

MIL-P-50891 (MU)  
24 October 1972

## MILITARY SPECIFICATION

PROJECTILE, 8 INCH: M422, PARTS AND SUBASSEMBLIES, BERYLLIUM

### 1. SCOPE

1.1 This specification covers requirements, quality assurance provisions, and the preparation for delivery criteria for one type of beryllium parts and subassemblies used on M422 Projectile, 8 inch.

### 2. APPLICABLE DOCUMENTS

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

#### STANDARDS

##### MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-453	Inspection, Radiographic
MIL-STD-1167	Ammunition Data Cards
MIL-STD-1168	Lot Numbering of Ammunition
MIL-STD-1169	Packaging, Packing and Marking for Shipments of Inert Ammunition Components

#### DRAWINGS

##### ORDNANCE CORPS

8787105	Body Section, Atomic Projectile, Front
8787107	Cylinder, Sintered
8787108	Plug, Closing
8787111	Disc, Solid, Plain
8787149	Base Jacket Assembly
8787150	Ring
EL8787105	Equipment List
EL8787107	Equipment List

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EL8787108	Equipment List
EL8787111	Equipment List
EL8787149	Equipment List
EL8787150	Equipment List

(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.)

### 3. REQUIREMENTS

3.1 Materials. The contractor shall furnish objective evidence (see 6.2) that the material complies with the specifications listed on the applicable drawing.

3.2 Assembly. The part or assembly shall comply with all requirements specified on the drawing (dwg) 8787105 or 8787107 or 8787108 or 8787111 or 8787149 or 8787150 with all requirements specified herein, and with the requirements of all applicable specifications to the extent specified on the drawing and herein.

3.3 First article testing. Requirements for the submission of first article samples by the contractor shall be as specified in the contract (see 4.2).

#### 3.4 Workmanship.

3.4.1 Plastic and metal characteristics. All components shall be free from cracks, splits, cold flow, shrinkage, cold shuts, inclusions, porosity, or any similar characteristic.

3.4.2 Threads. Threads shall be full and undamaged for the entire minimum length or depth as required on the applicable drawing.

3.4.3 Burrs. Parts shall be free from burrs.

3.4.4 Foreign matter. Parts shall be free from chips, dirt, grease, rust, corrosion, or any embedded foreign material.

3.4.5 Cleaning. The cleaning method shall not be injurious to any of the parts, nor shall the parts be contaminated by the cleaning agent.

### 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 in the contract or order, the supplier may use his own

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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.

#### 4.2 First article inspection.

4.2.1 Quantity to be submitted (see 6.4). When the contractor requires first article inspection, the contractor shall submit one complete assembly. (see dwg 8787105 and 8787149 as applicable and one set of parts for each assembly or one part as designated for first article testing to the testing facility designated in the invitation for bids or request for proposal.

4.2.2 Inspection and testing to be performed. The first article inspection sample shall be subjected to the inspections and tests specified in Table I. Tests need not be conducted in order specified in Table I.

TABLE I

### First Article Inspection and Tests

<u>Inspection and Tests</u>	<u>Non Dest</u>	<u>Parts</u>	<u>Sub Assy</u>	<u>Assy</u>
1. Classification of characteristics (see 4.3.4.1)	X	X	X	X
2. Cavitation (see 4.3.3.1)	X	X		

4.2.3 Inspection equipment. The inspection and testing specified in 4.2.2 shall be accomplished by using the gages and test equipment specified in 4.3.4.1.

4.2.4 Rejection. If any item fails to comply with any of the applicable requirements, the first article sample shall be rejected.

#### 4.3 Quality conformance inspection.

4.3.1 Lot formation. Lot formation shall be in accordance with MIL-STD-1168. Changes in lot numbers shall be recorded on Ammunition Data Cards in accordance with MIL-STD-1167 and MIL-STD-1168.

4.3.1.1 Inspection lot. An inspection lot shall be the quantity of parts, subassemblies or assemblies from the same lot, which are submitted to inspection for Government acceptance.

4.3.2 Product inspection examination. Critical characteristics shall require 100 percent inspection of all items in the inspection lot. A sample shall be selected at

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random from each inspection lot in accordance with the applicable major or minor characteristic table (see Table II and Table III), and inspected for all characteristics in the applicable classification. Any characteristics in the sample found to be defective shall reject the inspection lot. Sequence for the inspection of characteristics in each classification need not be followed as long as all characteristic inspections are performed.

Table II  
Major Characteristics

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<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>
1-72	all	140-141	124	256-259	177	541-549	230
73	72	142	125	260-262	178	550-559	231
74	73	143-144	126	263-265	179	560-569	232
75	74	145	127	266-268	180	570-579	233
76	75	146-147	128	269-271	181	580-590	234
77	76	148-149	129	272-275	182	591-601	235
78	77	150	130	276-278	183	602-613	236
79	78	151-152	131	279-282	184	614-625	237
80	79	153-154	132	283-285	185	626-637	238
81-82	80	155-156	133	286-289	186	638-649	239
83	81	157	134	290-293	187	650-662	240
84	82	158-159	135	294-296	188	663-676	241
85	83	160-161	136	297-300	189	677-690	242
86	84	162-163	137	301-304	190	691-704	243
87	85	164-165	138	305-308	191	705-719	244
88-89	86	166-167	139	309-312	192	720-735	245
90	87	168	140	313-316	193	736-751	246
91	88	169-170	141	317-320	194	752-768	247
92	89	171-172	142	321-324	195	769-785	248
93	90	173-174	143	325-329	196	786-804	249
94-95	91	175-176	144	330-333	197	805-823	250
96	92	177-178	145	334-338	198	824-842	251
97	93	179-180	146	339-342	199	843-863	252
98	94	181-182	147	343-347	200	864-884	253
99-100	95	183-184	148	348-352	201	885-907	254
101	96	185-187	149	353-356	202	908-930	255
102	97	188-189	150	357-361	203	931-955	256
103	98	190-191	151	362-366	204	956-981	257
104-105	99	192-193	152	367-372	205	982-1008	258
106	100	194-195	153	373-377	206	1009-1036	259
107	101	196-197	154	378-382	207	1037-1066	260
108-109	102	198-200	155	383-388	208	1067-1098	261
110	103	201-202	156	389-393	209	1099-1131	262
111	104	203-204	157	394-399	210	1132-1166	263
112-113	105	205-207	158	400-405	211	1167-1204	264
114	106	208-209	159	406-411	212	1205-1243	265
115	107	210-212	160	412-417	213	1244-1285	266
116-117	108	213-214	161	418-424	214	1286-1330	267
118	109	215-217	162	425-430	215	1331-1378	268
119	110	218-219	163	431-437	216	1379-1429	269
120-121	111	220-222	164	438-443	217	1430-1483	270
122	112	223-224	165	444-450	218	1484-1542	271
123-124	113	225-227	166	451-457	219	1543-1605	272
125	114	228-230	167	458-465	220	1606-1673	273
126-127	115	231-232	168	466-472	221	1674-1747	274
128	116	233-235	169	473-480	222	1748-1827	275
129-130	117	236-238	170	481-488	223	1828-1914	276
131	118	239-241	171	489-496	224	1915-2010	277
132-133	119	242-243	172	497-504	225	2011-2115	278
134	120	244-246	173	505-513	226	2116-2232	279
135-136	121	247-249	174	514-521	227	2233-2361	280
137	122	250-252	175	522-530	228	over 2361	298
138-139	123	253-255	176	531-540	229		

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Table III  
Minor Characteristics

<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>	<u>Lot Size</u>	<u>Sample Size</u>
1-16	all	28-29	23	52-56	31	132-156	39
17	16	30-31	24	57-62	32	157-191	40
18	17	32-34	25	63-69	33	192-244	41
19-20	18	35-36	26	70-76	34	245-334	42
21	19	37-40	27	77-86	35	335-519	43
22-23	20	41-43	28	87-97	36	520-1120	44
24-25	21	44-47	29	98-112	37	over 1120	45
26-27	22	48-51	30	113-131	38		

#### 4.3.2.1 Classification of characteristics (see 3.2).

Critical, major and minor characteristics are defined in MIL-STD-105. Inspection shall be conducted as follows:

##### 4.3.2.1.1 Sintered Cylinder (see dwg. 8787107).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
<u>Critical:</u>		
1.	No excessive cavitation (see 4.4.1).....	Test
2.	Perpendicularity of rear surface with outside diameter.....	Gage
3.	Perpendicularity of forward surface with outside diameter.....	Gage

#### Major:

101.	Outside diameter.....	Gage
102.	Concentricity of internal diameter with external diameter.....	Gage

#### Minor:

201.	Total length.....	Gage
202.	Marking correct, complete, not mislocated or illegible.....	Visual
203.	Finish proper.....	Visual
204.	Chamfer or radius present (as applicable).....	Visual
205.	Workmanship (see 3.4).....	Visual-Manual

##### 4.3.2.1.2 Closing plug (see dwg. 8787108).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
<u>Critical:</u>		
1.	No excessive cavitation (see 4.4.1).....	Test

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<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
Major:		
101.	Thickness.....	Gage
102.	Outside diameter, min.....	Gage
103.	End surface not flat as specified.....	Gage
Minor:		
201.	Marking correct, complete, not mislocated or illegible.....	Visual
202.	Chamfer present.....	Visual
203.	Workmanship (see 3.4).....	Visual-Manual

4.3.2.1.3 Body Section Projectile Front, prior to phosphate coating (see 8787105).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
Critical: None defined.		
Major:		
102.	Concentricity of outside diameter of bourrelet ring.....	Gage
103.	Concentricity of pitch diameter of rear threads with outside diameter to rear of groove, including perpendicularity with rear of sintered cylinder.....	Gage
104.	Parallelism of forward surface of closing plug with forward end.....	Gage
105.	Location of holes in closing plug in relation to pitch diameter of forward internal hole threads (2 threaded holes).....	Gage
106.	Inside diameter of sintered cylinder.....	Gage
107.	Depth of counterbore in rear of sintered cylinder...	Gage
108.	Diameter of counterbore in rear of sintered cylinder.....	Gage
109.	Diameter of holes in closing plug.....	Gage
Minor:		
201.	Total length, max.....	Gage
202.	Diameter of bourrelet ring at bottom of taper.....	Gage
203.	Outside body diameter at rear of groove.....	Gage
204.	Taper of bourrelet ring correct.....	Gage
205.	No excessive gap between shield support and closing plug.....	Gage
206.	Finish proper.....	Visual
207.	Stamping correct, complete and identifiable.....	Visual
208.	Workmanship (see 3.4).....	Visual-Manual
209.	Protective phosphate coating missing.....	Visual

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4.3.2.1.4 Ring (see dwg. 8787150).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
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## Critical:

1.	No excessive cavitation (see 4.4.1).....	Test
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## Major:

101.	Concentricity of inside diameter with outside diameter.....	Gage
102.	Perpendicularity of end surface with outside diameter.....	Gage
103.	Thickness, min.....	Gage

## Minor:

201.	Radius present (both places).....	Visual
202.	Marking correct, complete and identifiable.....	Visual
203.	Finish proper.....	Visual
204.	Workmanship (see 3.4).....	Visual-Manual

4.3.2.1.5 Base Jacket assembly prior to installing ring (see dwg. 8787149 covering a detail of dwg. 8787147).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
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Critical: None defined.

## Major:

101.	Interference fit between outside diameter of ring and base jacket assembly.....	Gage
102.	Interference fit between inside of ring and base jacket assembly mating diameter correct.....	Gage

## Minor:

201.	Workmanship (see 3.4).....	Visual-Manual
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4.3.2.1.6 Base Jacket and obturating ring assembly (see dwg. 8787147).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
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Critical: None defined.

## Major:

101.	Concentricity of outside diameter of obturating band with outside diameter of base jacket.....	Gage
102.	Thickness of flanged section of obturating band.....	Gage
103.	Length to datum diameter at forward angled surface of obturating band.....	Gage
104.	Diameter of center hole.....	Gage



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<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
Major: (Cont'd)		
105.	Concentricity of center hole with outside diameter of base jacket.....	Gage
106.	Finish proper on front end surface.....	Test
107.	Finish proper on center hole surface.....	Test
108.	Ring loose or seated flush with front end surface of base jacket.....	Visual-Manual
109.	Obturating ring tightly banded to base jacket assembly.....	Visual-Manual
110.	Obturating ring not split, cut, or shows no evidence of damage from molding.....	Visual
Minor:		
201.	Depth of undercut forward of obturating band.....	Gage
202.	Width of undercut forward of obturating band.....	Gage
203.	Location of undercut forward of obturating band.....	Gage
204.	Outside diameter of undercut immediately to rear of obturating band top section.....	Gage
205.	Total length.....	Gage
206.	Radius under flanged section of obturating band.....	Gage
207.	Radius at forward section of obturating band.....	Gage
208.	Workmanship (see 3.4).....	Visual-Manual

#### 4.3.2.1.7 Disc Solid Plain (see dwg. 8787111).

<u>Categories</u>	<u>Characteristics</u>	<u>Method of inspection</u>
Critical:		
1.	Excessive cavitation (see 4.4.1).....	Test
Major:		
101.	Perpendicularity of both end surfaces with diameter....	Gage
102.	Diameter correct.....	Gage
103.	Thickness correct.....	Gage
Minor:		
201.	Finish proper.....	Visual
203.	Workmanship (see 3.4).....	Visual

#### 4.3.3 Testing. This test shall be performed.

Test	Test Classification
a. Cavitation	Critical

This test is not considered destructive and samples so tested may be returned to the lot.

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4.3.3.1 Cavitation (see dwg 8787107, 8787108, 8787150, and 8787111). Each component shall be tested in accordance with 4.4.1. If any item fails to comply with drawing requirements, the item shall be rejected and removed from the lot.

4.3.4 Acceptance inspection equipment.

4.3.4.1 Critical and major characteristics and tests.

Inspection and testing shall be performed with the acceptance inspection equipment, operating instructions, and calibration instructions specified on the Equipment Lists (EL) (See EL-8787105, 8787107, 8787108, 8787111, 8787149, 8787150 as applicable). When either of the conditions listed below exist, the contractor shall design required equipment or specify suitable commercial equipment and obtain approval prior to use on the contract.

- a. Any deviation from equipment or procedures specified on the EL is desired (see 6.3).
- b. The code "CD" is listed in the "Part or Identifying Number" column on the EL (see 6.1.2).

4.3.4.2 Minor characteristics and tests. Acceptance inspection equipment for minor characteristics is not specified on ELs. The acceptance inspection equipment, operating instructions and calibration instructions used by the contractor for minor classification inspection shall be approved by the Government representative authorized by the procuring agency.

4.4 Test methods. The tolerances specified herein are absolute with no allowance for test equipment inaccuracy. The tolerances used by the manufacturer shall be equal to the absolute tolerances less the accuracy tolerances of the test equipment used.

4.4.1 Cavitation (see 4.3.3.1). Radiographic inspection shall be in accordance with MIL-STD-453.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.1).

5.1.1 Level A. The component shall be preserved and packaged in accordance with instructions contained in MIL-STD-1169 (MU).

5.1.2 Level C. The component shall be preserved and packaged in accordance with instructions contained in MIL-STD-1169 (MU).

5.2 Packing.

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5.2.1 Levels A and C. The component shall be packed in accordance with the applicable instructions contained in MIL-STD-1169 (MU).

5.3 Marking. Marking shall be in accordance with MIL-STD-1169 (MU).

5.4 Data cards. Data cards shall be prepared in accordance with MIL-STD-1167.

## 6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

### 6.1.1 Procurement requirements.

- a. Title, number, and date of this specification.
- b. Selection of applicable level of packaging and packing required (see 5.1 and 5.2).

6.1.2 Contract data requirements (see 4.3.4.1 and 5.4). Data specified in 4.3.4.1 and 5.4 will be delivered as identified on a numbered DD Form 1664 when specified on a DD Form 1423 incorporated in the contract.

6.2 Objective evidence. Records of contractor quality control and inspections which can be verified.

6.3 Acceptance inspection equipment (see 4.3.4.1). The contractor shall obtain approval from the Commanding Officer, Picatinny Arsenal, Dover, New Jersey 07801, ATTN: SMUPA-QA-N-I.

6.4 Instructions for first article inspection (see 4.2.1). Parts may be used in subassemblies if the examination or tests (see 4.2.2, Table I) are verified by a representative designated by the Government. Subassemblies may be used in final assemblies if the examination or tests (see 4.2.2, Table I) are verified by a representative designated by the Government.

6.5 Supersession data. This specification supersedes the requirements of Purchase Description PA-PD-1673, dated 30 April 1962.

Custodian:  
Army - MU

Preparing activity:  
Army - MU

Project No: 1195-A109