

MILITARY SPECIFICATION

PELLETS, EXPLOSIVE COMPOSITIONS
(FOR USE IN AMMUNITION)

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

1. SCOPE

1.1 Scope. - This specification covers explosive composition for eleven (11) types of pellets which contain explosives (i.e. HMX, RDX, etc.) in mixture with desensitizers (i.e. stearic acid, wax, etc.) with or without binders (i.e. graphite, polyisobutylene, plastics, etc.). Explosive compositions include but are not limited to the following: Composition A-3, Composition A-4, Composition A-5, CH-6, PBHMX, PBXN-5, etc. (see 6.4 and 6.8).

1.2 Classification. - Explosive composition pellets shall be of the following types:

- Type I - RDX, calcium resinate, Type II, Graphite, Grade I or II.
- Type II - RDX, stearic acid, Graphite, Grade I or II.
- Type III - RDX, calcium resinate, Type II, Graphite, Grade I or II.
- Type IV - Explosive Composition A-3.
- Type V - Explosive Composition A-4.
- Type VIA - Explosive Composition A-5, Class 1.
- Type VIB - Explosive Composition A-5, Class 2.
- Type VII - Explosive CH-6.
- Type VIII - Explosive PBX.
- Type IX - Explosive PBHMX.
- Type X - Explosive PBXN-5, Type I, Class 2, with or without Graphite, Grade I or II.
- Type XI - Other compositions as listed on applicable drawing.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

- PPP-T-45 - Tape Gummed Paper Reinforced and Plain for Sealing and Securing.

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FEDERAL

- PPP-F-320 - Fiberboard, Corrugated and Solid Sheet Stock Container Grade and Cut Shapes.
- PPP-B-636 - Box, Fiberboard.
- PPP-C-843 - Cushioning, Material, Cellulosic.
- TT-I-1795 - Ink, Marking, Stencil, Opaque (Porous and Non-Porous Surfaces).

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- MIL-G-155 - Graphite (For Use in Ammunition).
- MIL-S-271 - Acid, Stearic.
- MIL-R-398 - RDX.
- MIL-B-2427 - Boxes, Ammunition, Packing, Wood, Nailed.
- MIL-C-2439 - Container, Ammunition, Fiber, Spirally Wound.
- MIL-L-10547 - Liners, Case, Waterproof.
- MIL-A-13374 - Adhesive, Dextrin (Spiral Tube Winding for Ammunition Containers).
- MIL-C-20470 - Calcium Resinate.
- MIL-T-43036 - Tape Pressure Sensitive Adhesive, Plastic Film, Filament Reinforced (For Sealing Fiber Containers and Cans).
- MIL-A-48078 - Ammunition, Standard Quality Assurance Provisions, General Specification For.
- MIL-F-50449 - Filler, Sheet Form (For Use In Ammunition Containers).

STANDARDS

FEDERAL

- FED-STD-101 - Preservation, Packaging and Packing Materials: Test Methods.

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- MIL-STD-650 - Explosive: Sampling Inspection and Testing.

DRAWINGS

U.S. ARMY

- 8796522 - Marking Diagram and Sealing For Wood Packing Boxes.

9211789 - Ink, Marking, Opaque For Porous Surfaces (For Automatic or Semi-automatic Machine Application).

(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 to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM D 792-66 - Specific Gravity and Density of Plastics by Displacement.

(Requests for copies of ASTM Standards should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103).

CODE OF FEDERAL REGULATIONS

Title 49 - Transportation, Part 173.65

(The Interstate Commerce Commission Regulations are now a part of the Code of Federal Regulations, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Orders for the above publications should cite: "49 CFR 173.65 (latest revision)").

3. REQUIREMENTS

3.1 Materials and Composition.

3.1.1 Standard composition pellets. - The explosive composition of pellets containing standard explosive compositions (Types IV thru X) shall comply with the composition requirements given in their respective specifications (see 6.7).

3.1.2 Formulated compositions. - The explosive composition of pellets which are formulated in accordance with requirements given on drawings shall contain a homogeneous blend of individual ingredients (i.e. explosive, desensitizer or binder) which comply with their respective specifications as well as the following:

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3.1.2.1 RDX pellets with binder-lubricant. - Pellets made from a blend of RDX and binder-lubricant shall conform to the composition given in Table I when determined in accordance with applicable paragraph:

Table I

Type	Composition	Conforming to	% by Weight	Applicable Paragraph
I	RDX	MIL-R-398 (see 6.8.1, Note 14)	98.5 min	4.5.4
	Calcium Resinate, Type II	MIL-C-20470 (see 6.8.1, Note 15)	1.0 max	4.5.1
	Graphite, Grade A or B	MIL-G-155	0.5 max	4.5.2
II	RDX	MIL-R-398 (see 6.8.1, Note 14)	98.2 max	4.5.4
	[Stearic Acid	MIL-S-271		4.5.1
	Graphite, Grade A or B]	MIL-G-155	[1.8 min]	4.5.2
III	RDX	MIL-R-398 (see 6.8.1, Note 14)	98.2 max	4.5.4
	Calcium Resinate, Type II	MIL-C-20470 (see 6.8.1, Note 15)	1.2 min	4.5.1
	Graphite, Grade A or B	MIL-G-155	0.6 min	4.5.2

3.1.2.2 Other composition - Type XI. - Pellets containing other compositions shall conform to composition given on the applicable drawing when determined in accordance with methods which have prior approval of the Contracting Officer.

3.2 General requirements. - The following requirements will apply to all explosive pellets:

3.2.1 Cracks or laminations. - The pellets shall be free of all cracks or laminations when determined as specified in 4.4.2.1.

3.2.2 Detail requirements. - Detail requirements pertaining to dimensions and pellet weight shall be as specified on the applicable drawings when determined as specified in 4.4.2.1.

3.2.3 Workmanship. - The pellets shall be free of dust, grease and other foreign matter when determined as specified in 4.4.2.1.

3.2.4 Moisture. - The moisture content of the pellets shall not exceed 0.20 percent, unless otherwise specified in the applicable drawings, when determined as specified in 4.5.5 (see 4.4.3.1).

3.2.5 Density. - The density (if required by applicable drawing) of the pellets shall conform to the requirements specified on applicable drawings when tested as specified in 4.5.6.

3.3 First article inspection. - This specification contains technical 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).

3.4 Moisture content of packaging material. - The moisture content of the paperboard products (fiberboard boxes, separators and fillers) and wood products (sawdust) shall be 9.0 percent, maximum, when determined as specified in 4.5.7.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection and standard quality assurance provisions. - Unless otherwise specified herein or in the contract, the provisions of MIL-A-48078 shall apply and are hereby made a part of this detail specification.

4.2 Classification of inspections. - The following types of inspection shall be conducted on this item:

- a. First Article Inspection (see 4.3).
- b. Quality Conformance Inspection (see 4.4).
- c. Packaging Inspection (see 4.4.2).

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 consist of 150 pellets or sufficient pellets to make up 100 grams obtained by sampling as described in 4.4.3, except that 50 pellets each shall be removed from the beginning, middle portion and end of the pelletizing operation. The sample shall be obtained from a 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 Inspection to be performed. - The sample will be subjected by the Government to any or all of the examinations or tests specified in 4.4.2 and 4.5 of this specification.

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4.3.3 Rejection. - See MIL-A-48078(PA).

4.4 Quality conformance inspection.

4.4.1 Inspection lot formation. - Inspection lots shall comply with the lot formation provisions of MIL-A-48078. In addition, each lot of pellets shall be produced from one interfix lot of explosive composition produced in accordance with applicable drawings and specifications.

4.4.2 Examination. - Unless otherwise specified in the Classification of Defects and test tables, sampling plans for the major and minor defects shall be in accordance with MIL-STD-105, Inspection Level II (See MIL-A-48078, para 4.4.2).

**QUALITY CONFORMANCE INSPECTION
CLASSIFICATION OF DEFECTS & TESTS**

PARAGRAPH	TITLE	SHEET 1 OF 1			DRAWING NUMBER (See applicable drawing)
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	NEXT HIGHER ASSEMBLY
					PARAGRAPH REFERENCE /INSPECTION METHOD
4.4.2.1	Pellets, Explosive Composition				
<u>Critical</u>	None defined				
<u>Major B</u>	Check following if required by applicable drawing:				
131	Crack or lamination		0.40%	3.2.1	Visual
132	Weight		0.40%	3.2.2	Balance
133	Length		0.40%	3.2.2	Gage (CD)
134	Taper on outside surface		0.40%	3.2.2	Gage (CD)
135	Taper on inside surface		0.40%	3.2.2	Gage (CD)
136	Depth of cavity		0.40%	3.2.2	Gage (CD)
137	Concentricity of diameter of cavity or hole with respect to outside diameter		0.40%	3.2.2	Gage (CD)
138	Chamfer on OD		0.40%	3.2.2	Gage (CD)
139	OD (Max)		0.40%	3.2.2	Gage (CD)
140	ID		0.40%	3.2.2	Gage (CD)
141	Radii		0.40%	3.2.2	Gage (CD)
142	Other dimensions as specified		0.40%	3.2.2	Gage (CD)
<u>Minor</u>					
201	Evidence of poor workmanship		0.65%	3.2.3	Visual
NOTES:					

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PARAGRAPH 4.4.2.2	TITLE Unit packages		SHEET 1 OF 1		DRAWING NUMBER
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
<u>Critical</u> <u>Major B</u> 131 132 133 134 <u>Minor</u> 201 202	None defined Cushion missing Double cushion one end Contents loose Tube ends improperly closed Evidence of poor workmanship End cap not secure		0.40% 0.40% 0.40% 0.40% 0.65% 0.65%	- - - - 3.2.3 -	Visual Visual Manual Visual Visual Visual/Manual
NOTES:					

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PARAGRAPH 4.4.2.4	TITLE Case liner		SHEET 1 OF 1		DRAWING NUMBER NEXT HIGHER ASSEMBLY PARAGRAPH REFERENCE / INSPECTION METHOD
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	
<u>Critical</u> <u>Major B</u> 131 132 <u>Minor</u> 201	None defined Liner punctured or torn Liner improperly closed Type of liner incorrect		 0.40% 0.40% 0.65%	 - - -	 Visual Visual Visual
NOTES:					

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH 4.4.2.5	TITLE Wood packing case, sealed		SHEET 1 OF 1		DRAWING NUMBER
					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 B</u>					
131	Lumber undersize		0.40%	-	Scale
132	Board broken or split		0.40%	-	Visual
133	Contents exposed		0.40%	-	Visual
134	Strapping missing, broken or loose		0.40%	-	Visual/Manual
<u>Minor</u>					
201	Contents loose		0.65%	-	Manual
202	Strapping improperly assembled		0.65%	-	Visual
203	Marking misleading or unidentifiable		0.65%	-	Visual
NOTES:					

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4.4.3 Testing.

4.4.3.1 Sampling - for Type I thru III and Type XI. - A minimum of ten (10) pellets shall be removed from the beginning of the pelletizing operation and a minimum of 10 pellets shall be removed from the end of the pelletizing operation. The two 10 pellet samples shall be crushed and retained as two separate individual samples. Caution should be exercised (see 6.5). These two samples shall be tested for composition and moisture requirement in accordance with the tests depicted in 4.5. If either of these samples fail to comply with the requirement specified on applicable drawings or specifications, the lot of pellets shall be rejected. If the total weight of either of the samples described above (beginning or end) is less than 100 grams, then additional pellets shall be selected from the pelletizing operation (beginning and end) to obtain a minimum weight of 100 grams of each sample.

4.4.3.2 Sampling for density. - When required by the applicable pellet drawing, a random sample of ten (10) pellets shall be selected from the sample used in 4.4.2.1 and tested in accordance with 4.5.6. If the pellets fail to meet the applicable requirement, the lot shall be rejected.

4.4.3.3 Sampling for moisture content of packaging materials. - Paperboard products (fiberboard boxes, separators and fillers) and wood products (sawdust) shall be sampled in accordance with Special Inspection Level S-3 with AQL 4.0 percent. The sample size represents the number of each of the above components to be sampled except that the sample size of sawdust represents the number of individual containers (bags) to be sampled.

4.4.3.4 Testing of RDX pellets made from a blend of RDX and binder-lubricant. - The samples obtained in 4.4.3.1 and 4.4.3.2 shall be subjected to the tests listed in Table I unless otherwise specified.

Table I

<u>Inspection/Requirement</u>	<u>Defect Classification</u>
Determination of calcium resinate or stearic acid content (see 3.1.2.1 and 4.5.1)	Major B
Determination of graphite content of binder-lubricant (see 3.1.2.1 and 4.5.2)	Major B

Table I (Continued)

<u>Inspection/Requirement</u>	<u>Defect Classification</u>
Determination of total binder-lubricant content (see 3.1.2.1 and 4.5.3)	Major B
Determination of RDX content (see 3.1.2.1 and 4.5.4)	Major B
Moisture (see applicable drawing and 4.5.5)	Major B
Density (see applicable drawing and 4.5.6)	Major B

4.4.4 Inspection equipment. - The government reserves the right to inspect the contractor's equipment and determine that he has available and utilizes correctly, measuring and test equipment of the required accuracy and precision and that the instruments are of the proper type and range to make measurements of the required accuracy. Commercial inspection equipment, shall be employed where applicable for all tests and examinations specified in 4.5. The contractor is responsible for assuring proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purpose (see 6.2).

4.5 Test methods and procedures (see 6.3). - The tests in 4.5.1 thru 4.5.6 shall be performed using prescribed analytical procedures for replicate determinations given in standard analytical textbooks.

4.5.1 Determination of calcium resinate or stearic acid content. - Transfer an accurately weighed portion of approximately 5 grams (g) of the sample to a tared medium porosity, sintered glass crucible. Extract the sample with three separate 20 milliliter (ml) portions of chloroform which has been previously saturated with RDX, maintaining each portion in contact with the residue for approximately five minutes before applying suction. Stir occasionally to break up any lumps which may persist and wash down the sides of the crucible with each 20 ml portion of chloroform to insure complete removal of the calcium resinate or stearic acid. Aspirate the residue until the odor of chloroform is no longer detectable, place the crucible and contents in a drying oven at 100 degrees Centigrade (°C) to 105°C for one half hour, cool in

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a desiccator and weigh. Repeat the above extraction, drying and weighing procedure with individual 20 ml portions of chloroform until the loss in weight on subsequent extractions totals less than 0.003 g. Calculate the loss in weight of the crucible plus contents as percent calcium resinate or stearic acid, as applicable, on a moisture-free basis as follows:

$$\text{Percent calcium resinate or stearic acid} = \frac{100A}{W}$$

Where:

A = loss in weight of the crucible plus contents, in g

W = weight of sample on a moisture-free basis, in g

4.5.2 Determination of graphite content of binder-lubricant (when applicable). - Extract the residue remaining after the calcium resinate or stearic acid has been removed with two 20 ml portions of dimethyl formamide, maintaining each portion in contact with the residue for approximately five minutes with intermittent stirring before applying suction. Wash the crucible and contents with a minimum of three 20 ml portions of acetone, maintaining each portion in contact with the residue for approximately one minute with continuous stirring, before applying suction and until the following qualitative test for RDX in the acetone washings is negative. Transfer the acetone filtrate to a 25 ml beaker, evaporate to dryness in a steam bath and add several drops of a solution of chromotropic acid in normal one (1) N sulfuric acid. The formation of a reddish-brown color as compared to a pink color obtained by a blank prepared in an identical manner indicates the presence of RDX. Aspirate the residue until the odor of acetone is no longer detectable, place the crucible and contents in a drying oven at 100° to 105°C for one half hour, cool in a desiccator and weigh. Calculate the weight of the residue as percentage of graphite on a moisture-free basis as follows:

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

Where:

A = increase in weight of tared crucible, in g

W = weight of sample on a moisture-free basis, in g

4.5.3 Determination of total binder-lubricant content. The percent total binder-lubricant content shall be determined by adding the percent calcium resinate or stearic acid obtained to the percent graphite, when applicable.

4.5.4 Determination of RDX content. - The percent RDX content shall be determined by subtracting the percent total binder-lubricant from 100 percent.

4.5.5 Moisture.

4.5.5.1 Oven method. - Transfer approximately 5 g of the sample obtained in 4.4.3.1 (weighed to the nearest .0001 g) to a tared weighing dish with a cover. The uncovered dish, contents and cover shall be placed in an oven maintained at $100 \pm 5^{\circ}\text{C}$ for 1 hour. Cover the dish, remove from the oven, and cool the sample to room temperature in a desiccator. Determine the loss in weight by weighing the covered dish and contents. Calculate the percentage of moisture as follows:

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

Where:

A = loss in weight, in g

B = weight of sample, in g

4.5.5.2 Karl Fischer method. - Determine the moisture content of the sample in accordance with MIL-STD-650, Method 101.4, using methanol as the special solvent.

4.5.6 Density. - Determine the density of the pellets using one of the following methods:

4.5.6.1 Density by calculation. - The density of each pellet in the sample shall be determined by using the following calculation:

$$\text{Density, g/cc} = \frac{\text{Weight in g}}{(\text{Height, inches})(\text{Diameter, inches})^2(12.870)}$$

Use calculation given in 4.5.6.2 for determining compliance with minimum and maximum density by obtaining an average and standard deviation of the pellets measured (see 6.6).

4.5.6.2 Alternate density method. - Determine the density of each pellet in the sample in accordance with ASTM Method D792-66. Calculate the minimum and maximum density of the pellets as follows:

Density, minimum $\bar{x} - 3s$ (The average density minus 3 standard deviations shall be equal to or greater than the minimum density).

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Density, maximum $\bar{x} + 3s$ (The average density plus 3 standard deviations shall be equal to or less than the maximum density).

Where:

\bar{x} = average of ten (10) individual pellets
 s = standard deviation

Minimum and Maximum Density is as given in the applicable drawing.

4.5.7 Moisture content of packaging material.

4.5.7.1 Moisture content of paperboard products. - The moisture content of the paperboard products (fiberboard boxes, separators and fillers) shall be determined in accordance with Federal Test Method Standard No. 101, Method 5024, using the oven-drying method.

4.5.7.2 Moisture content of wood products. - The moisture content of the wood products (sawdust) shall be determined in accordance with Federal Test Method Standard No. 101, Method 5025, using the oven-drying method.

5. PREPARATION FOR DELIVERY

5.1 Packaging.

5.1.1 Level A - unit pack. - Unless otherwise specified, high explosive pellets shall be tightly packaged in convolute or spiral wound paper tubes of the proper inside diameter to accommodate the pellets and not exceeding 15 inches in length. The tubes shall be constructed in accordance with requirements cited in MIL-C-2439 para 3.3 except any paper board meeting the minimum requirements cited in 3.3 is acceptable. Wall thickness shall be as follows:

<u>Tube Size</u> <u>Inside Dia (inches)</u>	<u>Req'd Wall</u> <u>Thickness (min)</u>
Less than 3/16	.030
3/16 to 1/2	.060
1/2 to 2	.090
2 or larger	.120

The pellets shall be padded at each end of the tube with minimum 1/4 inch thick cushioning material cut square to fit the inside diameter of the tube. Cushioning material shall conform to Specification PPP-C-843, Type and Class Optional. Additional pads may be added as needed to prevent movement

of the tube contents. Tubes shall be closed by applying a closure cap over each end of the tube. The closure cap shall be constructed of paperboard .020 inch minimum thickness and shall be approximately 1 inch in length. The inside diameter of the cap shall be as required to provide a slide fit of the cap over the tube body. A length of pressure-sensitive tape 1" wide conforming to MIL-T-43036 shall be centered over and completely around the joint formed by the body and the end cap.

5.1.2 Level C - unit pack. - Pellets shall be unit packaged as specified in 5.1.1.

5.1.3 Level A - intermediate package. - Tubes containing the pellets shall be packed horizontally in a fiberboard box complying with requirements of PPP-B-636, Style RSC, Type CF, Grade 175, Class Domestic, Variety SW. The tubes shall be separated from the box and between layers by a minimum of one inch of clean dry and tightly packed sawdust. Not more than 10 pounds, net weight, of explosives shall be packed in one box. The box shall be closed with two inch wide tape conforming to Type III, Grade B of PPP-T-45. Each box shall be labeled to describe the contents.

5.1.4 Level C - intermediate pack. - Tubes containing pellets shall be packed as specified in 5.1.3.

5.2 Packing.

5.2.1 Level A. - One (1) intermediate package shall be packed in a Grade A, Type I, Class 2, wood box conforming to MIL-B-2427. Preservative treatment of boxes is not required. A case liner fabricated in accordance with MIL-L-10547, Type I, Grade A, B, C or D, or Type IV, Grade E shall be used in each box. The length and width of the liner shall be approximately 1/4 inch greater than the inside length and width of the box. Closure of liner shall be in accordance with instructions contained in the Appendix of the liner specification. After sealing the case liner, there shall be sufficient looseness between the contents and the liner to insure no pressure being applied to liner or seams. Fillers conforming to MIL-B-50449 shall be added to top of closed liner as required to prevent shifting of contents. Boxes shall be closed and strapped in accordance with instructions contained in the Appendix of the box specification.

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5.2.2 Level C. - Pellets shall be packed as specified in 5.2.1 except box shall be Grade C, Type I, Class 1 and Fillers shall be fiberboard PPP-F-320 Type CF, Class Domestic, Variety SW, Grade 175 min.

5.3 Marking. - Each unit and intermediate package shall be printed, stamped or labeled with the following information:

(QTY) PELLET (1)

LOT (MFR SYMBOL - NO.)

LOADED (INSERT MO/YR NUMERICALLY)

HIGH EXPLOSIVE - DANGEROUS

(1) Insert No. of Pellets in unit package or intermediate package as applicable, and correct nomenclature.

Letters shall be upper case and all marking minimum 1/4 inch in size. Labels shall be gummed, white paper. Ink shall be black conforming to TT-I-1795 Type II or III, or drawing 9211789. Each exterior container shall be marked in accordance with 8796522. DOT marking shall be HIGH-EXPLOSIVES - DANGEROUS and shall appear on the top and one side of the box in letters not less than 7/16 inch high. The words THIS SIDE UP shall appear on the top of the exterior container. Letter size shall be minimum 7/16 inch.

6. NOTES

6.1 Ordering data. - See MIL-A-48078 (PA).

6.2 Inspection equipment designs. - See MIL-A-48078 (PA).

6.3 Prior approval of the Contracting Officer is required for use of equivalent test methods. A description of the proposed method should be submitted thru the Contracting Officer to: Commander, ATTN: SARPA-QA-A-P, Picatinny Arsenal, Dover, N.J., 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 Intended use. - The pellets furnished under this specification are intended for use as the main charge in grenades, as a booster charge to initiate high explosives, and for use in detonators and leads, or any items requiring pressed pellets from explosive compositions. Pellets made for reconsolidation need not meet dimensional requirements.

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6.5 Caution: - Crushing of explosive composition pellets should be carried out remotely behind a barricade and local safety regulations should be observed.

6.6 "Engineering Design Handbook", AMC Pamphlet 706-110 has been found suitable as a reference and guide for calculating averages and standard deviations.

6.7 Standard explosive compositions: - Standard explosive compositions used in manufacture of pellets are covered by the following specifications:

Composition A-3 and A-4	MIL-C-440
Composition A-5	MIL-E-14970
PBX	MIL-P-14999
CH-6	MIL-C-21723
PBHMx	MIL-P-50854
PBXN-5	MIL-E-81111

6.8 General notes for pellets.

6.8.1 Pellets, less than 1/4 inch OD (see SKPAD-2).

Notes: 1 - Spec MIL-A-2550 applies.

2 - Material: See 1.2.

3 - Pellets containing stearic acid shall not be used in contact with lead azide.

4 - Dimensions A&B per end item drawing(s). Recommended tolerances are maximum. Dimension "B" should equal Dimension "A" but should never exceed two times Dimension "A".

5 - Radii per end item drawing(s) if required (Note 6).

6 - Radius permitted on only one side only if adequate precautions for proper assembly are assured.

7 - Weight and weight tolerance: See end item drawing(s). Computation performed as follows (Note 8 & 9):

min weight = (max dia)²(max length)(12.8704)(min density)

max weight = (min dia)²(min length)(12.8704)(max density)

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if a radius is specified subtract the weight of the fillet. Max fillet weight to be subtracted from max pellet weight which is computed as follows:

$$\text{max fillet weight} = (\text{max radius})^2 (.21460) (\text{min dia}) (51.48148) (\text{max density})$$

$$\text{min fillet weight} = (\text{min radius})^2 (.21460) (\text{max dia}) (51.48148) (\text{min density})$$

- 8 - Dimensions should be specified to one thousandth of an inch and weight should be specified to one milligram.
- 9 - In order to provide an adequate weight spread for production purposes the min density for RDX type pellets should be 1.59 and the max 1.69 gm/cc. Small pellets may require a reduction in the OD, length tolerance, and density spread to obtain an acceptable weight tolerance of at least + 1.5 mg. HMX type pellets should have a density spread of 1.65 to 1.75 gm/cc.
- 10 - A pellet which fails to meet the weight requirement per note 7 but meets the dimensional requirements shall be acceptable provided the density of the pellet is between (see end item drawing(s)).
- 11 - Advisory: - The face of punches used to consolidate some explosives should have a four (4) micro-inch finish max to prevent sticking. Jeweler's rouge should be used to perform the polishing.
- 12 - Advisory: - If the explosive, as received, has a spread in the bulk density greater than ± 0.025 gm/ml, blend the material to obtain a homogeneous mixture. A blending time of approx 30 minutes has been found to be generally acceptable when using a baffleless, 500 pound capacity, GEMCO blender revolving at approx 32 RPM.
- 13 - See MIL-STD-1316 for latest list of approved explosives to be used in fuzes beyond the interrupter.

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- 14 - Advisory: - RDX used shall pass through a U.S. Standard sieve No. 30 or finer and be retained on a U.S. Standard sieve No. 80 or coarser (spec RR-S-366) to maintain some pellet weights.
- 15 - Calcium resinate should all (100%) pass through a U.S. Standard No. 100 sieve.
- 16 - PBXN-5 may require a sieve cut of 20/40 to achieve uniformity when volumetric loading a pelleting machine.

6.8.2 Pellets, 1/4 inch diameter and larger (see SKPAD-1).

Notes: 1 - Spec MIL-A-2550 applies.

- 2 - Material: See 1.2 (Note 12).
- 3 - Dimensions A&B per end item drawing(s). Recommended tolerances are maximum.
- 4 - Radii per end item drawing(s) if required (Note 5).
- 5 - Radius permitted on one side only if adequate precautions for proper assembly are assured.
- 6 - Weight and weight tolerance: See end item drawing(s). Computation performed as follows (note 7 & 8):

$$\text{min weight} = (\text{max dia})^2 (\text{max length}) (12.8704) (\text{min density})$$

$$\text{max weight} = (\text{min dia})^2 (\text{min length}) (12.8704) (\text{max density})$$

if a radius is specified subtract the weight of the fillet. Max fillet weight to be subtracted from max pellet weight which is computed as follows:

$$\text{max fillet weight} = (\text{max radius})^2 (.21460) (\text{min dia}) (51.48148) (\text{max density})$$

$$\text{min fillet weight} = (\text{min radius})^2 (.21460) (\text{max dia}) (51.48148) (\text{min density})$$

- 7 - Dimensions should be specified to one thousandth of an inch and weight should be specified to one milligram.

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- 8 - In order to provide an adequate weight spread for production purposes the min density should be 1.50 and the max 1.70 gm/cc. Small pellets may require a reduction in the OD, length tolerance, and density spread to obtain an acceptable weight tolerance.
- 9 - A pellet which fails to meet the weight requirement per note 6 but meets the dimensional requirements shall be acceptable provided the density of the pellet is between (see end item drawing(s)).
- 10 - Advisory: - The face of punches used to consolidate some explosives should have a four (4) microinch finish wax to prevent sticking. Jeweler's rouge should be used to perform the polishing.
- 11 - Advisory: - If the explosive, as received, has a spread in the bulk density greater than ± 0.025 gm/ml, blend the material to obtain a homogeneous mixture. A blending time of approx 30 minutes has been found to be generally acceptable when using a baffleless, 500 pound capacity, GEMCO blender revolving at approx 32 RPM.
- 12 - See MIL-STD-1316 for latest list of approved explosives to be used in fuzes beyond the interrupter.
- 13 - HMX compositions should not be used to fabricate pellets 1/4 inch OD and larger due to its high cost.

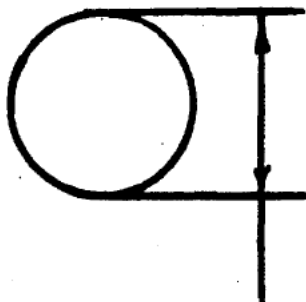
CUSTODIAN:
ARMY - PA

PREPARING ACTIVITY:
ARMY - PA

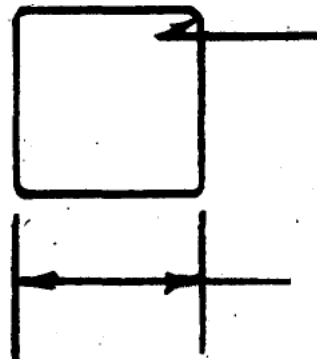
Project Number: 1376-A041

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PELLETS
 $\frac{1}{2}$ INCH OD & LARGER

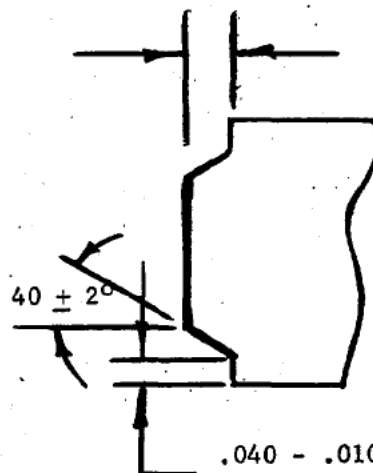


DIM "A" $-.005$
 NOTE 3



RADIUS
 NOTES 4 & 5

DIM "B" $-.015$
 NOTE 3



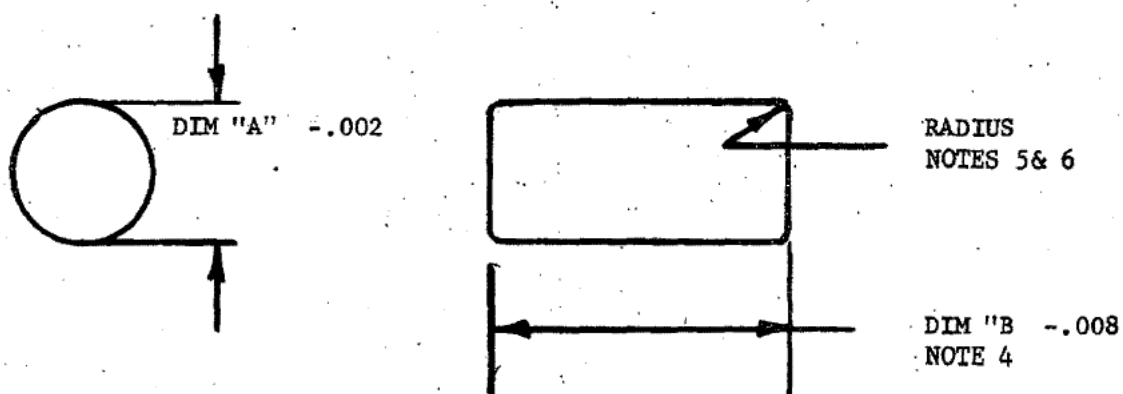
(TO ELIMINATE "FEATHER" EDGE ON PUNCH)

ALTERNATIVE TO RADIUS

SK PAD-1 (Figure 1)

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PELLETS
LESS THAN $\frac{1}{2}$ INCH OD



SK PAD-2 (Figure 2)