 Procedure.** Screen the test sample through a nest of sieves of the designated mesh sizes, using a single-eccentric type mechanical shaker that imparts to the sieve a rotary motion and tapping action of uniform speed of approximately 300 gyrations and approximately 150 taps per minute. Continue the screening for 15 minutes. Weigh the residues and calculate the percentage passing through each sieve. In the weighing and transferring of the sample and its size fractions, any dust clinging to sieve cloth, sieve wall, scale pan and miscellaneous surfaces, or clogging the sieve-cloth apertures, is to be regarded as part of the finest fraction (sieve-pan fraction). Neither this dust nor the material actually entering the sieve pan need be recovered for weighing; the granules lying on the respective sieve cloths are to be recovered and weighed, and the pan fraction calculated by difference.

**4.6 Inspection of preparation for delivery.** The packaging, packing, and marking of the herbicides shall be inspected to determine conformance to the requirements of section 5 of this specification.

## 5. PREPARATION FOR DELIVERY

(For civil agency use, the definitions and applications of the levels of packaging and packing shall be in accordance with Fed. Std. No. 102.)

**5.1 Packaging.** Packaging shall be level A or C, as specified (see 6.2).

### 5.1.1 Level A.

**5.1.1.1 Type I herbicide.** The herbicide shall be packaged in 5-gallon tight-head metal drums conforming to PPP-P-704, type I, class 3; 30-gallon tight-head metal drums conforming to PPP-D-705, type I; or 55-gallon nonremovable cover metal drums conforming to PPP-D-279, type II, as specified (see 6.2).

**5.1.1.2 Type II herbicide.** The herbicide shall be packaged in 20-pound quantities in lug-cover steel pails conforming to PPP-D-704, type II, class 3, or fiber drums conforming to PPP-D-723, type III, grade A; or in 50-pound quantities in fiber drums conforming to PPP-D-723, type III, grade A, as specified (see 6.2).

**5.1.2 Level C.** The herbicides shall be packaged in accordance with the manufacturer's standard practice. The size of containers shall be as specified (see 6.2).

**5.2 Packing.** Packing will be level A or C, as specified (see 6.2).

**5.2.1 Level A.** The type I and type II herbicides packaged as specified in 5.1.1.1 and 5.1.1.2 require no overpacking.

**5.2.2. Level C.** The herbicides shall be packed in a manner which will insure arrival at destination in satisfactory condition and which will be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification Rules, or with rules and regulations of other carriers as applicable to the mode of transportation.

### 5.3 Marking.

**5.3.1 Civil agencies.** Interior packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

**5.3.2 Military agencies.** In addition to the requirements of 3.3 and to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

**6.1 Intended use.** The type I herbicide covered by this specification is intended for use in the selective control of crabgrass, knotweed, and nimblewill in established bluegrass turf. If used on bent grasses or narrow-leak fescues, some stunting or thinning may result.

The type II herbicide covered by this specification is intended for use in the selective control of crabgrass and knotweed, but not nimblewill, in established bluegrass turf, St. Augustine grass, Bermuda grass, centipede grass, and zoysia grasses.

Both types prevent the growth of turf grasses seeded soon after treatment. The type II herbicide, however, is less liable to cause foliage burn on turf grasses. Both types should be applied pre-emergence for crabgrass and knotweed control. Type I should be applied post-emergence for nimblewill control as a selective contact herbicide. Both types can act through the soil and root systems as a selective root toxicant or as a systematic seedicide, and in the latter instance absorption and translocation into developing seeds of certain grasses can take place and render them nongerminable.

Neither type controls dandelion, dock, quackgrass, or dallis grass.

**6.2 Ordering data.** Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type of DMPA herbicide required (see 1.2.1).
- (c) Level of packaging and level of packing required (see 5.1 and 5.2).
- (d) Size of container (see 5.1.1 and 5.1.2).

**6.3 Turntable.** An approved turntable for use in conducting the grain size distribution test in 4.5.2.4 is the General Industries, Model TR, motorized 9-inch phonograph turntable, or equivalent.

**MILITARY CUSTODIANS:**

Army—MU

Navy—YD

Air Force—68

Interested activities:

*Review:*

Army—MU, MD

Navy—YD, MS

Air Force—68

*User:*

Army—SM

Navy—MC

Preparing activity:

Navy—YD