

**JAN-C-99**

31 OCTOBER 1944

JOINT ARMY-NAVY SPECIFICATION  
CEMENT, PETTMANArmy Number  
50-11-8CNavy Number  
52C34

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-SB

4 January 1943

Navy Department

**A. APPLICABLE SPECIFICATIONS.**

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

**U. S. ARMY SPECIFICATIONS**50-0-1—General Specification for Ammunition except Small Arms Ammunition.<sup>1</sup>

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

4-1018—Ethyl Alcohol.

**NAVY DEPARTMENT SPECIFICATION**General Specifications for Inspection of Material.<sup>2</sup>**FEDERAL SPECIFICATIONS**

RR-S-366—Sieves, Standard Testing.

TT-P-141—Paint, Varnish, Lacquer and Related Materials; General Specifications. (Methods for Sampling and Testing.)

TT-S-271—Shellac, Orange.

JJJ-T-121—Tar, Pine, Technical Grade.

LLL-R-626—Rosin.

**B. TYPES.**

B-1. This specification covers two types of cement: Type A, Pettman cement; Type B, modified Pettman cement.

**C. MATERIAL AND WORKMANSHIP.****C-1. Material.—**

C-1a. *Iron oxide.*—The iron oxide shall be a ground iron oxide ore, not less than 96.5 percent of which shall pass through a No. 325 (44 micron) U. S. Standard sieve. It shall contain not less than 50 percent of ferric oxide. ( $Fe_2O_3$ ), and the total of ferric oxide, insoluble siliceous material, and loss on ignition shall be not less than 90 percent.

C-1b. *Ethyl alcohol.*—The alcohol used shall be either Grade 2 alcohol or a mixture of ethyl and methyl alcohols complying with the requirements for Grade 4 alcohol except that it shall contain a maximum of 5 percent of methyl alcohol and no benzene.

C-1c. *Ethyl cellulose.*—The ethyl cellulose used shall be a technical grade soluble in alcohol.

C-1d. *Shellac.*—Type I, Grade D shellac shall be used.

C-1e. *Rosin.*—Type I, Grade D rosin shall be used.

<sup>1</sup> Applicable only to Army Purchases.<sup>2</sup> Applicable only to Navy Purchases.

**C-2. Workmanship.—**

**C-2a. Type A cement.**—Pettman cement should be prepared by mixing the pine tar and alcohol, adding the shellac, and stirring well. After the mixture has been allowed to stand for about 20 hours, it is stirred thoroughly and the iron oxide is added in small portions with continuous stirring. Stirring is continued until a product of uniform consistency is obtained.

**C-2b. Type B cement.**—Modified Pettman cement should be prepared by mixing the alcohol and ethyl cellulose until a clear solution is obtained, adding the rosin and mixing until this is dispersed, adding the pine tar with thorough stirring, and finally adding the iron oxide in small portions with continuous stirring. Stirring is continued until a product of uniform consistency is obtained.

**C-2c. Viscosity.**—Both types shall be so prepared that the finished material will have a viscosity of  $18 \pm 5$  seconds at  $25^{\circ}$  C. when determined by method 428.2 of Federal Specification TT-P-141 using the consistency cup which has an orifice  $0.15 \pm 0.0001$  in diameter.

**D. GENERAL REQUIREMENTS.**

D-1. See Section E.

**E. DETAIL REQUIREMENTS.**

**E-1. Composition.**—The composition of the two types of Pettman cement shall be as follows:

	<i>Type A</i> Percent	<i>Type B</i> Percent
Iron oxide-----	$50 \pm 3.0$	$33 \pm 2.0$
Alcohol-----	$20 \pm 2.0$	$19 \pm 2.0$
Pine tar-----	$12 \pm 1.5$	$17 \pm 2.0$
Shellac-----	$18 \pm 2.0$	-----
Rosin-----	-----	$30 \pm 2.0$
Ethyl cellulose-----	-----	$1 \pm 0.5$

**F. METHODS OF SAMPLING, INSPECTION, AND TESTS.**

**F-1. Size of lots.**—Maximum, 1,000 gallons.

**F-2. Sampling.**—Sampling shall be done as follows: Select 10 percent but not more than 10 of the containers comprising the lot, and mix thoroughly the contents of each selected container. Remove a sample of not more than 1 pint from each selected container. Label each of the primary samples so that the container from which it was taken can be identified easily. Make a composite sample of approximately 1 pint from equal portions of the primary samples, and mix this thoroughly. Place the composite sample in an airtight container and label so as to show the name of the material, type, manufacture, plant, purchase order, and number of gallons in the lot. All acceptance tests shall be made on the composite sample representative of the lot. Hold the primary samples for possible future examination should the composite sample fail to meet the requirements.

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

**F-4. Tests.**—The following tests shall be made at a Government laboratory unless otherwise specified in the contract or order.

**F-4a. Iron oxide.**—Stir the sample so as to mix thoroughly, and transfer a weighed portion of approximately 2 gm. to a tared platinum or porcelain crucible. Remove the combustible material by burning, and ignite the residue to constant weight. Calculate the weight of residue to percentage of iron oxide in the sample.

**F-4b. Alcohol.**—Transfer a weighed portion of 1.0 to 1.5 gm. of the thoroughly mixed sample to a tared glass or metal weighing dish 2 inches in diameter. Distribute the cement in as thin a layer as prac-

licable and dry for 6 hours at 75° C. in the case of Type A material or for 2 hours in the case of Type B material. Cool the dish and contents in a desiccator and weigh. Calculate the loss in weight to percentage of alcohol in the sample.

F-4c. *Shellac*.—Weigh a fritted-glass crucible of approximately 40 ml. capacity containing a short glass stirring rod and approximately 15 gm. of clean sand which passes the No. 20 (840 micron) U. S. Standard sieve and is retained on the No. 30 (590 micron) U. S. Standard sieve. Transfer 1.0 to 1.3 gm. of the sample to the sand in the crucible. Avoid getting the sample on the inner wall of the crucible. Accomplish the transfer and weighing as rapidly as possible in order to reduce to a minimum the error due to loss of solvent. Mix the sample thoroughly with the sand by means of the stirring rod. Heat the crucible and contents in an oven at approximately 100° C. for ½ hour, remove the crucible from the oven and to the still hot crucible add 15 ml. of boiling carbon tetrachloride. Break up the agglomerate as completely as possible with the stirring rod. Allow carbon tetrachloride to remain in contact with the sample, with constant stirring, for a total of approximately one minute then apply suction. Add a 10 ml. portion of boiling carbon tetrachloride, stir the contents for about ½ minute and apply suction and repeat this procedure five times. After the final extraction aspirate the residue until the odor of carbon tetrachloride is no longer detectable. Heat the crucible for about ½ hour in an oven at approximately 100° C., cool in a desiccator and weigh. Add 10 ml. of boiling carbon tetrachloride to the crucible and stir for ½ minute. Apply suction and aspirate until the odor of carbon tetrachloride is no longer detectable. Heat the crucible for about ½ hour in an oven at 100° C., cool in a desiccator, and weigh. If the loss in weight effected by this extraction exceeds 0.003 gm. repeat the extraction with 10 ml. portions of solvent as described above until the loss in weight effected by the final extraction is 0.003 gm. or less. Calculate the weight of residue to percentage of shellac in the sample.

$$\text{Shellac, percent} = \frac{100A - BC}{0.95 W}$$

Where

A = weight of residue.

B = percentage of iron oxide in the sample.

W = weight of sample.

The correction factor 0.95 is based on an estimated 5 percent wax content of the shellac since the wax is extracted by the carbon tetrachloride.

F-4d. *Pine tar*.—Calculate the percentage of pine tar in Type A material by subtracting from 100 the sum of the percentages of iron oxide, alcohol, and shellac determined as described in paragraphs F-4a, F-4b, and F-4c.

F-4e. *Pine tar, rosin, and ethyl cellulose*.—Calculate the percentage of pine tar, rosin, and ethyl cellulose in Type B material by subtracting from 100 the sum of the percentages of iron oxide and alcohol determined as described in paragraphs F-4a and F-4b.

F-5. *Re-tests*.—If the official sample representative of the lot fails to pass the inspection tests, the manufacturer shall have the option of having analyses and tests of each primary sample made at his own expense. The manufacturer may then replace defective portions of the lot represented by the primary samples which fail to meet the requirements and again submit the lot for inspection and acceptance, provided the markings on the containers are such that complete replacement of defective portions of the lot can be made to the satisfaction of the inspector.

**G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.**

G-1. *Packaging.*—Pettman cement shall be furnished, unless otherwise specified, in commercial metal cans or pails of not more than 10 gallons capacity, or in barrels or drums, complying with applicable regulations of the Interstate Commerce Commission.

G-2. *Packing.*—Unless otherwise specified, cans or pails of cement shall be wood-jacketed or packed in commercial containers so constructed as to insure acceptance for safe transportation by common or other carriers at the lowest rate to the point of delivery.

G-3. *Marking.*—Unless otherwise specified each container shall be plainly marked with the following information completed:

MATERIAL .....	MANUFACTURER .....
TYPE .....	CONTRACT NO. ....
STOCK NO. ....	GROSS WEIGHT .....
QUANTITY .....	DATE .....
CONTRACTOR .....	LOT NO. ....

In addition, 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 material covered by this specification is intended for use as a waterproofing cement in the loading and assembly of ammunition.

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 and Federal Specifications (required for Army purchases) and U. S. Army specifications may be obtained, as indicated in the "Index of United States Army 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, United States Army, and Federal 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 and Federal 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 specifications.

**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 or 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.

NAVY: OS

[JAN-C-99]

## SPECIFICATION ANALYSIS SHEET

Form Approved  
Budget Bureau No. 119-11004

## INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hercof).

SPECIFICATION

ORGANIZATION (Of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

YES

NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

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