

MIL-M-19719A**5 JULY 1960****SUPERSEDING****MIL-M-19719 (NOrd)****20 DECEMBER 1956****MILITARY SPECIFICATION****METHYL CENTRALITE (FOR AMMUNITION USE)**

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope. This specification covers methyl centralite for use in the manufacture of propellants.

1.2 Classification. Methyl centralite shall consist of the following classes as specified (see 6.2):

Class 1 — Lump

Class 2 — Powder

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standards, of the issue in effect on date of invitation for bids, form a part of this specification.

SPECIFICATIONS**FEDERAL**

PPP-B-41 — Barrels, Wood, Slack.

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

STANDARDS**MILITARY**

MIL-STD-105 — Sampling Procedures and Tables for Inspection of Attributes.

MIL-STD-129 — Marking for Shipment and Storage.

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

OFFICIAL CLASSIFICATION COMMITTEE

Consolidated Freight Classification Ratings, Rules, and Regulations.

(Application for copies should be addressed to the Official Classification Committee, 1 Park Ave. at 38rd Street, New York 16, N. Y.)

AMERICAN TRUCKING ASSOCIATION

National Motor Freight Classification Rules.

(Application for copies should be addressed to the American Trucking Association, 1424 16th Street, N. W., Washington, D. C.)

3. REQUIREMENTS

3.1 Material. Methyl centralite shall be a white crystalline, lump or powder, compound consisting essentially of dimethyldiphenylurea $[\text{CO}(\text{NCH}_2\text{C}_6\text{H}_5)_2]$.

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3.2 Solidification point. When tested as specified in 4.4.1, the solidification point shall be not less than 120.5° C and not more than 122° C.

3.3 Appearance of melted material. Methyl centralite shall melt to a bright clear liquid, free from scum and deposit.

3.4 Volatile matter. When tested as specified in 4.4.3, the loss in weight shall not exceed 0.20 percent.

3.5 Ash content. When tested as specified in 4.4.4, the ash content shall not exceed 0.1 percent.

3.6 Hydrolyzable chlorine compounds. Methyl centralite, tested as indicated in 4.4.5, shall give no indication of the presence of hydrolyzable chlorine compounds.

3.7 Acidity. Material, when tested as indicated in 4.4.6, the acidity shall not exceed 0.006 percent acid calculated as acetic acid.

3.8 Amines. The content of the amines shall not exceed 0.20 percent calculated as methyl aniline, when tested as specified in 4.4.7.

3.9 Particle size (Class 2-powder). When tested as specified in 4.4.8, 100 percent of the material shall pass through a U. S. Standard No. 50 (297 micron) sieve conforming to Specification RR-S-366.

3.10 Workmanship. Methyl centralite shall be free from grit, visible impurities and foreign matter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Gov-

ernment. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 Sampling.**4.2.1 Size of lot.**

4.2.1.1 At place of manufacture. For the purpose of sampling, a lot of methyl centralite shall consist of a manufacturer's batch. If the material cannot be identified by batch, a lot shall consist of not more than 5,000 pounds of methyl centralite offered for delivery at one time.

4.2.1.2 At place of delivery. For purpose of sampling, a lot of methyl centralite shall consist of all the methyl centralite in a single shipment.

4.2.2 Samples. The sample size shall be determined in accordance with MIL-STD-105 Inspection Level I. The minimum sample size shall consist of ten (10) containers unless the entire lot is composed of ten or less containers in which case all containers shall be selected. From each selected container, a primary sample of one pound shall be removed by means of a scoop or sampling thief. An 8-ounce portion shall be placed in a rubber-stoppered bottle and 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 and quartered until a composite sample of approximately one pound is obtained. The composite sample shall be placed in a rubber-stoppered bottle and labeled to show the name of the material, manufacturer, plant, contract or order number, number of pounds in the lot, and lot number. Acceptance tests shall be made on the composite sample representative of the lot at the facility specified in the contract or purchase order. The primary samples shall be held for possible future examination should the composite sample fail to meet the requirements.

4.3 Inspection. The inspector shall inspect the packing and marking for compliance with section 5.

4.4 Tests.

4.4.1 Solidification point. Spread about 50 grams of the sample on a glass tray and dry in an oven at 100° C overnight. Then melt the sample in an oven at 125° C. Fill the inner tube of the solidification point apparatus (Fig. 1) to within 1½ inch of the top with the melted sample. Close the test tube with the cork carrying the stirrer and calibrated thermometer. Adjust the height of the calibrated thermometer so that the bulb is in the center of the molten sample. Allow the material to cool with constant stirring to within 2° C of the freezing point. Then place the tube in its place in the apparatus. Stir slowly and constantly, reading the temperature every 15 seconds. Continue stirring until the temperature stays steady for three readings after the rise from super cooling. Carefully watch the mercury thread as soon as it begins to rise and note the maximum rise, also the length of time this maximum is maintained. Determine the correction for emergent stem by determining the average temperature of the exposed mercury column of the standard thermometer by means of a second thermometer suspended about 1 cm from the standard thermometer, with its bulb about the middle of the exposed mercury column.

Emergent stem

$$\text{correction} = N (T-t) \times 0.000159$$

where N = length of exposed mercury column expressed in degrees.

t = average temperature of the exposed mercury column determined by means of a second thermometer suspended so that its bulb is in the midpoint of the exposed mercury column.

T = the uncorrected solidification point.

0.000159 = the coefficient of expansion of mercury in glass.

Record the correction reading as the solidification point of the sample. Corrected reading is ° C = T + emergent stem correction.

4.4.2 Appearance of melted material. Determine by visual examination when melting the sample for solidification point test.

4.4.3 Volatile matter. Transfer a 10 gram portion of the sample, weighed to the nearest 0.1 milligram, to a tared glass-stoppered weighing bottle. Heat in an oven at 100° C to 105° C for three hours, cool in a desiccator, and weigh. Calculate the loss in weight as percentage of volatile matter.

$$\text{Percent of volatile matter} = \frac{\text{loss in weight}}{\text{wt. of sample}} \times 100$$

4.4.4 Ash. Transfer a weighed sample of approximately 5 grams of the material to a tared porcelain crucible and add sufficient 95 percent ethyl alcohol to cover the material. Ignite the mixture and allow it to burn down slowly and then heat to redness until all carbon has been removed. Cool in a desiccator and weigh. Calculate the increase in weight to percentage ash in the sample as follows:

$$\text{Percent ash} = \frac{\text{increase in weight of tared crucible}}{\text{weight of sample}} \times 100$$

4.4.5 Hydrolyzable chlorine compounds. Warm 5 grams of methyl centralite on a water-bath for 15 minutes with 10 ml. of a 5 percent solution of sodium ethylate in alcohol. Dilute the liquid to 100 ml. with distilled water and allow methyl centralite to crystallize. Filter, acidify the filtrate with concentrated nitric acid and add 5 ml. of 10 percent silver nitrate. The opalescence should not be greater than that produced by a blank containing equal volume of solution using all reagents except sample.

4.4.6 Acidity. Dissolve 20 grams of methyl centralite in 100 ml. of benzene and extract with three successive 25 ml. portions of boiled distilled water. Titrate the total ex-

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tract with N/.02 sodium hydroxide solution using phenolphthalein as indicator. Carry out a blank estimation concurrently with the determination. Calculate as follows:

$$\text{Percent acetic acid} = \frac{6.0 N (V-B)}{W}$$

where N = normality of sodium hydroxide solution.

V = volume of sodium hydroxide solution for sample.

B = volume of sodium hydroxide solution for blank.

W = weight of sample.

4.4.7 Amines. Dissolve 25 grams of methyl centralite in 30 ml. of hot benzene. Add 5 ml. of a xylene solution of acetic anhydride of approximately N/4 concentration. Allow the stoppered flask containing the mixture to stand overnight. Add 25 ml. of N/10 sodium hydroxide solution, shake thoroughly and transfer to a separating funnel. Wash the flask with distilled water and add the washings to the contents of the funnel. Add 25 ml. of N/10 hydrochloric acid, shake and then separate the aqueous layer. Wash the funnel with successive quantities of distilled water, adding the washings to the separated aqueous layer. Titrate with N/10 sodium hydroxide solution using phenolphthalein as indicator. Carry out a blank estimation concurrently with the determination.

$$\text{Percent of methylaniline} = \frac{10.7(V_1 - V_2)N}{W} - (A \times 1.78)$$

where V_1 = volume of sodium hydroxide required to titrate blank.

V_2 = volume of sodium hydroxide required to titrate sample.

N = normality of sodium hydroxide solution.

W = weight of sample.

A = percent acidity as acetic acid.

Note. This method is not specific for amines but will detect other groups such as OH.

4.4.8 Particle size. (Class 2-powder) — Fit a No. 50 (297 micron) U. S. standard sieve

with a bottom pan. Place a weighed portion of 100 gm of the sample on the sieve. Cover and shake for 10 minutes by hand or for 5 minutes by means of a mechanical shaker geared to produce 300 ± 15 gyrations and 150 ± 10 taps of the striker per minute. Weigh the amount retained on the sieve (if any) and calculate percentage of material passing through the sieve.

4.4.9 Resubmission. If the composite sample, or any primary sample subjected to test fails to pass the tests, the lot shall be rejected. The contractor shall then have the option of having a partial or complete analysis made on samples from any or all of the containers in the lot at no expense to the Government. The contractor may then remove the defective portions of the lot and resubmit the lot for acceptance, provided complete replacement of the defective portions can be made to the satisfaction of the inspector. The resubmitted lot shall be accepted, provided that new samples, selected in accordance with 4.2.2, pass all the tests required by this specification.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. (Not applicable).

5.2 Packing.

5.2.1 Level A. Unless otherwise specified, the methyl centralite shall be packed in slack wood barrels conforming to Specification PPP-B-41.

5.2.2 Level C. Methyl centralite shall be packed to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Containers shall comply with Consolidated Freight Classification Rules and Container Specifications for rail shipments or National Motor Freight Rules and Containers Specifications for truck shipments, as applicable.

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5.3 Marking. In addition to any special marking specified by contractor or order, shipments shall be marked in accordance with standard MIL-STD-129.

6. NOTES

6.1 Intended use. Methyl centralite is used as a coating agent in propellants and in the manufacture of propellant powders.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. Selection of applicable level of packing.
- c. Class of material desired.

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.

Custodians:

Army—Ordnance Corps
Navy—Bureau of Naval Weapons
Air Force—MAMA

Preparing activity:

Navy—Bureau of Naval Weapons

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APPARATUS FOR DETERMINING SOLIDIFICATION
OR SETTING POINT

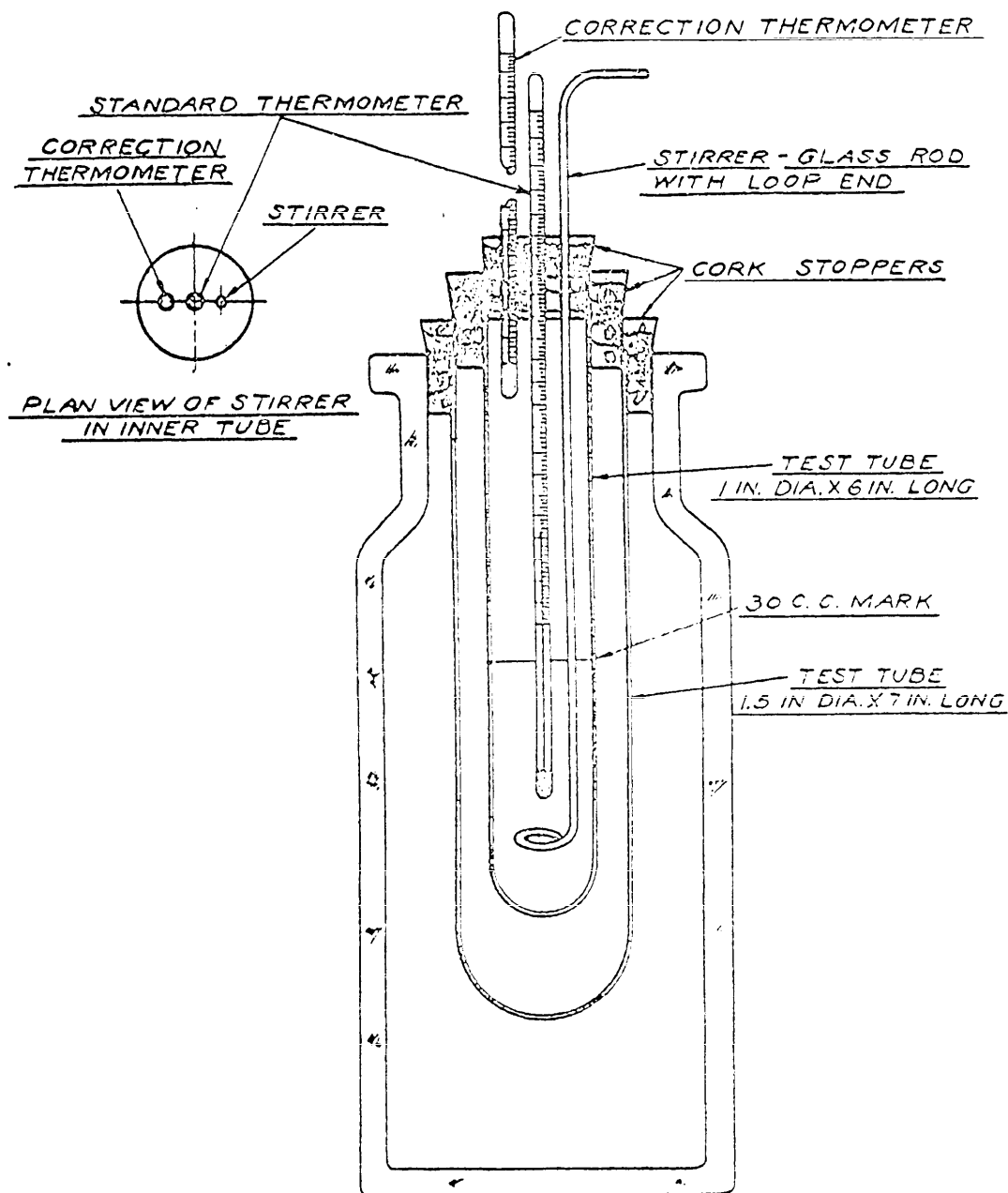


FIG-1- LARGE MOUTH LITER BOTTLE.
1000 C.C. CAPACITY