MIL-B-162D
7 February 1968
SUPERSEDING
MIL-B-162C
25 May 1962
Amendment 1
30 September 1964

MILITARY SPECIFICATION

BARIUM NITRATE

1. SCOPE

1.1 Scope. This specification covers barium nitrate for use in the manufacture of propellants and for other Ordnance applications.

1.2 Classification. Barium nitrate shall be of the following classes, as specified (see 6.1 and 6.2):

Class 1 - (see table I and table II)
Class 2 - (see table I and table II)
Class 3 - (see table I and table II)
Class 4 - (see table I and table II)
Class 5 - (see table I and table II)
Class 6 - (see table I and table II)

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS

L-P-378 - Plastic Film (Polyethylene, Thin Gauge)
RR-S-366 - Sieves; Standard, Testing

FSC 6810

MILITARY

MIL-D-3464 - Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification
MIL-D-6054 - Drums, Metal - Shipping and Storage
MIL-D-26993 - Drums, Fibre, for Domestic Shipment of Desiccant

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-1233 - Procedures for Determining Particle Size, Particle Size Distribution, and Packed Density of Powdered Materials

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

INTERSTATE COMMERCE COMMISSION

49 CFR 71-78 - Rules and Regulations of the Transportation of Explosives and Other Dangerous Articles

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402. Orders should cite "49 CFR 71-78".

3. REQUIREMENTS

3.1 Color. The color of the barium nitrate shall be white when determined as specified in 4.2.2.1. The use of any material, such as Prussian blue (ferric ferrocyanide), for the purpose of imparting a satisfactory color to the barium nitrate, shall not be permissible.

3.2 Chemical requirements. Barium nitrate shall conform to the applicable chemical requirements specified in table I, when tested as specified in the applicable paragraphs.

Table I. Chemical requirements

Properties	Percent by weight						Applicable Paragraph
	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	
Barium nitrate, min.	99.7	99.0	99.5	99.5	98.5	99.5	4.3.1
Strontium (as Sr), max.	0.6	-	0.6	-	-	0.6	4.3.2
Calcium (as Ca), max.	0.05	-	0.05	-	-	0.05	4.3.3
Iron and aluminum (as oxides), max.	-	0.50	-	0.02	-	0.02	4.3.4
Calcium and magnesium (as oxides), max.	-	0.50	-	-	-	-	4.3.5
Sodium (as Na_2O), max.	-	0.15	-	-	-	0.15	4.3.6
Chloride (as $BaCl_2$), max.	0.0075	0.0075	0.0075	0.0075	-	0.0075	4.3.7
Grit, max.	0.05	0.05	0.05	0.05	-	0.05	4.3.8
Heavy metals	None	-	-	-	-	-	4.3.9
Moisture, max.	0.20	0.10	0.20	0.20	0.05	0.10	4.3.10
pH	5.0-8.0	5.0-8.0	5.0-8.0	-	5.0-8.0	5.0-9.0	4.3.11
Insoluble matter, max.	0.10	0.10	0.10	0.10	0.10	0.10	4.3.12
Hygroscopicity, max.*	-	-	-	-	0.05	-	4.3.13

*This requirement applicable only when requested by the procuring agency (see 6.2).

3.3 Granulation. The barium nitrate shall conform to the granulation requirements specified in table II when tested as specified in 4.3.14.

Table II. Granulation requirements

Sieve number	Class 1 Gran. A	Class 1 Gran. B	Class 2	Class 3	Class 4	Class 5	Class 6 Gran. A	Class 6 Gran. B
30	--	--	99.5	--	--	--	--	--
50	--	--	--	98.0	--	--	99.0	--
60	--	--	--	--	--	99.0	--	99.0
100	99.9	99.9	--	80.0	--	75.0*	40.0	--
120	--	--	--	--	98.0	--	--	---
140	40.0	85.0	--	--	--	--	--	--
200	25.0*	35.0±10.0	2.0*	--	--	5.0*	75.0*	--
230	--	--	--	--	50.0±10.0	--	--	--
325	--	20.0*	--	--	30.0*	--	--	--

*Maximum
(b) See 3.3.1

3.3.1 Average particle diameter (applicable to class 2 only). In addition to conforming to the granulation requirements specified in table II, the average particle diameter of class 2 barium nitrate shall be 140 ± 40 microns, when determined as specified in 4.3.15.

3.3.2 Average particle diameter (applicable to class 6, granulation B only). In addition to conforming to the granulation requirements specified in table II, the average particle diameter of class 6, granulation B, barium nitrate shall be 20 microns maximum, when determined as specified in 4.3.16.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Contractor quality assurance system. The contractor shall provide and maintain an adequate quality assurance system, acceptable to the Government, covering the supplies under the contract. A current written description of the system shall be submitted to the contracting officer prior to initiation of production. The written description will be considered acceptable when, as a minimum, it provides the quality assurance required by this specification. The contractor shall notify the Government of an obtain approval for any changes to the written procedure that might affect the degree of assurance required by this specification or other applicable documents referenced herein.

4.2 Inspection provisions.

4.2.1 Lot formation. A lot shall consist of one or more batches of barium nitrate, produced by one manufacturer, in accordance with the same specification, or same specification revision, under one continuous set of operating conditions. Each batch shall consist of that quantity of barium nitrate that has been subjected to the same unit chemical or physical process intended to make the final product homogeneous.

4.2.2 Examination. Sampling plans and procedures for the following classification of defects shall be in accordance with MIL-STD-105. Also, at the option of the procuring activity, AQL's and sampling plans may be applied to the individual characteristics listed using an AQL of 0.40 percent for each major defect and an AQL of 0.65 percent for each minor defect.

4.2.2.1 Containers for domestic shipment and limited storage, prior to closing.

Categories	Defects	Method of inspection
Critical:	None defined	
Major:	AQL 0.60 percent	Major
101.	Thickness of liners incorrect, minimum	Gage
102.	Liner material improper	Visual
103.	Liner missing cut, torn or punctured	Visual
104.	Liner improperly sealed	Visual
Minor:	AQL 0.60 percent	Minor
201.	Color	Visual

4.2.2.2 Container for domestic shipment and limited storage, closed.

Categories	Defects	Method of inspection
Critical:	None defined	
Major:	AQL 0.40 percent	Major
101.	Container poorly sealed	Visual
102.	Marking misleading or unidentifiable	Visual
Minor:	None defined	

4.2.2.3 Container for overseas shipment, prior to closing.

Categories	Defects	Method of inspection
Critical:	None defined	
Major:	AQL 0.65 percent	Major
101.	Liner material improper	Visual
102.	Liner mixxing, cut, torn or punctured	Visual
103.	Liner improperly sealed	Visual
Minor:	None defined	

4.2.2.4 Container for overseas shipment.

Categories	Defects	Method of inspection
Critical:	None defined	
Major:	AQL 0.40 percent	Major
101.	Weight incorrect, max.	Scale
102.	Marking missing, misleading or unidentifiable	Visual
Minor:	None defined	

4.2.3 Testing.

4.2.3.1 Sampling by lot. A random sample of 10 containers shall be selected from each lot. When lots are comprised of 10 containers or less, each container shall be sampled. For determining compliance with the average particle size requirements of class 6,granulation B, all the containers in the lot shall be sampled.

4.2.3.1.1 Preparation of composite. Approximately two ounce primary sample of barium nitrate shall be removed from each of the ten containers in order to equal twenty ounces. If there are less than 10 containers, equal primary samples in sufficient quantity to equal twenty ounces shall be removed from each container. The individual primary samples shall then be combined in order to form a homogeneous composite sample of twenty ounces and subjected to the tests specified in 4.3. If the composite sample fails to comply with any of the requirements specified, the lot shall be rejected.

4.3 Test methods and procedures.

4.3.1 Barium nitrate. Transfer a 10.0000 gm. to a 1 liter beaker, dissolve in about 800 ml. of water and dilute to 1 liter in a volumetric flask. Pipet a 50 ml. aliquot into a 400 ml. beaker and dilute to about 225 ml. with water. Add 6 ml. of hydrochloric acid and heat to about 80°C. While stirring, add 10 ml. of ammonium acetate solution (40 percent), 25 ml. of potassium dichromate solution (10 percent) and 10 gm. of reagent grade urea. Cover with a watch glass, heat to boiling and boil moderately until a precipitate settles on the bottom of the beaker (this will take about 20 to 30 minutes), then continue to boil moderately for 90 minutes. Midway during the 90 minute boiling period, wash down the cover lid with water and add sufficient hot water to bring up the volume to about 250 ml. At the end of the heating period, filter the solution (while hot) through a tared sintered glass crucible of fine porosity. Transfer the precipitate to the crucible with potassium dichromate wash solution (made by diluting 50 ml. of 10 percent potassium dichromate solution to 1 liter with water) and finally wash the precipitate four times with water. Save the filtrate for the determination of strontium and calcium (see 4.3.2 and 4.3.3). Dry the crucible at 120°C for 1 hour, cool in a desiccator and weigh. Calculate the percent barium nitrate as follows:

$$\text{Percent barium nitrate} = \frac{103.16A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample, in aliquot, gm.

4.3.2 Strontium (applicable to classes 1, 3 and 6 only). Add 60 ml. of ammonium oxalate solution (6.5 percent) and 100 ml. of 95 percent ethyl alcohol to the filtrate from the barium determination (see 4.3.1), mix, and allow to stand overnight. Filter through a Whatman No. 40 filter paper and transfer and wash with ammonium oxalate wash solution (prepared by adding 35 ml. of 6.5 percent ammonium oxalate solution to 1 liter of water).

Place the filter paper and precipitate into a platinum crucible, char and burn off the filter paper at low heat, and ignite over a Meker burner for 15 minutes. Transfer most of the precipitate to a 250 ml. beaker and add 10 ml. of nitric acid to the crucible to dissolve the remainder of the precipitate, warming on the hot plate if necessary. Finally wash the nitric acid into the beaker with a little water. Evaporate to dryness by heating on a hot plate at low heat without a watch glass and then heat in an oven at 150° to 160°C for 30 to 45 minutes. (If the determination is interrupted at this stage, store the beaker in an oven at 105° to 110°C). Cover with a dry watch glass and allow to cool to room temperature (do not use a water bath for this cooling). Add 15 ml. of acetone around the sides of the beaker and rub the bottom of the beaker with a dry policeman and break up any clumps of salt. Wash down the policeman with a little acetone and remove it. Allow to stand for 2 hour while swirling frequently. Filter through a 6 cm. Whatman No. 40 filter paper. Use an untorn filter paper and set it into the funnel with acetone. Wash the precipitate into the filter paper with acetone contained in a wash bottle and then wash the filter paper and precipitate thoroughly four times with acetone. Collect the filtrate in a 250 ml. beaker and retain it for the determination of calcium (see 4.3.3).

Transfer the filter paper and precipitate to the 250 ml. beaker and add 15 ml. of nitric acid, 3 ml. of sulfuric acid, and 2 ml. of perchloric acid. Cover with a watch glass, boil down on a hot plate at moderate heat until the organic matter has been destroyed and the solution is fuming and then with the cover lid askew, heat at the maximum temperature of the hot plate until the volume is reduced to approximately 2 ml. Cool, add 40 ml. of water, cover with the watch glass and boil at moderate heat until the volume is approximately 20 ml. Remove from the hot plate and add 50 ml. of 95 percent ethyl alcohol. Allow to stand overnight. Filter through a tared Selas porcelain filtering crucible, transfer and wash with alcoholic wash solution (made by adding 1 ml. of sulfuric acid and 900 ml. of 95 percent ethyl alcohol to 100 ml. of water), and finally wash with 10 ml. of 95 percent ethyl alcohol. Place the sintered crucible into a 30 ml. porcelain crucible and heat over a Meker burner for 15 minutes. Cool and weigh. Calculate the percent strontium as follows:

$$\text{Percent strontium} = \frac{47.70A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample in aliquot, gm. (see 4.3.1).

4.3.3 Calcium (applicable to classes 1, 3 and 6 only). Evaporate the acetone filtrate from the determination of strontium (see 4.3.2) to dryness by heating on an electric hot plate under a hood. Add 5 ml. of nitric acid, 2 ml. of sulfuric acid, and 0.5 ml. of perchloric acid, and fume to a volume of approximately 1 ml. Cool, add 10 ml. of water, and boil down to a volume of approximately 5 ml. Remove from the hot plate and add 50 ml. of 95 percent ethyl alcohol. Allow to stand overnight. Filter through a tared Selas porcelain filtering crucible, transfer and wash with alcoholic wash solution (see 4.3.2), and finally wash with 10 ml. of 95 percent ethyl alcohol. Place the sintered crucible into a 30 ml. porcelain crucible and heat over a Meker burner for 15 minutes. Cool and weigh. Calculate the percent calcium as follows:

$$\text{Percent calcium} = \frac{29.44A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample in aliquot, gm. (see 4.3.1).

4.3.4 Iron and aluminum (applicable to classes 2, 4 and 6 only). Transfer a 5 gm. sample to a 250 ml. beaker, add 200 ml. of water, and stir to dissolve. Filter through a Whatman No. 40 filter paper and wash with water. Discard the filter paper. Add a slight excess of ammonium hydroxide to the filtrate, heat to boiling, and boil for a minute. Filter while hot through a Whatman No. 40 filter paper and wash with ten 20 ml. portions of hot water. Retain the filtrate for the determination of calcium and magnesium (see 4.3.5). Transfer the filter paper and precipitate to a tared platinum or porcelain crucible. Char and burn off the filter paper at dull red heat, and then ignite on a Meker burner for 30 minutes. Cool in a desiccator and weigh. Make a blank determination by adding ammonium hydroxide to water, boiling, filtering and igniting. Calculate the percent iron and aluminum (as oxides) as follows:

$$\text{Percent iron and aluminum (as oxides)} = \frac{100(A-B)}{W}$$

where: A = weight of residue of sample, gm
B = weight of residue from blank, gm.
W = weight of sample, gm.

4.3.5 Calcium and magnesium (applicable to class 2 only). Heat the filtrate from the iron and aluminum determinations to boiling and add 15 ml. of 1:9 sulfuric acid, drop by drop, with constant stirring. Allow the precipitate to settle, and test the clear supernatant liquid for complete precipitation by adding 2 drops of the dilute sulfuric acid. Decant the solution through a Whatman No. 40 filter paper and wash with water. Evaporate the filtrate to a volume of approximately 20 ml., filter through a Whatman No. 40 filter paper, and wash with water. Add 15 ml. of 9 N ammonium carbonate solution and 15 ml. of 95 percent ethyl alcohol to the filtrate and allow to stand for at least 30 minutes while stirring frequently. Filter through a Whatman No. 40 filter paper and wash with 9 N ammonium carbonate solution and 15 ml. of 95 percent ethyl alcohol. Retain the filtrate for determination of sodium (see 4.3.6). Dissolve the precipitate in 1:3 hydrochloric acid and dilute to approximately 50 ml. Make slightly ammoniacal, heat to boiling, add 2 ml. of saturated ammonium oxalate solution, and allow to stand overnight. Filter through a Whatman No. 42 filter paper and transfer and wash with hot 1 percent ammonium oxalate solution. Transfer the filter paper and precipitate to a tared platinum crucible, burn off the filter paper at dull red heat, and then ignite in a blast burner for 15 minutes. Cool in a desiccator and weigh. Calculate the percent calcium oxide as follows:

$$\text{Percent calcium oxide} = \frac{100A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample, gm.

Evaporate the filtrate from the calcium determination to approximately 50 ml. Add 10 ml. of 10 percent ammonium phosphate solution and 5 ml. of ammonium hydroxide and allow to stand for 4 or 5 hours. Filter through a Whatman No. 42 filter paper, and wash with 5 percent ammonium hydroxide solution. Transfer the filter paper and precipitate to a tared platinum crucible, char, and burn off the filter paper at dull red heat, and then ignite over a blast for 15 minutes. Cool in a desiccator and weigh. Calculate the percent magnesium oxide as follows:

$$\text{Percent magnesium oxide} = \frac{36.2A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample, gm.

Calculate the total percent of calcium oxide plus magnesium oxide.

4.3.6 Determination of sodium (applicable to classes 2 and 6 only). Evaporate the filtrate from the precipitation of calcium and magnesium (see 4.3.5) to such a volume that it may be transferred to a tared platinum dish. Carefully add 1 ml. of sulfuric acid and evaporate to dryness. Remove any ammonium salts present by gentle ignition and continue to heat until no additional fumes of sulfur trioxide are given off. Cool in a desiccator and weigh. Calculate the percent sodium (as sodium oxide) as follows:

$$\text{Percent sodium (as sodium oxide)} = \frac{43.6A}{W}$$

where: A = weight of residue, gm.
W = weight of sample, gm.

4.3.7 Chloride (not applicable to class 5). Dissolve a 100 gm. sample in 800 ml. of hot water, filter through a Whatman No. 40 filter paper and quantitatively transfer any insoluble matter to the paper with hot water. Save the insoluble material on the filter paper for the determination of grit (see 4.3.8). Add 5 ml. of nitric acid to the filtrate, heat to boiling, and add 5 ml. of 5 percent silver nitrate solution. Continue boiling until the solution is clear, then allow the precipitate to settle in the dark at room temperature for 3 or more hours. Filter through a tared sintered glass crucible and wash with 1 percent nitric acid solution. Dry at 130° to 150°C for one hour, cool in a desiccator, and weigh. Calculate the percent chloride (as barium chloride) as follows:

$$\text{Percent chloride (as barium chloride)} = \frac{72.7A}{W}$$

where: A = weight of precipitate, gm.
W = weight of sample, gm.

4.3.8 Grit (not applicable to class 5). Wash the insoluble matter remaining on the filter paper from the chloride determination into a beaker with a minimum amount of hot water. Add 10 ml. of nitric acid and 30 ml. of hydrochloric acid. Heat the mixture on a steam bath for 1 hour, cool, and decant the supernatant liquid. Wash any insoluble with water, by decantation, transfer to a filter paper, and continue washing until free from acid. Transfer the insoluble residue to a U. S. standard No. 120 sieve complying with RR-S-366, and, by means of a jet of water, wash until no more material will pass through the sieve. Rinse the sieve and residue with alcohol and then with ether, and allow to dry at room temperature. Transfer any residue on the sieve to a tared weighing bottle, dry at 100° to 105°C for 1 hour, cool in a desiccator, and weigh. Calculate the weight of the residue to percent grit. Transfer the material to a glass slide and rub between two glass slides. Determine the presence of grit by scratching noise and scratches on glass slides.

4.3.9 Heavy metals (applicable to class 1 only). Dissolve approximately 25 gm. of the sample in distilled water. Add a few drops of hydrochloric acid and then pass in hydrogen sulfide for two or three minutes. Inspect for the formation of a precipitate. Render the solution ammoniacal and allow to stand for three hours. Again inspect for the formation of precipitate. The appearance of a precipitate in the acid solution or alkaline solution is indicative of the presence of heavy metals.

4.3.10 Moisture. Transfer a 10 gm. sample to a weighing bottle, and weigh the weighing bottle plus sample. Heat at 100° to 105°C for 3 hours, cool in a desiccator, and weigh. Calculate the percent moisture as follows:

$$\text{Percent moisture} = \frac{100A}{W}$$

where: A = loss in weight, gm.
W = weight of sample, gm.

4.3.11 pH. Dissolve a 1 gm. sample in 20 ml. of water that has been boiled and cooled. Determine the pH with a pH meter having glass and calomel electrodes. The pH meter shall be calibrated with standard buffer solution.

4.3.12 Insoluble matter. Transfer a 10 gm. sample to a 400 ml. beaker, add 200 ml. of hot water and stir to dissolve. Filter through a tared sintered glass crucible of medium porosity, transfer and wash thoroughly with hot water. Dry the crucible at 100° to 105°C for 1 hour, cool in a desiccator and weigh. Calculate the percent insoluble matter as follows:

$$\text{Percent insoluble matter} = \frac{100A}{W}$$

where: A = weigh of residue, gm.
W = weight of sample, gm.

4.3.13 Hygroscopicity (applicable to class 5 only). The method for the determination of the hygroscopicity shall be as directed by the contracting agency (see 6.2).

4.3.14 Granulation. Nest the specified sieves (see table II) complying with RR-S-366, on a bottom pan. Place a weighed portion of 100 gm. of the sample on the upper sieve, cover, and shake for 10 minutes by hand, or for five minutes by means of a mechanical shaker geared to produce 300 ± 15 gyrations and 150 ± 10 taps of the striker per minute. Weigh the amounts retained by the sieves, and calculate to percentage as required (see 6.3).

4.3.15 Average particle diameter (applicable to class 2 only). The average particle diameter shall be determined in accordance with MIL-STD-1233, method 200. The density of barium nitrate is 3.244 gm. per cc.

4.3.16 Average particle diameter (applicable to class 6, granulation B only). The average particle diameter shall be determined in accordance with MIL-STD-1233, method 100. The density of barium nitrate is 3.244 gm. per cc.

4.3.17 Alternate test method for the determination of strontium, calcium, iron, aluminum, magnesium, sodium, and heavy metals by spectrograph. The following spectrographic method or other spectrographic method found satisfactory may be used in place of paragraphs 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6 and 4.3.9. In case of doubt or dispute, the methods of 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6 and 4.3.9 shall be used as the standard method.

4.3.17.1 Dilute the samples with three parts of graphite powder* and mix 1 minute in a vibration mill. Pack the sample in a purified carbon electrode with centerpost. This is the lower (electrically positive) electrode. The upper electrode is a 1/4 in. diameter graphic rod sharpened to a 60 degree point. Arc the sample for 20 seconds using the following excitation conditions:

Voltage, V, adjusted to result in a current of 6 amperes	
Capacitance, microfarads	60
Inductance, microhenries	600
Resistance, ohms	40
Output current, amperes	6

Exposure:

Spectral region A°, 2840 - 4320 and 2490	3280
Slit width, microns	20
Arc exposure periods, seconds	20

Photographic processing:

Emulsion: Kodak SA-1 plate
Development: Rock for 2 minutes at 70°F in Kodak D-19 developer
Stop bath: Rock for 1 minute in Kodak potassium chrome alum solution
Fixing: Rock for 5 minutes in Kodak acid fixer
Washings: Running water for 2 min.
Drying: Blower and heat for 4 min.

Photometry:

Determine the emulsion calibration curve by the two line method. Determine the transmittance of the analytical and internal standard line pairs and convert to relative intensities using the emulsion calibration curve (see table below). Use the data to plot an analytical curve of log-concentration versus log intensity ratio from the spectra of the standard of each element. Determine the concentration of each element by referring to the proper analytical curve.

*National Spectrographic Grade SP1

Analytical line pairs

Element	Analytical line	Internal std. barium	Concentration range (as metals)
Iron	3059.09	3662.53	0.01 to 0.40
Strontium	3464.46	3662.53	0.01 to 0.10
Calcium	3179.33	3662.53	0.05 to 0.20
Sodium	3302.34	3662.53	0.01 to 0.15
Aluminum	3082.16	2771.36	0.01 to 0.10
	2660.35	2771.36	0.05 to 0.30
Magnesium	2779.83	2771.36	0.01 to 0.30

Apparatus:

The following equipment was found satisfactory:

1. Bausch and Lomb large Littrow Spectrograph.
2. ARL, High Precision Source Unit, Model 4700.
3. ART Dietert Densitometer Comparator.
4. ARL thermostatically controlled developing machine and a warm air plate dryer.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A, B or C as specified (see 6.2).

5.1.1 Level A. Barium nitrate shall be packed in 100 lbs. steel drums conforming to MIL-D-6054. Steel drums shall be with a full open head provided with a twist lock closure. The lid shall have a tubular rubber gasket. The drums shall be provided with a bag fabricated from nominal 6 ml. thick polyethylene. Polyethylene bags shall be made from plastic film conforming to L-P-378, type I, finish 1. All bag seams and closure shall be heat sealed. Three units of desiccant conforming to MIL-D-3464 shall then be put on top of the sealed polyethylene bag (to absorb any moisture which may be entrapped). A printed card identified with marking in accordance with MIL-STD-129 shall be inserted just before the drum is closed.

5.1.2 Level B. Barium nitrate shall be packed in fiber drums conforming to MIL-D-26993. Polyethylene bags as specified in 5.1.1 shall be provided. Fiber drum shall be with a full open head provided with a locking ring closure. Net weight of material of each drum shall be 150 pounds.

5.1.3 Level C. Barium nitrate shall be packed in accordance with manufacturer's commercial practice to assure acceptance by common carrier for safe delivery at first destination for immediate use. Container shall comply with Interstate Commerce Commission Regulations (see Code Federal Regulations CFR 71-78) and regulations of carriers as applicable to the mode of transportation.

5.2 Marking. Unless otherwise specified, exterior shipping containers shall be marked in accordance with MIL-STD-129, and shall include the batch number.

5.2.1 Special marking. Each container of barium nitrate shall be labeled as follows:

DANGER! May be fatal if swallowed.
Do not take internally.
Avoid breathing dust.
Wash thoroughly after handling.

6. NOTES

6.1 Intended use. The barium nitrate covered by this specification is intended for the following uses:

Class 1 - for use in the manufacture of priming compositions.
Class 2 - for use in the manufacture of photoflash compositions.
Class 3 - for use in the manufacture of propellants.
Class 4 - for use in the manufacture of special compositions.
Class 5 - for use in the manufacture of incendiary mixtures.
Class 6 - for use in the manufacture of pyrotechnic compositions.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.
(b) Class of barium nitrate required (see 1.2).
(c) Hygroscopicity (see 3.2).
(d) Granulation required (see 3.3).
(e) Level of packing required (see 5.1).
(f) Special marking (see 5.2.1)

6.3 Granulation. In humid weather, heat the sieves and sample in an oven at 50°C for 10 to 15 minutes to prevent sieve binding (see 4.3.14).

Custodian:
Army - MU
Navy - AS

Review activities:
Army - MU, MD,
Navy - AS, OS

User activities:
Army - MI

Preparing activity:
Army - MU

Project No. 6810-0773

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

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. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION

ORGANIZATION

CITY AND STATE

CONTRACT NUMBER

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 - Optional)

DATE

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