

MIL-P-46994B
4 January 1982
SUPERSEDING
(See 6.8)

MILITARY SPECIFICATION

PELLETS/GRANULES
BORON/POTASSIUM NITRATE

This Specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers seven (7) types of igniter pellets/granules for use in rocket motors and fuzes. (see 6.8)

1.2 Classification. Igniter pellets/granules covered by this specification shall be of the following types and classes, as specified (see Tables III and IV):

Type I - Cylindrical
Type II - Bl - Convex
Type III - Modified Cylindrical
Type IV - As per Drawing 9234458 or Drawing 9311312 (see 2.1)
Type V - As per Drawing 657421 (See 2.1 and 6.8)

Class 1. Crush Strength: Axial 18,500g, Radial 18,000g
Class 2. Crush Strength: Axial 7,500g, Radial 7,500g
Class 3. Crush Strength: Axial 3,000g, Radial 2,000g

Type VI - As per Drawing SK445983 (See 2.1)
Type VII - Oblate Spheroid Granules

Class 1. 5% max. retained on USS Sieve No. 50
Class 2. 5% max. retained on USS Sieve No. 60
Class 3. 5% max. retained on USS Sieve No. 100

FSC: 1375

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research and Development Command, Attn. DEDAR-QA, Dover, New Jersey 07801 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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2. APPLICABLE DOCUMENTS

2.1 Issue of documents. 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

FEDERAL

- | | |
|-----------|-------------------------------------|
| RR-S-366 | - Sieve, Test |
| PPP-C-96 | - Cans, Metal, 28 Gauge and Lighter |
| PPP-B-636 | - Boxes, Shipping, Fiberboard |

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- | | |
|-------------|---|
| MIL-P-116 | - Preservation, Packaging Method of |
| MIL-B-131 | - Barrier Material, Greaseproofed, Waterproofed, Flexible |
| MIL-P-156 | - Potassium Nitrate |
| MIL-R-7575 | - Resin, Polyester Low Pressure Laminating |
| MIL-B-51092 | - Boron, Amorphous, Powder |
| MIL-P-81351 | - Peroxide, Methyl Ethyl Ketone |
| MIL-P-82646 | - Plastic Film, Conductive Heat-Sealable, Flexible |
| MIL-B-82647 | - Bag, Plastic, Conductive Heat-Sealable, Flexible |
| MIL-B-117 | - Bags, Sleeves, and Tubing - Interior Packaging |
| MIL-BV-2427 | - Box, Ammunition Packing: Wood, Nailed |

STANDARDS

MILITARY

- | | |
|--------------|---|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-109 | - Quality Assurance Terms and Definitions |
| MIL-STD-129 | - Marking for Shipment and Storage |
| MIL-STD-286 | - Propellants, Solid: Sampling, Examination and Testing |
| MIL-STD-1168 | - Lot Numbering of Ammunition |
| MIL-STD-1218 | - ACS Chemicals |
| MIL-STD-1233 | - Procedures for Determining Particle Size, Particle Size Distribution and Packed Density of Powdered Material. |

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DRAWINGS

ARMY

9234458 Pellets, Ignition
9311312 Pellet

NAVY

657421 Pellet, Boron Potassium Nitrate (Type I)
SK445983 2-D Ignition Grain

(Copies of specifications, standards, drawings and publications required by contractors 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 of the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

CODE OF FEDERAL REGULATIONS, TITLE 49, TRANSPORTATION
PARTS 100-199.

(The Code of Federal Regulations is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.) Orders should specify "49 CFR 100-199" (latest revision).

ASTM-E11	- Testing Sieves and Their Uses
ASTM-D2905	- Statements of Number of Specimens Required to Determine the Average Quality of a Textile Material

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19013).

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Composition.

3.1.1 Material. The constituent materials used in the manufacture of the igniter pellet shall comply with the following requirements:

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Constituent Material	Conforming to:
Potassium Nitrate	MIL-P-156 except particle size shall be 15 microns maximum (max.) (see 6.5.1)
Boron, Amorphous	MIL-B-51092 except particle size shall be 1.5 microns max. and the Boron purity shall be 90% to 92% (see 6.5.2)
Polyester Resin	MIL-R-7575 Grade A, Class O, Form K (see 6.4.2)
Peroxide, Methyl Ethyl Ketone	MIL-P-81351 (see 6.4.3)
Cobalt Naphthenate	(see 6.4.1)

3.1.2 Formulation. The igniter compositions shall be a homogeneous blend of materials complying with 3.1.1 which have been added in the following proportions (see 6.4, 6.5 and 6.6)

TABLE I. Formulation

<u>Materials</u>	<u>All types except Type IV</u>	<u>Type IV</u>
Potassium Nitrate, %	70.7 \pm 2.0	72.2 \pm 1.5
Boron, Amorphous, %	23.7 \pm 2.0	22.2 \pm 1.5
Binder, %	5.6 \pm 0.5	5.6 \pm 0.5

3.1.3 Binder. The binder used in the formulation given in 3.1.2 shall be prepared in accordance with the following proportions (see 6.4):

TABLE II. Binder Composition

<u>Ingredients</u>	<u>Percent</u>
Polyester Resin, (see 6.4.2)	98.0 \pm 1.0
Catalyst, (see 6.4.3)	1.5 \pm 0.1
Accelerator, (see 6.4.1)	0.5 \pm 0.01

3.1.4 Boron. The boron content in the igniter composition shall comply with the following when tested as specified in 4.6.8:

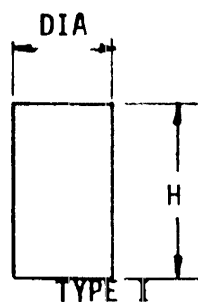
	<u>Percent Boron</u>
All Types, except Type IV:	21.5 \pm 2.0%
Type IV:	20.0 \pm 1.5%

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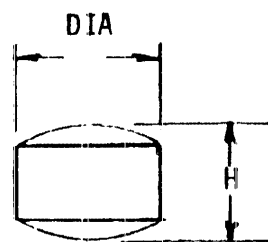
3.2 Dimensions. The pellets/granules shall conform to the dimensions specified in this specification and applicable drawings when determined as specified in 4.6.5.

3.3 Physical and ballistic properties. The physical and ballistic properties of the pellets/granules shall be in accordance with Table III and IV when determined as specified in the applicable paragraphs in 4.6.

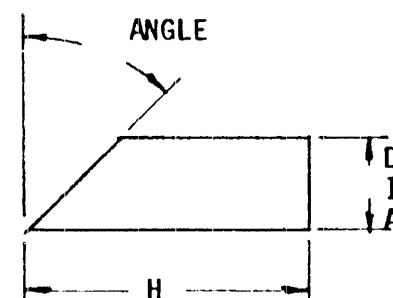
TABLE III PHYSICAL PROPERTIES




TYPE I




TYPE II



TYPE III

TYPE		DIA. IN.	HEIGHT, IN.	ANGLE ⁰	MINIMUM WT. gm
I-A	CYLINDRICAL	.125+.002	.188+.004	-----	0.067
I-B	CYLINDRICAL	.125+.002	.100+.005	-----	0.031
I-C	CYLINDRICAL	.161+.001	.217-.002	-----	*
I-D	CYLINDRICAL	.143+.001	.187-.016	-----	*
I-E	CYLINDRICAL	.161+.001	.182-.012	-----	*
II-A	BI-CONVEX	.125+.002	.100+.005	-----	0.031
II-B	BI-CONVEX	.250+.003	.130+.005	-----	0.140
II-C	BI-CONVEX	.250+.003	.250+.005	-----	0.305
II-D	BI-CONVEX	.500+.003	.250+.005	-----	1.065
II-E	BI-CONVEX	.257-.010	.136-.008	-----	0.154-.008
III	MODIFIED CYLINDRICAL	.161+.001	.182-.016	15 ⁰ +1 ⁰	0.154-.008
IV	SEE DRAWING #9234458 or DWG 9311312		*		
V	SEE DRAWING #657421  *		*		
VI	SEE DRAWING #SK445983 *		*		
VII	OBLATE SPHEROID GRANULES (SEE TABLE V)				

* The diameter, height and weight shall be as specified in the contract.

 Type V is the same as Type 1 of Drawing 657421

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TABLE IV PHYSICAL AND BALLISTIC PROPERTIES

TYPES:	<u>I & VI</u>	<u>II & III</u>	<u>IV</u>	<u>V</u>			<u>VII</u>		
Class:				<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>
<u>Properties</u>									
Density, min. gm/cm ³	N/A	N/A	1.60	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content (percent) max.	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Burning Rate <u>U</u> (inches/second)	1.25-1.75	1.25-1.75	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Heat of Reaction (calories/gram) Min.	1500	1500	1600	1500	1500	1500	1500	1500	1500
Crush Strength:									
Axial (grams) min.	5000	6000	12,000	18500	7500	3000	N/A	N/A	N/A
Radial (grams) min.	500	N/A	3,000	18000	7500	2000	N/A	N/A	N/A
Time to Max. Pressure, milliseconds	N/A	N/A	45.0±15	N/A	N/A	N/A	N/A	N/A	N/A

U As defined in 4.6.2.

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3.4 Cracks or laminations. The igniter pellets shall be free of cracks or laminations.

3.5 Granulation. The granulation for Type VII shall be as specified in Table V when determined as specified in 4.6.9.

TABLE V Size Requirements

<u>Class</u>	<u>5% Max. retained on USS Sieve No.</u>	<u>5% max. thru USS Sieve No.</u>
1	50	60
2	60	100
3	100	140
	Special Granulations (See 6.1 and 6.7)	
	6	12
	12	25
	25	50
	40	140

Other granulations may be specified for special applications.

3.6 First article inspection. This specification makes provisions for first article inspection. Requirements for the submission of first article samples by the contractor shall be as specified in the contract (see 6.1).

3.7 Workmanship. All pellets and packaging material shall be free of dirt, grease and other foreign matter (see 4.4.2.1).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection - Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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 supplies and services conform to prescribed requirements. Reference shall be made to MIL-STD-109 to define terms used herein.

4.2 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First Article Inspection (see 4.3)
- b. Quality Conformance Inspection (see 4.4)

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4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.3.2. The first article shall be sampled as described in 4.5.1. The sample shall be obtained from the first production lot which has been produced by the contractor using the same production processes, procedures and equipment as will be used in fulfilling the contract. All materials, shall be obtained from the same sources of supply as will be used in regular production.

4.3.2 Inspections to be performed. The sample will be subjected by the Government to any or all of the examinations or tests specified in this specification.

4.3.3 Rejection. If any test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate its inspection upon any failure to an assembly, component, or test specimen in the sample to comply with any of the stated requirements.

4.4 Quality conformance inspection.

4.4.1 Lot formation. A lot shall consist of one or more batches of pellets/granules produced by one manufacturer, in accordance with the same specification, or same specification revision, under one continuous set of operating conditions. Each lot shall consist of that quantity of pellets/granules that has been subjected to the same unit chemical or physical process intended to make the final product homogenous. The lot shall comply with the provisions for submission of product as specified in MIL-STD-105. The criteria and procedure for the assignment of lot numbers shall be in accordance with MIL-STD-1168.

4.4.2 Examination. Unless otherwise specified sampling plans and procedures for major and minor defects shall be in accordance with MIL-STD-105, Inspection Level II.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

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PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.1	Igniter Pellets				None
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>	None Defined				
<u>Major</u>					
101	Cracks or Laminations	-	0.40%	3.4	Visual
<u>Minor</u>					
201	Evidence of Poor Workmanship	-	0.65%	3.6	Visual
NOTES:					

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

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PARAGRAPH	TITLE	SHEET 1 OF 1	DRAWING NUMBER
4.4.2.2	Waxed Container Prior to Closing	1	None NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%
<u>Critical</u>	None Defined		
<u>Major</u>	Liner Missing		0.40%
101			5.1
<u>Minor</u>	Marking Misleading or Unidentifiable		0.65%
201			5.3
			Visual
			Visual
PARAGRAPH REFERENCE / INSPECTION METHOD			

NOTES:

QUALITY CONFORMANCE INSPECTION

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET 1 OF 1		DRAWING NUMBER
CATEGORY	EXAMINATION OR TEST	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.3	Waxed Container Sealed			None NEXT HIGHER ASSEMBLY
<u>Critical</u>	None Defined			
<u>Major</u>	None Defined			
<u>Minor</u>				
201	Tape Missing	0.65%	5.1	Visual
NOTES:				

DRDAR-QA Form 160 Jul 77 Replaces SARPA-QA Form 2567 Feb 74 Which is Obsolete

QUALITY CONFORMANCE INSPECTION

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	SHEET 1 OF 1		DRAWING NUMBER
CATEGORY				AQL OR 100%	REQUIREMENT PARAGRAPH	None NEXT HIGHER ASSEMBLY PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.4	BOX					
<u>Critical</u>	None Defined					
<u>Major</u>						
101	Box sprung or board broken or split to extent that contents are exposed, or likely to become exposed.			0.40%	5.2	Visual
<u>Minor</u>						
201	Contents loose.			0.65%	5.2	Manual
202	Marking misleading or unidentifiable			0.65%	5.2	Visual
NOTES:						

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4.5 Testing.

PRECAUTION: This specification covers sampling and testing of toxic or hazardous materials. Accordingly, it is emphasized that all applicable safety rules, regulations and procedures must be followed in handling and processing these materials.

4.5.1 Sampling.

4.5.1.1 Sampling for Boron Content, Moisture and Burning Rate. Two separate representative samples of approximately 100g each of the igniter blend shall be selected from each lot for these test. One sample shall be obtained prior to pelletizing and the second sample near the end of the pelletizing operation. The lot shall be rejected if either test sample fails to meet the requirements given in Table IV for Burning Rate, Moisture and Boron Content as given in 3.1.4 when tested in accordance with the applicable paragraph given in 4.6 (Burning Rate paragraph 4.6.2, moisture 4.6.6, Boron Content 4.6.8).

4.5.1.2 Sampling Pellets for Required Tests (see 3.2 and 3.3). A minimum of seventy five pellets shall be removed from the beginning of the pelletizing operation and a minimum of seventy five shall be removed from the end of the pelletizing operation. These two sub samples shall be thoroughly combined to assure a random distribution and used for the following tests: Weight, Crush Strength, Heat of Reaction, Dimensions, Density. The lot shall be rejected if any test sample fails to meet the requirements specified on the applicable drawings or this specification.

4.5.1.3 Sampling for Granulation. Two (2) independent and representative samples, approximately 10g each, shall be obtained for this test. The lot shall be rejected if either sample fails to comply with the requirements given in 3.5 when tested in accordance with 4.6.9.

4.5.1.4 Classification of Defects. The classification of defects shall be as given in Table VI:

TABLE VI Classification of Defects

<u>Inspection/Requirements</u>	<u>Defect Classification</u>
Boron (see 3.1.4)	Major Defect
Physical Properties (see Tables III & IV)	Major Defect
Ballistic Properties (see Table IV)	Major Defect
Granulation (see Table V)	Major Defect
Dimensions (see 3.2)	Major Defect

NOTE: THIS IS THE BEST AVAILABLE COPY OF THIS DOCUMENT - IT WAS RECOVERED USING AN ONLINE TOOL FROM THE ORIGINAL PAGE 14 (FOLLOWING PAGE).

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4.5.1.2 Sampling Pellets for Required Tests (see 3.2 and 3.3). A minimum of seventy five pellets shall be removed from the beginning of the pelletizing operation and a minimum of seventy five shall be removed from the end of the pelletizing

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4.5.2 Inspection equipment. For the performance of all tests and examinations specified in 4.6, commercial inspection equipment should be employed. The contractor shall have available, and utilize correctly, this equipment and is charged with the responsibility of assuring that proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purposes. (See 6.3).

4.6 Test methods and procedures. (See 6.3) The following tests shall be performed on the samples obtained as per 4.5.1, to determine compliance with the requirements given in section 3 of this specification and the applicable drawings. The tests for moisture and boron content shall be performed on each of the two samples (see 4.5.1.1) using prescribed procedures for replicate determinations given in standard analytical text books or ASTM-D2905. Also, unless otherwise specified herein, all chemicals shall be reagent grade or ACS grade in accordance with MIL-STD-1218.

4.6.1 Weight. Weigh 15 pellets to the nearest milligram. Obtain the average weight of a pellet by dividing the total weight obtained by 15. Repeat the weighing on 15 different pellets and calculate the average weight of a pellet.

4.6.2 Burning rate. The burning rate shall be conducted using a 10 gram sample in accordance with method 801.1 of MIL-STD-286. The sample shall be placed on a 6 x 6 inch square of nylon cloth with one M1A1 squib and squib lead wires. The nylon cloth shall be bunched around the sample and squib to form a tightly packed bag and tied with nylon twine. The test shall be conducted on three individual replicates. For each closed bomb test run, the pressure versus time shall be recorded. The Burning Rate (R) shall be determined as follows:

$$R = \frac{h}{2t}$$

Where h = Determined average height of pellet (see 4.6.5).

t = Time on pressure time trace from first indication of pressure until the curve reaches a stabilized maximum. (seconds)

If the average burning rate from three (3) individual replicates fails to comply with the requirements specified in 3.3 the lot shall be rejected.

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4.6.3 Crush strength. Ten sample pellets shall be tested on the axial direction and ten additional pellet samples shall be tested in the radial direction. Each pellet shall be centered in the jaws of the hardness tester so that the force is applied along the axial center for one test and along the radial center for the other test. The load shall be applied in increments; 1,000 grams axial and 100 grams radial, maintained at each force for a period of not less than 5 seconds. The force increments shall be increased until the test sample is crushed. Observation shall be made for compliance to 3.3 based on the average value found..

4.6.3.1 Alternate. The load shall be applied at a constant cross-head speed of .025 inch per minute, and the load which this crushing movement produced shall be recorded as rupture. The values of maximum load shall be reported.

4.6.4 Heat of reaction. Fifteen sample pellets shall be weighed to the nearest milligram. The pellets shall be placed in a Parr Bomb calorimeter number 1200 or approved equal. A ten centimeter strip of Parr wire number 45Cl0, or equivalent shall be connected across the test equipment terminals. Water shall not be added to the combustion chamber. The combustion chamber shall be closed and purged with argon or helium gas under a pressure of 25 atmospheres. The bomb is closed after purging so that an atmosphere of inert gas is maintained in the bomb at atmospheric pressure. The pellets shall be burned and the heat of reaction determined in calories per gram, to determine compliance with 3.3.

4.6.4.1 Heat of reaction (Alternate) and Time to Max. Pressure (for Type IV only). The heat of reaction shall be determined in accordance with Standard MIL-STD-286, Method 802.1, with the following guidance:

The sample weight shall be 1.400 ± 0.050 gram. A six-inch piece of platinum wire shall be connected across the electrodes coiled 5 to 7 times and placed in contact with the sample. The pressure transducer shall be placed in the bomb head. A 360mL bomb shall be purged twice with 15 atmospheres of helium and sealed with 1 atmosphere of helium. The maximum pressure and time to maximum pressure shall be obtained simultaneously on a Visicorder.

4.6.5 Dimensions. Using a 50 pellet sample, measure each pellet with a micrometer.

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4.6.6 Moisture. Determine the moisture content of each sample obtained in 4.5.1.1 using Method 101.2 of MIL-STD-286 with a 2 gram sample. (Retain samples for Boron Determination.)

4.6.7 Density (Applicable to Type IV pellets only). Using fifty (50) pellets, weigh each pellet to the nearest mg. Calculate the density as follows:

$$\text{Density, g/cm}^3 = \frac{W}{0.78 D^2 H}$$

For pellets B and E (see Dwg 9234458), Use:

$$\text{Density, g/cm}^3 = \frac{2.56W}{D^2 (H^1 + H^2)}$$

Where:

- H = Average Height of Pellet, cm.
- W = Average Weight of Pellet, g.
- H¹ = Height of lowest point of Pellet, cm.
- H² = Height of highest point of Pellet, cm.
- D² = Diameter of pellet squared, cm².

4.6.8 Boron. Using the dried samples obtained in 4.6.6, quantitatively transfer an accurately weighed portion of 0.220 g (weighed to nearest 0.001g) of the sample into a 500 mL standard taper flask. To the flask, add 10 mL of distilled water, 40 mL of 30 percent hydrogen peroxide and ten drops of concentrated nitric acid. Attach the flask to condenser and heat the flask gently until the solution becomes colorless. Increase the heat and reflux for one hour. Do not allow the condensation point to exceed one foot from the bottom of the condensation jacket. Allow the solution to cool. After the solution has cooled, wash inner walls thoroughly with distilled water. Wash five times, using approximately 15 mL of distilled water for each washing. Remove the flask from the reflux apparatus. Filter the solution through No. 40 Whatman filter paper into a 400 mL beaker. Wash out the flask three times with distilled water and pour washings through the filter paper. Wash the filter paper two times carefully. Titrate the solution until a pH of 6.4 is obtained to neutralize the nitric acid. Record the burette reading. Add one mL of one percent phenolphthalein indicator solution and five mL of 20 percent mannitol solution. Titrate remaining boric acid with 0.3N sodium hydroxide until solution becomes pale pink. Add five mL quantities of mannitol (which will make

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the solution colorless) and titrate after each addition to the pink end point. Continue additions of mannitol and the titrations until the mannitol no longer disperses the color. Record the total volume of sodium hydroxide used, subtract milliliters of sodium hydroxide solution recorded above to titrate the nitric acid. The additional volume of sodium hydroxide was used to titrate the boric acid.

$$\text{Percent Boron} = \frac{V \times N \times 1.082}{W}$$

Where:

V = Volume of sodium hydroxide solution used to titrate the boric acid, mL

N = Normality of sodium hydroxide solution

W = Weight of sample taken, g

4.6.9 Granulation. Determine the granulation using specification RR-S-366 and ASTM-E11.

5. PACKAGING Unless other wise specified Level A packaging will be used.

5.1 PRESERVATION

5.1.1 Level A. The pellets shall be packaged in moisture proof containers, of not more than 1.5 pound capacity, conforming to Type V, Round, Plan A, PPP-C-96. The containers shall be lined with, 1/8" thick, shock absorbing material followed by a layer of conductive plastic in accordance with MIL-P-82646. Prior to packaging, the grains shall be placed on a 20 to 30 mesh screen and lightly agitated to remove any dust or small particles. The container shall be sealed then placed in a bag conforming to Type 1, Class E, MIL-B-117. Entrapped air shall be exhausted from the bag and the bag heat sealed in accordance with MIL-P-116.

5.1.2 Level B. Level B will be the same as Level A.

5.2 PACKING.

5.2.1 Level A. Place containers in a snug fitting, wood box conforming to Type-II, Class-1, Grade-C MIL-BV-2427. The gross weight shall not exceed 150 pounds.

5.2.2 Level B. Place containers in a snug fitting fiberboard box conforming to Style RSC, Grade-WSC, PPP-B-636 Gross weight shall not exceed 65 pounds (10 pounds for air shipment).

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5.3 Marking. Marking shall be in accordance with MIL-STD-129 and paragraph 173.93 (F) of Code of Federal Regulations Title 49.

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification.
- b. Type and class required (see 1.2).
- c. Level of packing protection required.
- d. Description sheets shall be prepared for each lot in accordance with MIL-STD-1171.
- e. Provisions for submission of first article samples.

6.2 Intended Use. The Boron/Potassium Nitrate pellets or granules described in this specification are intended for use as a primary charge in rocket motor igniters and fuzes.

6.3 Equivalent Test Methods. Prior approval of the Contracting Officer is required for use of equivalent test methods. A description of the proposed method should be submitted through the Contracting Officer to: Commander, ARRADCOM, ATTN: DRDAR-QAR-R, Dover, NJ 07801. This description should include but not be limited to the procedures used, the accuracy and precision of the method, test data to demonstrate the accuracy and precision and drawings of any special equipment required.

6.4 Material.

6.4.1 Accelerator. Cobalt Naphthenate as manufactured by Nuodex Corporation, Elizabeth, New Jersey has been found satisfactory.

6.4.2 Polyester resin. Laminac number 4116 or 4110, as manufactured by American Cyanamid Corporation, New York NY, has been found satisfactory. Store at a temperature of 60°F or less. Do not use if there is evidence of solidification. Shelf life is approximately six months.

6.4.3 Catalyst. The organic peroxide solution is 60 percent methyl/ethyl ketone peroxide in dimethyl phthalate. Lupersol DDM as manufactured by the Lucidol Division of Wallace and Tiernan, Inc., Buffalo, New York has been found satisfactory. Store at a temperature of 45°F or less. Shelf life is approximately six months. Mix polyester resin and accelerator

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thoroughly then add catalyst to mixture within 30 minutes of time of use. CAUTION: NEVER MIX ACCELERATOR AND CATALYST TOGETHER AS A VIOLENT REACTION MAY OCCUR.

6.4.4 Submission of Inspection Equipment Designs for Approval. Submit equipment designs, as required to Commander, ARRADCOM, ATTN: DRDAR-QAR, Dover, New Jersey 07801, for approval.

6.5 Tests.

6.5.1 Potassium Nitrate. To minimize problems with agglomerations, the potassium nitrate should be pulverized prior to mixing into the composition. The particle size should be 15 microns maximum when determined in accordance with MIL-STD-1233, Method 100.

6.5.2 Boron. Determine the particle size of the boron in accordance with MIL-STD-1233, Method 100.

6.6 Process. The igniter composition shall be mixed in a muller type blender using a non-aqueous solvent.

6.7 Special Granulation. The special granulations listed may be specified for special procurements

6.8 Supersession. MIL-P-46994B supersedes MIL-P-46994A dated 15 March 1971, MIL-T-81266 (WP) dated 16 March 1965 and OS9765 dated 9 June 1977 which contained type V through VII. Type V in Table I is the same as Type I in drawing 657421 and Spec. OS9765 and Type VII in Table I is the same as Type II in Spec. OS9765.

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