

MIL-P-17449 (NOrd)

29 October 1953

SUPERSEDING

NAVY-4P14(Ord)

25 October, 1946

MILITARY SPECIFICATION

POWDER, PROPELLANT, CORDITE N

1. SCOPE

1.1 Scope. - This specification covers propellant powder for Naval guns.

1.2 Classification. - The powder shall be of the following types, as specified in the contract or order (see 6.1):

Type I - Cylindrical multi-perforated grains.

Type II- Cylindrical single-perforated grains.

2. APPLICABLE SPECIFICATIONS, STANDARDS, DRAWINGS AND PUBLICATIONS

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

SPECIFICATIONS

MILITARY

- JAN-A-463 - Alcohol, Ethyl (For Ordnance Use).
- JAN-A-489 - Acetone (For Ordnance Use).
- JAN-E-255 - Ethyl Centralite (Carbamite).
- JAN-N-244 - Nitrocellulose (For Use in Explosives).
- JAN-N-246 - Nitroglycerine.
- JAN-N-494 - Nitroguanidine (Picrite).
- JAN-P-193 - Potassium Sulphate (For Ordnance Use).
- JAN-P-270 - Powder, Propellant, Cannon.
- JAN-P-323 - Powder, Propellant, Cannon, M2 and M5.
- JAN-P-381 - Powder, Propellant, 4.2" Chemical Mortar

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NAVY DEPARTMENT

General Specifications for Inspection of Material

BUREAU OF ORDNANCE

OS 1666 - Powder, Propellant, US Navy Guns -
Ballistic Appendix, Navy

STANDARDS

MILITARY

MIL-STD-129 - Marking of Shipments

DRAWINGS

BUREAU OF ORDNANCE

Packing Box MK 7 and Mods, except Mod 1.

(Copies of specifications, standards, drawings and publications 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 publication, of the issue in effect on date of invitation for bids, forms a part of this specification.

CODE OF FEDERAL REGULATIONS

49 CFR 71.1 - Transportation, Interstate Commerce
Commission, Explosives and Other Dangerous Articles.

(Copies of the regulations cited are obtainable from the Superintendent of Documents, Government Printing Office.)

3. REQUIREMENTS

3.1 Materials. - The raw materials used in the manufacture of the powder shall conform to the applicable specifications listed in 2.1. For the following materials, the types and grades shall be as indicated:

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Alcohol - Specification JAN-A-463, Grade 2.

Nitrocellulose - Specification JAN-N-244, Grade C, type I, except that the tolerance on percent nitrogen shall be ± 0.15 .

Potassium Sulphate - Specification JAN-P-193, Grade A.

3.2 Composition. - The composition of the powder, exclusive of total volatiles and flash eliminating salt, shall be as shown in table I.

Table I - Composition

	Percent
Nitrocellulose*	19.0 ± 1.0
Nitroglycerine	18.7 ± 1.0
Ethyl centralite	7.3 ± 0.5
Nitroguanidine	55.0 ± 1.5

* Includes total added calcium carbonate where permitted.

3.2.1 Total volatiles. - Total volatiles content of the powder shall not exceed 0.30 percent.

3.2.3 Flash eliminating salt. - When specified in the contract or order, flash eliminating salt such as potassium sulphate shall be incorporated in the powder. When used, the amount of such salt shall be within ± 0.25 percent of the approved amount expressed on a volatiles-free basis (see 6.1).

3.2.4 Ash. - The ash content, expressed on a volatiles-free basis, shall not exceed 0.30 percent, exclusive of alkalinity as CaCO_3 and flash eliminating salt.

3.3 Processing. -

3.3.1 Process approval. - Details of the manufacturing process and the equipment used by the contractor shall be submitted in writing to the Chief of the Bureau of Ordnance, Navy Department, Washington 25, D.C., and written approval received prior to commencement of manufacture. Any deviation from the approved manufacturing process shall be submitted in writing, and the written approval of the Bureau of Ordnance obtained prior to use. See 6.1.

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3.3.2 Description sheets. - With every lot of powder submitted for acceptance, the manufacturer shall furnish on official blanks 8 copies of a description sheet giving a complete history of its manufacture and chemical and physical analyses.

3.3.3 Process. - The manufacturing process shall be as follows, unless approval of deviation is obtained in accordance with 3.3.1.

3.3.3.1 Dehydration of nitrocellulose. - Nitrocellulose shall be dehydrated with alcohol of the specified grade so as to thoroughly remove water. The excess alcohol shall be removed by pressure, leaving no more alcohol than that required for mixing. At least 1.10 pounds of alcohol for each pound of dry nitrocellulose in the press charge shall be pumped through the block. This includes the amount of alcohol left in the finished block.

3.3.3.2 Mixing. - Using suitable mechanical mixers, the dehydrated nitrocellulose shall be thoroughly broken up and mixed with the nitroguanidine and any flash eliminating salt specified. The nitroglycerin, desensitized with acetone, and any additional solvent required shall then be added, and the material thoroughly mixed (not less than 20 minutes). After this preliminary mixing, the required amount of ethyl centralite shall be added and the mixing continued until a homogeneous mixture is obtained. If necessary, additional amounts of acetone, alcohol or both may be added. The ethyl centralite shall be thoroughly screened or run through a pulverizer before incorporation in the mix. The mixer shall be run for at least 3 hours after the ethyl centralite has been added, and the temperature of the mix shall not exceed 40°C. Clean green scrap colloid from the cutting machines, presses and mixers, and hard scrap if cleaned and properly softened may be reworked separately or in subsequent mixings of the powder composition. Green scrap shall not be collected for reuse from sweepings, die head cake, or other sources of possible contamination. After mixing, the colloid shall be transferred to a macerator and processed for sufficient time to obtain the maximum degree of colloidizing.

3.3.3.2.1 Modified procedures. - The mixing procedure specified above, or suitable modification of those procedures proposed by the contractor and approved by the Bureau of Ordnance may be used, providing that the mixing, incorporation, uniformity and visual homogeneity of the powder so processed is the equivalent of that produced in accordance with the procedure of 3.3.3.2 and meets the requirements of this specification, including ballistic requirements, 3.6.

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3.3.3.3 Straining and granulation. - The charge from the macerator, or from the final mixing if no macerator is used, shall be blocked and then strained through screens in a "macaroni" press to promote more thorough colloidizing and to remove uncolloided nitrocellulose and foreign particles such as pieces of metal, wood, etc. The colloid shall then be blocked, and granulated by extrusion through dies, followed by cutting to desired lengths. Suitable screens shall be used in the graining presses to further assure removal of any foreign material and to reduce the amount of uncolloided material to a minimum.

3.3.3.4 Drying. - The drying operations shall be so conducted as to remove the solvent slowly and uniformly so as to prevent wrinkled, cracked, belled, blistered or otherwise deformed grains. At no stage in the drying operations shall the temperature of the propellant exceed 45°C. Drying shall be continued until the volatiles content does not exceed the maximum permitted.

3.3.3.5 Screening. - Hand sorting or suitable screening equipment (or both) may be used to produce finished powder with a minimum of cracked, distorted, scorched, streaked, blistered or spotted grains, or lumps, clusters, grains with unsymmetrical perforations, uncolloided material, air cavities, butt ends and long grains. The method of sorting shall be indicated in the report on details of manufacture submitted in accordance with 3.3.1.

3.3.3.6 Blending. - The powder shall be blended in lots of the sizes indicated in specification JAN-P-270. Temperature during blending shall be less than 35°C.

3.3.3.7 Protection. - The powder and all its ingredients shall at all times be protected from the action of direct sunlight and acid fumes.

3.3.3.8 Reground material. - No reground powder or nitrocellulose shall be used. This does not prohibit the use of clean green scrap and hard scrap as described in 3.3.3.2.

3.4 Grain forms and dimensions. - The grain form and dimensions for the type specified in the contract or order (see 6.1) shall conform to the corresponding type of Specification JAN-P-270.

3.5 Stability. -

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3.5.1 Heat test at 65.5°C. - When tested as specified in 4.2.3 the minimum time for discoloration of the test paper shall be 15 minutes.

3.5.2 Stability test at 120°C. - When tested as specified in 4.2.4 no sample shall turn the methyl violet paper to salmon pink in less than 40 minutes, or show visible evidence of fumes in 60 minutes or less.

3.5.3 Surveillance test at 65.5°C. - Unless otherwise specified, the powder shall pass the 65.5°C surveillance test for its particular web thickness. Acceptance, however, shall not be deferred pending completion of any surveillance test.

3.6 Ballistic requirements. - The powder shall conform to the ballistic requirements of the contract or order and of Specification OS 1666.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Sampling and Inspection. - Sampling and inspection shall be in accordance with Specification JAN-P-270. For Naval purchases, the general inspection procedures shall be in accordance with General Specifications for Inspection of Material.

4.1.1 Ballistic sample. - The sample for ballistic tests shall be marked and shipped in accordance with Interstate Commerce Commission Regulations to the Naval Proving Ground, Dahlgren, Va., for firing tests.

4.1.2 Chemical samples. - Samples for chemical tests shall be submitted in accordance with specification JAN-P-270.

4.1.3 Stability samples. - In addition to the above, a stability sample of 10 pounds from each lot shall be shipped to the Naval Powder Factory, Indian Head, Md. for storage as a retained sample.

4.2 Test procedures. -

4.2.1 Preparation and extraction of samples. - Grind or shave as thinly as possible with a powder cutter a representative sample of the powder. Reserve a sufficient amount for tests not requiring extraction. Accurately weigh for extraction and place in a Wiley or Soxhlet extractor the following samples:

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(a) One 5gm. sample to provide an extract for the determination of ethyl centralite.

(b) Two 1.25gm. samples wrapped in separate filter papers to be placed in the same extraction thimble to provide samples for the nitrocellulose and potassium sulphate determinations and a 5gm. sample for a carbon tetrachloride extract for the nitroglycerine determination.

Extract the samples with carbon tetrachloride. Adjust the temperature of the heat source so that the carbon tetrachloride drips off the ends of the condensers at the rate of 2 to 3 drops per second. Continue the extraction until completion is indicated by the absence of residue when a portion of the carbon tetrachloride is evaporated to dryness. The time required depends upon the fineness of the sample. Transfer the carbon tetrachloride extracts to 250 ml beakers and evaporate by means of a current of dry air until the odor of carbon tetrachloride is no longer detected.

4.2.2 Composition. - All calculations shall be on the basis of the powder free of volatiles and flash eliminating salt.

4.2.2.1 Total volatiles. - Weigh accurately a 10gm. sample of the powder, prepared as in 4.2.1 into a tared aluminum dish with a cone-shaped glass cover (Figure 4, JAN-P-381). Heat the covered dish in an oven at 100°C for 2 hours. Cool in a desiccator and weigh.

$$\% \text{ Total volatiles} = \frac{\text{Loss in weight} \times 100}{\text{Weight of sample}}$$

4.2.2.1.1 Total volatiles (alternate method). - Weigh accurately a 4-5gm. sample of the powder, prepared as in 4.2.1, into a tared glass-stoppered Erlenmeyer-shaped bottle of about 30 ml. capacity (height 60 mm; diameter of bottom 40 mm., inside of neck tapered from 15 mm. to 13 mm. diameter). Place the glass stopper horizontally on the mouth of the bottle and heat for 2 hours in an oven at 100° ± 2°C with all vents closed. Replace the stopper, cool in a desiccator, and weigh.

$$\% \text{ Total volatiles} = \frac{\text{Loss in weight} \times 100}{\text{Weight of sample}}$$

4.2.2.2 Nitrocellulose. - Transfer the residue from the 1.25gm. sample extraction in 4.2.1 to a 400 ml beaker, cover with a 100 ml of acetone, stir and allow to stand overnight

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under a bell jar. Stir the mixture again until all the material at the bottom of the beaker is dispersed throughout the solution. Add 25 ml of distilled water containing 2-3 drops of concentrated hydrochloric acid dropwise with constant stirring. If the solution is not acid to litmus make just acid with dilute hydrochloric acid. After the addition of the acid solution allow the mixture to stand for a few minutes until the nitrocellulose all coagulates, then add 100 ml of water. Heat the mixture on a steam bath until all of the acetone has boiled off. The nitrocellulose precipitate thus obtained is coarsely granular and easy to filter. Filter the hot mixture through a tared sintered glass filtering crucible in a vacuum bell jar, catching the filtrate in a 400 ml beaker. Wash the residue of nitrocellulose in the crucible a few times with hot water until free of chlorides. Reserve the filtrate and washings for the determination of potassium sulfate (see 4.2.2.7). Dry the crucible and contents to constant weight at 95°-100°C., cool in a desiccator and weigh. Calculate the weight of residue to percentage of nitrocellulose in the sample.

4.2.2.3 Nitroglycerin. -

4.2.2.3.1 Reagents. - Reagent solutions for the nitroglycerin determination shall be prepared as described in Specification JAN-P-323.

4.2.2.3.2 Procedure. - Dissolve the dried extract from the extraction of the two 1.25 gm. samples or of the 5gm. sample in 4.2.1(b) with 50 to 100 ml of glacial acetic acid, transfer to a 250 ml volumetric flask, make up to volume with glacial acetic acid and mix thoroughly. Avoid temperature changes between the time of making up to volume and taking the aliquot for analysis. Using carbon dioxide, displace the air in a 500 ml titration flask equipped with a ground glass neck and a side arm carrying a No. 2 one-hole rubber stopper. A glass tube through this stopper is connected to a carbon dioxide tank. (A special titration flask suitable for this determination is described in JAN-P-323). Transfer a 50 ml aliquot to the titration flask. Continue to pass carbon dioxide through the flask until the titration is completed. After carbon dioxide has passed through the flask for about five minutes, add 15 ml of 1:1 hydrochloric acid and pipette in exactly 25 ml of approximately 0.7 normal ferrous chloride solution. Connect a reflux condenser to the flask and reflux gently for about 15 minutes. Completion of the reaction is indicated by the color of the mixture, which has darkened upon heating, changing to a light reddish brown. After the reduction, increase the rate of flow of the carbon dioxide to prevent

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air being sucked back as the flask is cooled. Cool the flask by immersing in a vessel of water, add 3 ml of 20-percent ammonium thiocyanate solution and titrate with approximately 0.2 normal titanous chloride solution until the red color disappears. Run a blank on the ferrous chloride solution using the same quantities of reagents as in the titration of nitroglycerin. Calculate the percentage of nitroglycerin in the sample as follows:

$$\text{Percent nitroglycerin} = \frac{2.523 (V-B)N}{W}$$

where

V = ml titanous chloride solution used in titration of sample

B = ml titanous chloride solution used in blank

N = normality of titanous chloride solution

W = weight of sample represented by the aliquot portion corrected for total volatiles and flash eliminating salt.

4.2.2.4 Ethyl centralite. -

4.2.2.4.1 Reagents. - Reagents for this determination shall be prepared as described in Specification JAN-P-323. The use of acetic acid as a solvent is satisfactory.

4.2.2.4.2 Procedure. - Dissolve the dried extract from the extraction of the 5gm. sample of 4.2.1 with 50 ml of alcohol, transfer to a 100-ml volumetric flask, make up to volume with alcohol and mix thoroughly. Transfer a 25-ml aliquot to a 500 ml glass-stoppered Erlenmeyer flask by means of a pipette. Add 20 ml of 0.2 normal potassium bromide-potassium bromate solution from a pipette. Cool the mixture to 15°-20°C. Moisten the stopper with a drop of KI solution, add 10 ml of 1:1 hydrochloric acid and quickly stopper the flask, then shake thoroughly for 45 seconds. Immediately add 20 ml of 15 percent potassium iodide solution and titrate without delay the liberated iodine with 0.1 Normal sodium thiosulfate solution to a colorless endpoint, using 5 ml of starch indicator. Run a blank exactly as in the ethyl centralite determination, using 25 ml of alcohol instead of the alcoholic solution of the extract. Calculate the percentage of ethyl centralite in the sample as follows:

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$$\text{Percent ethyl centralite} = \frac{6.71 (B-V)N}{W}$$

where

B = ml $\text{Na}_2\text{S}_2\text{O}_3$ used in blank
 V = ml $\text{Na}_2\text{S}_2\text{O}_3$ used in titration of sample
 N = normality of $\text{Na}_2\text{S}_2\text{O}_3$
 W = weight of sample in the aliquot corrected for total volatiles and flash eliminating salt.

4.2.2.5 Nitroguanidine. - The nitroguanidine is determined by difference. The percentage of nitroguanidine equals 100 minus the sum of the percentages of nitrocellulose, calcium carbonate, ethyl centralite and nitroglycerin determined in the sample.

4.2.2.6 Alkalinity as CaCO_3 . -

4.2.2.6.1 Reagents. -

Bromphenol blue indicator. - Add 0.1 gm. of bromphenol blue to 15 ml of 0.1 normal sodium hydroxide in a small beaker and stir until dissolved. Dilute this solution to 100 ml.

Hydrochloric acid, approximately 0.1 normal. - Place 10 ml of concentrated hydrochloric acid, sp. gr. 1.18 in a 1000 ml volumetric flask and make up to volume with distilled water free of carbon dioxide.

Sodium hydroxide, 0.1 normal. - Dissolve 50 gm. of sodium hydroxide in 50 ml of distilled water, transfer to a 100 ml test tube and avoid wetting the top. Stopper tightly with a cork covered with tin foil and let stand in a vertical position until the supernatant liquid is clear. Carefully withdraw the required amount (sufficient liquid to give 4 gm. NaOH per liter of solution), dilute quickly with recently boiled distilled water and preserve in a paraffined bottle with a two-hole stopper carrying a glass siphon tube with stopcock, and a soda-lime guard tube. To standardize the NaOH solution, accurately weigh about 1 gm. of reagent grade potassium acid phthalate dried at 100°C and transfer to a 300 ml flask. Add 50 ml of distilled water, free from carbon dioxide, stopper the flask, and shake gently until the sample is dissolved. When the sample is in solution, add 3 drops of

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a 1-percent solution of phenolphthalein and titrate with the approximately 0.1 normal solution of sodium hydroxide. Calculate the normality of the solution as follows:

$$\text{Normality of sodium hydroxide} = \frac{W}{0.2042 V}$$

where

W = weight of potassium acid phthalate
V = ml of sodium hydroxide solution used.

4.2.2.6.2 Procedure. - Transfer a 5gm portion of the ground sample to a 500 ml glass-stoppered Erlenmeyer flask, add 100 ml of acetone and, after shaking for a few minutes allow the mixture to stand for a few hours or overnight. Add 25 ml of water dropwise with constant shaking to precipitate the nitrocellulose and then add 10 ml of 0.1 normal hydrochloric acid from a pipette. Add 1.5 ml of bromphenol blue indicator and titrate the solution with 0.1 normal sodium hydroxide solution until the appearance of a permanent blue-violet color. Run a blank determination on the reagents. Calculate the percentage alkalinity in the sample as follows:

$$\text{Percent alkalinity as CaCO}_3 = \frac{5 (B-V)N}{W}$$

where

B = ml NaOH solution for blank
V = ml NaOH solution for sample
N = normality of NaOH solution
W = weight of sample corrected for total volatiles and flash eliminating salt

4.2.2.7 Potassium sulfate. - To the filtrate from the nitrocellulose determination (see 4.2.2.2) add 1 or 2 drops of concentrated hydrochloric acid, adjust the volume to about 100 ml and heat to boiling. Add slowly, with vigorous stirring, 10 ml of 10 percent barium chloride solution, cover the beaker and warm on a steam bath for a few hours or overnight. Filter while warm through a tared filtering crucible, transferring the precipitate with the aid of a policeman, and wash with warm water until free of chlorides. Do not allow the solution to cool enough to cause precipitation of nitroguanidine. Dry and ignite for 10 minutes at 800° to 900°C,

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cool in a desiccator and weigh. Calculate the percentage of potassium sulfate in the sample as follows:

$$\text{Percent K}_2\text{SO}_4 = \frac{74.65A}{W}$$

where

A = weight of barium sulfate residue

B = weight of sample corrected for total volatiles.

4.2.2.8 Ash. -

4.2.2.8.1 For powders containing added mineral salts other than potassium sulfate. - Transfer an accurately weighed portion of approximately 2gm. of the sample to a tared 50 ml porcelain crucible. Add 5 ml of concentrated nitric acid, a few drops of concentrated sulfuric acid and digest on the steam bath until the powder is disintegrated and no liquid remains. Ignite the crucible and contents first by gentle heating until fumes are no longer evolved and then by heating in a muffle at a dull red heat for 10-15 minutes. It is not necessary to destroy all the carbonaceous matter. Cool the dish, add 10 ml of water and 5 ml of approximately 38 percent HCl and digest on the steam bath for 5 minutes. Dilute to 25 ml and make slightly alkaline with a 5 percent solution of NH_4OH using a drop of methyl orange as an indicator. Filter the solution through an ashless filter paper, washing the dish and paper with warm water to remove all soluble constituents. Transfer the filter paper to a previously ignited and tared crucible, dry for 30 minutes at 100°C , heat gently to char the paper, ignite in a muffle for about 30 minutes at a dull red heat, cool in a desiccator and weigh. Calculate the weight of residue as percentage of ash in the sample on a total volatiles free basis.

4.2.2.8.2 For powders containing potassium sulfate. - Transfer an accurately weighed portion of approximately 2gm. of the sample to a tared 50 ml porcelain crucible. Add 5 ml of concentrated nitric acid and a few drops of concentrated sulfuric acid. Digest on the steam bath until the powder is disintegrated and no liquid remains. Heat the crucible on a hot plate until sulfur trioxide ceases to be evolved. Ignite the residue gently at first to avoid mechanical loss and then in a muffle furnace at approximately 750°C until all carbonaceous matter is consumed. Cool, add a few drops of 30-percent sulfuric acid, heat gently until evolution of sulfur trioxide

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cease and ignite to constant weight at approximately 750°C. Cool in a desiccator and weigh. Calculate the percentage of ash in the sample on a total volatiles free basis as follows:

$$\text{Percent ash} = \frac{100A}{W} - (B + C)$$

where

- A = weight of residue
- B = percent potassium sulfate in the sample
(see 4.2.2.7)
- C = percent calcium carbonate in the sample as calcium sulfate
- W = weight of sample corrected for total volatiles.

4.2.3 Heat test at 65.5°C (KI). - Make one determination on each of 2 of the 7 original samples selected as described in 4.1. Grind each sample as specified in 4.2.1. Screen the ground material and retain for the test the material which passes through a U.S. Standard sieve No. 20 and is retained by a U.S. Standard sieve No. 40. Test tubes 5½ inches long by ½ inch inside diameter are used. Transfer a weighed portion of approximately 1.3gm. of the sample to the test tube, using a copper funnel long enough to reach the bottom of the tubes and shake the sample down well before testing. Suspend a strip of standard KI starch paper 1 inch long by 3/8 inch wide vertically in each tube by means of hook of platinum wire about 0.019 inch diameter. One end of the platinum wire is fused into the end of a glass rod approximately 4 inches long and 1/8 inch in diameter. The glass rod passes through a perforation in a well rolled cork, the perforation being of such a size that the rod may be moved up or down without allowing a leakage of gas. Corks may be reused if they have been washed in distilled water and dried. However, in case of failure of the test, it must be repeated, using new corks. Moisten the standard paper strip at its upper corner with a 50 percent solution (by weight) of glycerine and water, so that the upper third of the paper is moist. Insert the cork with its rod and paper in the test tube, immerse the test tube to a depth of 2¼ inches in a constant temperature bath at 65.5° ± 0.5°C and adjust the height of the paper so that the bottom of the strip is approximately ½ inch above the level of the top of the bath. Compute the time of the test from

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the time of the insertion of the tube in the bath to the first positive discoloration of the paper. The first appearance of discoloration of the damp portion of the test paper marks the end of the test for each separate tube, the minimum time for any one of the tubes being the heat test of the powder. (Secure standard KI - starch paper from the Naval Powder Factory, Indian Head, Md.).

4.2.4 Stability test at 120°C. - The 120°C heat test shall be performed as described in Specification JAN-P-270.

4.2.5 Surveillance test at 65.5°C. - The sample for test shall consist of 45gm of powder in whole grains. Place the sample in a standard surveillance bottle which has been previously washed carefully in distilled water and thoroughly dried. The bottles used shall be special 8-oz. salt-mouth bottles of pyrex glass with tight ground glass stoppers. (If ordinary bottles are used, a white coating forms on the inside of the bottle which obscures the test). Place the samples in a constant temperature magazine maintained at $65.5^{\circ} \pm 2.0^{\circ}\text{C}$. The end of the test is the first appearance of red fumes in the bottle. A standard "fume tube" containing oxides of nitrogen may be used for purposes of comparison if necessary. The bottle have an etched space which serves for pencil marking of index of sample, date of commencement of test and any identification data.

4.2.6 Ballistic tests. - Ballistic tests shall be conducted as specified in O.S. 1666.

4.2.7 Grain form and dimensions. - Determinations of grain form and dimensions shall be as specified in Specification JAN-P-270.

4.2.8 Retests. - A lot failing to pass any of the specified tests, shall be rejected, but may, upon application from the manufacturer and approval by the Chief of the Bureau of Ordnance, be retested once.

5. PREPARATION FOR DELIVERY

5.1 Packing. - Unless otherwise specified, the powder shall be packed in air-tight, tested boxes conforming to Bureau of Ordnance Drawings for Packing Box MK 7 and Mods, except Mod 1.

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5.1.1 Air test. - Containers shall, after packing, be tested with air, and shall withstand without leakage an internal air pressure of 2 to 3 pounds for a period of 1 minute.

5.2 Marking. - In addition to any special marking required by the contract or order, shipments shall be marked in accordance with standard MIL-STD-129 and the Interstate Commerce Regulations for Transportation of Explosives (2.2). Each container shall be marked to show the contract number, the "lot designation" (e.g. IHPB to signify Indian Head manufactured 3"/50 granulation) followed by consecutive lot numbers; the caliber of gun. Upon acceptance, marking shall be added to show the "index number" of that powder lot. The "index number" shall consist of the letters "SPCG" followed by the number assigned by the Bureau of Ordnance for that powder lot. For each caliber, the number used in the "lot designation" for a contractor shall begin with lot 1 for the first lot made by each contractor and continue consecutively for all subsequent lots made by that contractor for the same caliber.

6. NOTES

6.1 Procurement documents should specify the following:

- Title, number and date of specification.
- Type of grain (see 1.2).
- Percent of potassium sulfate or other flash eliminating salt to be added (see 3.2.3).
- Process approval (3.3.1).
- Information concerning government material furnished.
- Information on inspection and acceptance conditions.

In case the powder fails to pass the ballistic tests in the weapon for which it was intended, the Bureau of Ordnance may, if deemed to its interest, accept the powder, upon its meeting the specifications for any other weapon.

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

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