JAN-B-366

15 JULY 1946

JOINT ARMY-NAVY SPECIFICATION

BARIUM STEARATE

Army Number	Navy Number
50-11-139	5189

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

A. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATION.

A-1. *Specifications.* 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 Specification for Ammunition except Small Arms Ammunition.[1]

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

NAVY DEPARTMENT SPECIFICATION

General Specifications for Inspection of Material.[2]

FEDERAL SPECIFICATION

RR-S-366—Sieves; Standard, Testing.

A-2. *Other publication.* The following publication, of the issue in effect on date of invitation for bids, forms a part of this specification:

BUREAU OF SUPPLIES AND ACCOUNTS PUBLICATION

Navy Shipment Marking Handbook.[2]

B. GRADE.

B-1. This specification covers one grade of barium stearate 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. *Moisture.*—Maximum, 0.2 percent.

E-2. *Melting point.*—Minimum, 240° C.

[1] Applicable only to Army purchases.
[2] Applicable only to Navy purchases.

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E–3. *Water-soluble salts.*—Maximum, 0.5 percent.—

E–4. *Barium content.*—20.0 ± 0.5 percent.

E–5. *Acidity or alkalinity.*—Maximum, 0.01 percent.—

E–6. *Grit.*—None.

E–7. *Granulation.*—Barium stearate shall conform to the following granulation requirements using U. S. Standard sieves conforming to the requirements of Federal Specification RR–S–366:

	Percent, (min.)
Through No. 100 sieve	95.5
Through No. 200 sieve	95

F. METHODS OF SAMPLING, INSPECTION, AND TESTS.

F–1. *Size of lots.*—For purposes of inspection, a lot shall not exceed 50,000 pounds and shall consist of material from not more than one manufacturing batch of barium stearate. (See par. H–4.)

F–2. *Sampling.*—Three containers shall be selected, at random, from the lot for sampling purposes. If there are fewer than 3 containers in the lot, all the containers shall be selected. A ½ pound representative sample shall be taken from each selected container and placed in a tightly-stoppered bottle. The samples shall be thoroughly mixed to form a composite sample representative of the lot. The bottle shall be labeled to identify the sample with the lot represented.

F–3. *Inspection.*—

F–3a. *Army.*—Inspection shall be made in accordance with the requirements of U. S. Army Specification 50–0–1.

F–3b. *Navy.*—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. *Moisture.*—Transfer a weighed portion of approximately 2 gm of the sample to a tared, glass weighing dish. Dry the dish and contents at 100° to 105° C for 2 hours, cool in a desiccator and weigh. Calculate the loss in weight as percentage of moisture in the sample.

F–4b. *Melting point.*—

F–4b(1). *Apparatus.*—Set up a melting point bath equipped with a mechanical stirrer and a source of heat than can be easily regulated. A beaker of 1 to 2 liters capacity about three-fourths full of clear cottonseed oil is suitable. Suspend an accurately standardized total immersion centigrade thermometer in the bath so that the bulb is not less than 1½ inches from the bottom of the bath. If the mercury column will not be completely immersed at the temperature of the observed melting point, suspend a second thermometer about ½ inch from the first thermometer with its bulb at the height of the middle of the exposed mercury column of the first thermometer.

F–4b(2). *Procedure.*—Use thin-walled capillary tubes of uniform diameter, long enough to extend above the top of the bath.

Fill the tube with barium stearate to a depth of approximately 4 mm., compact by tapping, and fasten the tube to the standardized thermometer so that the lower end of the tube is in contact with the bulb of the thermometer. Start the stirrer, heat the bath rapidly to about 230° C. and then gradually so that the rise in temperature does not exceed 1 degree in 1 minute. Record the temperature observed at the instant the first meniscus of melted material appears across the capillary tube.

F–4b(3). *Report.*—If the mercury column is completely immersed at the above temperature, report this temperature as the melting point of the sample. If part of the column is exposed, add the following correction to the observed melting point:

$$n(T-t) \times 0.00016$$

where

n = number of degrees in the exposed column
T = uncorrected melting point
t = average temperature of exposed column.

F–4c. *Water-soluble salts.*—Transfer a weighed portion of approximately 1 gm. of the sample to a platinum crucible and ignite until all of the carbonaceous matter has been consumed. Cool and weigh the crucible, place it in a 250-ml. beaker, cover with distilled water, and boil gently for 15 minutes. Filter the solution through an ashless filter paper, and wash the crucible and beaker, decanting the washings through the filter. Place the filter paper in the crucible, dry, and ignite until all carbonaceous matter is consumed. Cool the crucible and contents, weigh, and from the difference between the weights before and after extraction with water, calculate the percentage of water-soluble salts in the sample.

F–4d. *Barium content.*—Place the crucible and residue from the determination of water-soluble salts, specified in paragraph F–4c, in a small beaker. To the crucible add 10 ml of distilled water and 10 ml. of 20-percent hydrochloric acid, covering the beaker immediately with a watch-glass. After the reaction has subsided, remove the dish and wash the contents into the beaker. Filter the solution, washing any insoluble residue on the filter with hot distilled water. Place the filter paper and residue in the platinum dish and burn off the paper. To the ash add 2 ml. of hot 20-percent hydrochloric acid, heat for a few minutes, and add 10 ml. of distilled water. Filter the solution and wash the filter and residue with hot distilled water, catching the filtrate and washings in the beaker containing the combined solutions to approximately 250 ml. and heat to boiling. Add 50 ml. of 10-percent sulfuric acid, continue boiling for a few minutes, and allow the beaker to stand on a steam bath until the precipitate of barium sulfate has settled completely. Transfer the precipitate to a tared filtering crucible and wash 10 times with hot distilled water. Heat the crucible and contents at 100° to 105° C. for one half hour and then at 600° C. (dull red heat) for one hour. Cool the crucible and precipitate in a desiccator and weigh. Calculate the weight of precipitate to percentage of barium in the sample on a moisture-free basic.

$$\text{Percentage of barium} = \frac{58.85A}{W}$$

where

A is the weight of precipitate
W is the weight of the dry sample.

F–4e. *Acidity or alkalinity.*—Emulsify a 5-gm. portion of the sample with 50 ml. of petroleum ether and transfer the emulsion to a separatory funnel. Add 100 ml. of distilled water and shake thoroughly. Allow the water to separate and transfer it to a beaker. Add a few drops of phenolphthalein indicator and note if mineral alkalinity is absent as indicated by failure of the solution to turn pink. If the solution is not alkaline, add a few drops of methyl red indicator and note if mineral acidity is absent as indicated by the solution turning yellow in color. If the presence of mineral alkalinity or acidity is indicated, titrate the solution with approximately N/10 acid or alkali and calculate to percentage of barium hydroxide or sulfuric acid in the sample.

F–4f. *Grit.*—Transfer a 5-gm. portion of the sample to a platinum dish and heat until nearly all the carbonaceous matter is consumed. Add 10 ml. of 20-percent hydrochloric acid solution and heat gently. Dilute the solution with distilled water and filter, transferring the residue to the filter paper. Wash the residue with hot water. Dry the filter paper and heat in the platinum dish until all carbonaceous matter is consumed. Transfer the residue to a smooth glass slide and rub on the glass by exerting pressure with a smooth steel spatula blade. Note if particles of grit are present as indicated by lack of uniformity of the material and the persistence of a scratching noise when pressing and rubbing of the material on the glass plate is continued.

F–4g. *Granulation.*—Superimpose a tared U. S. Standard No 100 sieve on a tared U. S. Standard No. 200 sieve. Place a 50-gm. portion of the sample in a beaker and wet thoroughly with water containing a wetting agent. Transfer the mixture to the No. 100 sieve and wash with water until no more material passes through the sieve. Remove the No. 100 sieve and wash any material held on the No. 200 sieve until no more material passes through it. Dry the sieves at 100° to 105° C., cool and weigh. From the weights of material held on the sieves, calculate the percentages of the sample passing through each sieve.

F–5. *Rejection and resubmission.*—If the composite sample fails to conform to any of the requirements of this specification, the inspection lot shall be rejected. The contractor shall have the option of having a partial or complete analysis made on each container in the lot at no expense to the Government. The contractor may then remove defective portions of the inspection lot and resubmit the lot for acceptance.

G. PACKAGING, PACKING AND MARKING FOR SHIPMENT.

G–1. *Packing.*—Unless otherwise specified in the contract or order, barium stearate shall be packed in commercial barrels or drums 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 the U. S. Army Specification 100–2; for the Navy, in accordance with the requirements 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. *Use.*—Barium stearate covered by this specification is intended for use as a binder and lubricant in the pelleting of explosives.

H–3. *Army.*—This specification replaces Picatinny Arsenal Tentative Specification PXS–1050.

H–4. A batch is defined as that quantity of material which has been subjected to some unit chemical or physical mixing process intended to make the final product substantially uniform.

H–5. 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, 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, U. S. 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–6. Copies of Joint Army-Navy specifications and Federal specifications (required for Navy purchases), Navy Department specifications, and Navy Shipment Marking Handbook 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 stimulated when requesting copies of specifications.

H–7. Copies of this Joint Army-Navy specification (required for Army purchases) may be obtained from the Office, Chief of Ordnance, War Department, Washington 25, D. C.

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