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30 JULY 1945

JOINT ARMY-NAVY SPECIFICATION DIETHYLPHTHALATE

(For Use in Explosives)

Army Number
50-11-91A

Navy Number
51D24

This specification was approved by the War Department and the Navy Department for use of procurement services of the Army and the Navy and supersedes the following specification:

U. S. Army
50-11-01
July 18, 1938

Navy Department

A. APPLICABLE SPECIFICATIONS

A-1. The following specifications, of the issue in effect on date of invitation for bids, form a part of this specification:

U. S. ARMY SPECIFICATIONS

50-0-1—General Specifications for Ammunition, except Small Arms Ammunition.¹

100-2—Standard Specification for Marking Shipments by Contractors.

NAVY DEPARTMENT SPECIFICATION

General Specifications for Inspection of Material.²

B. GRADE

B-1. This specification covers one grade of diethylphthalate, as hereinafter specified.

C. MATERIAL AND WORKMANSHIP

C-1. See section E.

D. GENERAL REQUIREMENTS

D-1. See section E.

E. DETAIL REQUIREMENTS

E-1. *Color*.—The color shall be not darker than the standard solution described in paragraph F-4a.

E-2. *Specific gravity*.— 1.12 ± 0.01 at $15^{\circ}/15^{\circ}$ C.

E-3. *Ester content as diethylphthalate*.—Minimum 99.0 percent.

E-4. *Acidity as phthalic acid*.—Maximum 0.03 percent.

E-5. *Ash*.—Maximum 0.01 percent.

¹ Applicable only to Army purchases.

² Applicable only to Navy purchases.

F. METHODS OF SAMPLING, INSPECTION, AND TESTS

F-1. Size of lots.—Maximum 50,000 pounds.

F-2. Sampling.—A minimum of 10 percent of the containers shall be selected by the Government Inspector so as to be representative of the lot. When lots comprise less than 100 containers, either 10 containers or all containers shall be taken. Approximately 8 ounces of material shall be removed from each selected container and a portion placed in a glass bottle having a glass stopper or a cap containing a cork or cardboard liner covered with metal foil. Each primary sample shall be labeled so that the container from which it was taken can be easily identified. The remaining portions of the primary samples shall be thoroughly mixed to form a composite sample of approximately 1 quart. The composite sample shall be placed in a glass bottle having a glass stopper or a cap containing a cork or cardboard liner covered with metal foil and labeled to show the name of the material, manufacturer, plant, contract or order number, lot number and number of pounds in the lot. All acceptance tests shall be made on the composite sample representative of the lot. The primary samples shall be held for possible future examination.

F-3. Inspection.—Inspection shall be made at the point of delivery unless otherwise specified in the contract or order.

F-4. Tests.—The laboratory tests shall be made in accordance with the following paragraphs. For Navy purchases the tests shall be made at a Government laboratory unless otherwise specified in the contract or order.

F-4a. Color.—Add 0.5 ml. of 0.1 N iodine solution to 100 ml. of distilled water. Compare the color with 25 ml. of the sample.

F-4b. Specific gravity.—Determine by means of a pycnometer or Westphal balance.

F-4c. Ester content (as diethylphthalate).—Transfer 20 gm. of the sample to an appropriate size flask and add 50 ml. of 0.5 N alcoholic KOH by means of a calibrated burette or pipette (0.5 N alcoholic KOH is prepared by adding 28 gm. of C. P. KOH to 1 liter of 95-percent alcohol). Fit the flask to a reflux condenser by means of ground joints and heat (on a water bath) until the precipitation appears to be complete. Add approximately 15 ml. of distilled water to dissolve the potassium phthalate and reflux on a water bath for not less than 45 minutes with occasional swirling of the flask. Wash down the sides of the reflux condenser and the ground joints with approximately 25 ml. of the distilled water. Cool the solution to 25° C and titrate with 0.5N HCl using phenolphthalein indicator. At the same time, run a blank determination on 50 ml. of alcoholic KOH, which has been carried through the complete process. Calculate the ester content as percentage of diethylphthalate as follows:

$$\text{Percentage diethylphthalate} = \frac{11.11 (V-v) N}{W}$$

Where

N = normality of the acid used

V = ml. of acid used to titrate blank

v = ml. of acid used to titrate excess of potassium hydroxide after saponification

W = weight of sample

F-4d. Acidity.—Measure 100 ml. of ethyl alcohol into a flask, add 3 drops of phenolphthalein indicator, and titrate the alcohol to a

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faint pink color with 0.1 N sodium hydroxide solution. Add an accurately measured 50 ml. portion of the sample to the alcoholic solution. Titrate the mixture with 0.1 N sodium hydroxide. Calculate the percentage of acidity as phthalic acid as follows:

$$\text{Percent phthalic acid} = \frac{0.166 VN}{G}$$

Where

V = ml. sodium hydroxide required for titration

N = normality of sodium hydroxide solution

G = specific gravity of sample.

F-4e. Ash.—Weigh a portion of approximately 10 gm. of the sample in an accurately tared porcelain crucible. Evaporate nearly to dryness over a low flame or on a hot plate. Ignite the residue to constant weight at a red heat. Cool the crucible in a desiccator and weigh. Calculate the increase in weight as percentage of ash.

F-5. Reaumption.—If the composite sample representative of a lot of drums or other small containers fails to pass the inspection tests, the manufacturer shall have the option of having analysis of each primary sample made at no further expense to the Government. The manufacturer may then remove or replace defective portions of the lot represented by the primary samples which fail to meet the requirements and submit the lot for acceptance, provided the markings on the container are such that complete removal or replacement of defective portions of the lot can be made to the satisfaction of the Government inspector.

G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT

G-1. Packing.—Unless otherwise specified, diethylphthalate shall be delivered in standard commercial containers, so constructed as to insure acceptance by common or other carriers for safe transportation, at the lowest rate, to the point of delivery.

G-2. Marking.—In addition to any special marking required by the contract or order, shipments for the Army shall be marked in accordance with the requirements of U. S. Army Specification 100-2; for the Navy in accordance with the requirements of the latest issue of the Navy Shipment Marking Handbook.

H. NOTES

H-1. Requests, requisitions, schedules, and contracts or orders should contain the title of the specification, the number, and date.

H-2. Uses.—The diethylphthalate covered by this specification is intended for use in the manufacture of propellant powder.

H-3. Copies of Navy Shipment Marking Handbook may be obtained upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C.

H-4. Copies of Joint Army-Navy specifications (required for Army purchases) and U. S. Army specifications may be obtained as indicated in the "Index of United States Army, Joint Army-Navy and Federal Specifications Used by the War Department." Copies of this Index may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Agencies within the War Department will obtain copies of Joint Army-Navy and United States Army specifications through established War Department channels. Both the title and identifying symbol number should be stipulated when requesting copies of specifications.

H-5. Copies of Joint Army-Navy specifications (required for Navy purchases) and Navy Department specifications may be obtained upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C., except that Naval activities should make application to the Supply Officer in Command, Naval Supply Depot, Bayonne, N. J. Both the title and identifying symbol number should be stipulated when requesting copies of specification.

H-6. Copies of this specification required for Army purchases may be obtained from the Office, Chief of Ordnance Army Service Forces, Washington 25, D. C.

H-7. Copies of this specification required for Navy purchases may be obtained as indicated in paragraph H-5.

Notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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