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MIL-P-50257 (MU)
14 February 1969
SUPERSEDING
(See 6.9)

MILITARY SPECIFICATION

PROJECTILE, 8 INCH, HE: M404

LOADING, ASSEMBLING AND PACKING

1. SCOPE

1.1 This military specification covers the loading assembling and packing for one type of projectile designated as Projectile, 8 inch, HE: M404.

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 military specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-A-2550 - Ammunition and Special Weapons, General Specification for

MIL-I-45607 - Inspection Equipment, Supply and Maintenance of

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes (ABC-STD-105)

FSC: 1320

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MIL-STD-109 - Quality Assurance Terms and Definitions

MIL-STD-286 - Propellants, Solid; Sampling, Examination and Testing

MIL-STD-453 - Inspection, Radiographic

MIL-STD-1168 - Lot Numbering of Ammunition

MIL-STD-1235 - Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

DRAWINGS

U.S. ARMY MUNITIONS COMMAND

P-119549 - Grenade, GP, M43A1
P-133333 - Projectile, HE, 8 Inch, M404
F-7548346 - Pallet for 8 inch Projectile, Empty or Loaded
C-8881922 - Container Assembly

PUBLICATIONS

ARMY

ET-133333 - Equipment Tabulation

(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 documents form 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.

CODE OF FEDERAL REGULATIONS

Title 49 - Transportation, Parts 171-179

(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 171-179 (latest revisions).)

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3. REQUIREMENTS

3.1 Material.-Materials and parts shall be in accordance with the applicable drawings and specifications.

3.2 Projectile.-The projectile assembly and components shall comply with all requirements specified on Drawing (dwg.) P-133333, all associated drawings, and with all requirements specified in applicable specifications.

3.3 Check test for total volatiles of grenade container assembly.-The total volatiles content of the propellant in grenade container assembly shall not exceed 1.25 percent when tested as specified in 4.4.5. (See 4.3.3.6)

3.4 Ballistic functioning

3.4.1 Projectile.-The projectile shall function satisfactorily (see 6.6.1) when tested as specified in 4.4.7. (Not applicable to safety phase.)

3.4.2 Grenade.-The grenade shall function satisfactorily (see 6.7.1) and shall not detonate in the air stream upon ejection from the projectile when tested as specified in 4.4.7. (Not applicable to Zone 7X safety phase.)

3.4.3 Safety.-There shall be no premature burst (see 6.6.2) or evidence thereof, in any of the test firings. In addition, there shall be no premature burst or separation of the metal parts in the gun bore or in flight when the projectile is fired at Zone 7X (Safety Phase) and using a propelling charge adjusted to give one hundred and twelve (112) percent of the average pressure produced by the propellant loaded in the particular ammunition lot. Testing shall be as specified in 4.4.7.3.

3.5 Workmanship.-All parts and assemblies shall be fabricated, loaded and assembled in a thorough, workmanlike manner. They shall be free of burrs, chips, sharp edges, cracks, projections, unblended radii, surface defects, dirt, grease, rust, corrosion products and other foreign matter. The cleaning method used shall not be injurious to any part, nor shall the parts be contaminated by the cleaning agents. Exterior surface coatings shall be continuous except for a few light scratches not exposing base material. All required markings shall be neat and sharply defined.

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3.6 Submission of results of contractor-conducted examinations and tests.-The contractor shall forward copies of the results of any of his examinations or tests to the designated address as required by the contract. (See 6.4)

3.7 First article testing.-This specification makes provisions for first article testing. Submission of first article quantity by the contractor shall be as specified in the contract.

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 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. The provisions of MIL-A-2550 shall apply.

4.1.1 Submission of product.-At the time the completed lot of items deliverable under the contract is submitted to the Government for acceptance, the contractor shall supply the following information accompanied by a certificate which attests that the information provided is correct and applicable to the product being submitted:

a. A statement that the lot complies with all the quality assurance provisions specified in this specification.
b. Drawing and specification number and date, together with identification and date of changes thereto.
c. A statement that all material purchased by the contractor meets requirements, when such material is controlled by Government or commercial specifications referenced in any of the contractual documents, and that certificates of conformance are on file and available for review.
d. Number of items in the lot.
e. Date submitted.

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The certificate shall be signed by a responsible agent of the certifying organization. The initial certificate submitted shall be substantiated by evidence of the agent's authority to bind his principal. Substantiation of the agent's authority will not be required with subsequent certificates unless, during the course of the contract, this authority is vested in another agent of the certifying organization.

4.2 First article inspection (see 6.1)

4.2.1 Submission.-These tests shall be conducted on the sample quantities specified herein beginning with the first lot produced and continuing until three (3) consecutive lots have passed the acceptance criteria specified. Thereafter, sampling plans for these tests shall be in accordance with 4.3.3.7.2 (Regular production.) The contractor shall submit the sample projectiles to a Government proving ground designated by the Contracting Officer for testing in accordance with 4.2.2. All materials, parts and assemblies shall be the same as will be used in production and shall be obtained from the same sources of supply. Prior to submission, the sample shall be inspected by the contractor to the degree necessary to assure that it conforms to the requirements of the contract. All first article samples for these tests shall be selected by the Government inspector. First article provisions shall also apply whenever a lot is ballistically rejected or a lapse in production exceeds ninety (90) days, or whenever a change occurs in manufacturing process, material used, drawing, specification or source of supply as to significantly affect product uniformity as determined by the Government. Prior to submission, the contractor shall inspect the sample to the degree necessary to assure that it conforms to the requirements of the contract and submit a record of this specification with the sample. A sample containing known defects will not be submitted unless specifically authorized by the Contracting Officer.

4.2.2 Radiographic inspection of projectile (for engineering information only).-Prior to forwarding the projectiles to the proving ground for ballistics testing, as specified in 4.2.3, they shall be subjected to radiographic examination for engineering information only. Radiography shall be performed after assembly of the base plug and less the charge assembly. The projectile assembly shall be radiographically examined for loose stacks, missing forward plate, gap between forward plate and adjacent grenade layer, and presence of safety clips. (Safety clips should not be present.) Examination shall be as specified in 4.4.6. Projectiles subjected to this examination shall be suitably marked to permit future reference.

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4.2.3 Ballistic functioning (see 3.4)-The Government inspector shall select twelve (12) projectiles from each lot to be subjected to first article inspection. These projectiles will be subjected, by the Government, to the following ballistic tests, in accordance with the methods specified in 4.4.7. (Three (3) of these projectiles are for proving ground replacement.) Projectiles for ballistics tests shall be radiographed as specified in 4.2.2.

4.2.3.1 Three (3) of the sample projectiles shall be tested at Zone 1 as specified in 4.4.7.1.

4.2.3.2 Three (3) of the sample projectiles shall be tested at Zone 7 as specified in 4.4.7.2.

4.2.3.3 Three (3) of the sample projectiles shall be tested in Zone 7X (safety phase) as specified in 4.4.7.3.

4.2.3.4 Rejection-The lot represented by the sample shall be rejected if the ballistic test results for that lot reveal any one of the following defects:

a. Any premature burst occurs (see 6.6.2) Code No. 01001.

b. Two (2) or more projectiles fail to function satisfactorily (excluding fuze malfunctions) (see 6.6.1) Code No. 01002.

c. Any separation of metal parts occurs prior to initiation of the time fuze. Code No. 01003.

d. A total of seventy-two (72) or more grenade burst-in-housing occur (see 6.7.3) (Not applicable to Zone 7X safety phase firings) Code No. 01004.

e. A total of forty-two (42) or more grenades fail to function satisfactorily (see 6.7.1) (excluding bursts in-housing). (Not applicable to Zone 7X safety phase firings) Code No. 01005. (see Note below.)

NOTE: Defects 01004 and 01005 refer to the total occurrences of that type of grenade defect in the cumulative results of the six (6) rounds tested as specified in 4.2.3.1 and 4.2.3.2. If any grenade air detonations (see 6.7.2) occur in two (2) or more projectile firings (regardless of the number of air detonations), such air detonations shall be considered as grenades failing to function satisfactorily.

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In the event of rejection, the Government reserves the right to require the contractor to take corrective action and submit a new first article quantity. Until the first article quantity is acepted, the contractor is not authorized by the Government to proceed with regular production unless otherwise directed by the Contracting Officer.

4.2.3.5 Projectile replacement.-The provisions of 4.3.3.7.4 shall also apply to first article ballistic functioning tests.

4.2.3.6 Retest.-The provisions of 4.3.3.7.5 shall also apply to first article ballistic functioning tests.

4.2.4 Additional inspections to be performed.-Components will be subjected by the Government to any or all the examinations or test specified in 4.3.2 of this specification and any or all requirements of the applicable drawing.

4.3 Inspection provisions

4.3.1 Lot formation.-The term "inspection lot" as used in this specification is defined as an essentially homogeneous collection of units of product from which a representative sample is drawn and inspected to determine conformance with applicable requirements. The sample selected shall represent only that quantity of units from which the sample was drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, in accordance with the same drawing, same drawing revision, same specification and same specification revision and complies with the provisions for submission of product as specified in MIL-STD-105. Changes to process, specification, or drawing not affecting safety, performance, interchangeability, or storage, as determined by the Government, shall not be deemed to alter the homogeneity of an inspection lot All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein regardless of the type of sampling procedure which is being applied to determine conformance with requirements. Lot numbering, as required, shall be in accordance with MIL-STD-1168. Each inspection lot of projectiles shall contain:

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a. Body assemblies of one lot interfix number from one manufacturer.
b. Hardware components of one lot interfix number from one manufacturer.
c. Loaded grenades on one lot interfix number from one manufacturer. (See Note)
d. Charge propellant from one lot only.
e. Fuzes of one lot interfix number from one manufacturer.
f. Projectiles of one zone weight only (See 4.3.3.1)

NOTE: Only those grenade lots which have successfully completed the functioning test indicated in the specification covering the loading of the grenade shall be assembled into the body assembly.

4.3.2 Examination.-The examinations listed in the following subparagraphs shall be performed on inspection lots (see 4.3.1) of the components or assemblies designated in the applicable paragraph headings. Inspection for critical defects (and major defects, when so specified) shall be 100 percent. Sampling plans for major and minor defects shall be in accordance with MIL-STD-105 except that continuous sampling plans in accordance with MIL-STD-1235 may be used if approved by the Government. Instead of applying the AQL's designated herein to the groups of major and minor defects listed, the contractor may elect to apply AQL's to individual defects using an AQL of 0.40 percent for each major defect and an AQL of 0.65 percent for each minor defect. When this method is elected, it shall be applied to all the major and minor defects listed in the applicable subparagraph of this section, except where 100 percent inspection is specified, and be documented as part of the contractor's inspection system. Equipment necessary for the performance of the inspections listed shall be in accordance with 4.3.4.

4.3.2.1 Forward Plate, prior to assembly into body assembly (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No. (see 6.2)
Critical:	None defined		
Major:	AQL 0.40 percent		
101.	O-ring missing or damaged	Visual	02001
102.	Lubrication missing from O-ring	Visual	02002
Minor:	None defined		

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4.3.2.2 Bag, Charge, prior to insertion into cap (see dwg. P-133329 covering a detail of dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		
Major:	AQL 0.40 Percent		
101.	Weight of propellant charge	Balance	03001
102.	Bag damaged	Visual	03002
Minor:	AQL 0.65 Percent		
201.	Evidence of poor workmanship (see 3.5)	Visual	03003

4.3.2.3 Charge Assembly (see dwg. P-133331)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		
Major:	AQL 0.65 Percent		
101.	Depth to cover	Gage	04001
102.	Diameter between crimp, max.	Gage	04002
103.	Cover or cap damaged	Visual	04003
Minor:	AQL 1.50 Percent		
201.	Staking of cover incomplete	Visual	04004
202.	Cover improperly seated	Visual	04005
203.	Evidence of poor workmanship (see 3.5)	Visual	04006

4.3.2.4 Grenade (prior to assembling into stacking ring) (See dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical:			
1.	Grenade in armed position (outer spring fails to restrain yoke close to housing)	Visual	05001

Major: None defined

Minor: None defined

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4.3.2.5 Projectile, prior to loading grenades (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major:	AQL 0.40 Percent		
101.	Forward plate missing	Visual	06001
102.	Foreign matter on interior surface (see 3.5)	Visual	06002
Minor: None defined			

4.3.2.6 Projectile, prior to assembly of base plug and prior to fully engaging grenade stack-up in body assembly (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major:	AQL 0.65 Percent		
101.	Grenade missing or improperly positioned	Visual	07001
102.	Safety clip not removed from grenade	Visual	07002
103.	Grenade outer spring damaged	Visual	07003
Minor: None defined			

4.3.2.7 Base plug (prior to assembly to projectile (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major:	AQL 0.40 Percent		
101.	Gasket or O-ring missing	Visual	08001
Minor:	AQL 1.00 Percent		
201.	Lubrication missing from thread or O-ring	Visual	08002
202.	Evidence of poor workmanship (see 3.5)	Visual	08003

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4.3.2.8 Projectile, prior to assembly of lifting plug and gasket (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		
Major:	AQL 0.65 Percent		
101.	Charge assembly fails to withstand disassembly torque	Test	09001
102.	Depth to upper face of charge assembly	Gage	09002
103.	Staking of charge assembly missing or inadequate	Visual	09003
104.	Charge assembly cover damaged	Visual	09004
Minor:	AQL 1.00 Percent		
201.	Threads damaged	Visual	09005
202.	Evidence of poor workmanship (see 3.5)	Visual	09006

4.3.2.9 Projectile, prior to assembly of lifting plug (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		
Major:	AQL 0.40 Percent		
101.	Gasket missing from lifting plug	Visual	10001
Minor:	AQL 0.65 Percent		
201.	Evidence of poor workmanship (see 3.5)	Visual	10002

4.3.2.10 Projectile (see dwg. P-133333)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		

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Major:	AQL 0.65 Percent		
101.	Lifting plug fails to withstand minimum disassembly torque	Test	11001
102.	Base plug fails to withstand disassembly torque	Test	11002
103.	Diameter of bourrelet, max. (applicable when paint on projectile is retouched)	Gage	11003
104.	Prick punch indentations (in weight zone marks) missing or not discernible to touch	Visual-Tactile	11004
Minor:	AQL 2.50 Percent		
201.	Protective coating with a total of bare areas in excess of 1/4 square inch	Visual	11005
202.	Strapping improperly assembled	Visual	11006
203.	Rotating band damaged	Visual	11007
204.	Grommet assembly missing, damaged or improperly assembled	Visual	11008
205.	Evidence or poor workmanship (see 3.5)	Visual	11009

4.3.2.11 Pallet (loaded) (see dwg. 7548346)

Categories	Defects	Method of Inspection	Code No.
Critical:	None defined		
Major:	AQL 1.00 Percent		
101.	Strap width incorrect	Visual	12001
102.	Strapping improperly assembled	Visual	12002
103.	Connector missing or improperly assembled	Visual	12003
104.	Projectile missing	Visual	12004
105.	Lifting plug missing or damaged	Visual	12005
106.	Board broken or split	Visual	12006
107.	Markings for FSN or descriptive nomenclature missing, incorrect or unidentifiable	Visual	12007
Minor:	AQL 1.00 Percent		
201.	Marking, other than above, missing, incorrect or unidentifiable	Visual	12008
202.	Evidence of poor workmanship (see 3.5)	Visual	12009

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4.3.3 Testing

4.3.3.1 Projectile weight (lbs) and zone weight, (see dwg. P-133333), Major Defect (Code No. 13001).-Weighing of the projectile and the inspection for correct weight (lbs) and zone weight marking shall be conducted 100 percent. Any projectile which fails to comply with the applicable requirement shall be removed from the lot. Equipment shall be in accordance with 4.3.4.

NOTE: To preclude processing of excessively small lots resulting from the requirement for lotting of projectiles by zone weight, the following procedure shall apply:

a. The procuring agency shall establish the minimum quantity of projectiles to be included in an end item ammunition lot.

b. If zoning segregation results in smaller quantities of a particular projectile zone weight (see "a") these quantities may be accumulated by the applicable zone weight and included in a hybrid lot.

c. Ballistic samples will not be required from the hybrid lot provided that (1) identification with the parent (principal) projectile lot has been maintained (see "d" below), and (2) it can be demonstrated that the hybrid lot does not contain any rounds associated with a ballistically rejected parent projectile lot.

d. Data cards for such hybrid lots shall be annotated to indicate the parent ammunition lot from which tested rounds came and the quantities associated with each parent lot.

4.3.3.2 Air pressure test of projectile (see dwg. P-133333) Major Defect (Code No. 14001).-Fifty (50) projectiles shall be selected from each lot for this test. The test shall be performed as specified in 4.4.1 using equipment in accordance with 4.3.4. If any projectile fails to comply with the requirements specified on the applicable drawing, the lot shall be rejected.

4.3.3.3 Leakage test of charge bag (see dwg. P-133329) Major defect (Code No. 15001).-Fifty (50) charge bags shall be selected from each lot for this test. The test shall be performed as specified in 4.4.2 using equipment in accordance with 4.3.4. If any charge bag fails to comply with the requirement specified on the applicable drawing, the lot shall be rejected.

4.3.3.4 Moisture content of charge propellant (see dwg. P-133329) Major Defect (Code No. 16001).-The contractor shall provide adequate controls to insure compliance with the applicable requirement. The moisture content of each lot of propellant shall be determined at the loading station at the time of loading of charge bags. This determination shall be made at least once for each eight (8) hours of production. Sampling of the propellant shall be in accordance with MIL-STD-286, Method 101.1.2. If the moisture content fails to comply with the requirement specified on the applicable drawing and loading of

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the charge bags has not begun, the propellant lot shall be rejected until corrective action has been taken as verified by repeating the moisture content determination. If loading has begun, charge assemblies loaded with the non-conforming propellant shall be rejected. This determination shall be performed as specified in 4.4.3.

4.3.3.5 Volatiles content of charge propellant (see dwg. P-133329) Major Defect (Code No. 17001).-The contractor shall provide adequate controls to insure compliance with the applicable requirement. The volatiles content of each lot of propellant shall be determined at the loading station at the time of loading the charge bags. This determination shall be made at least once for each eight (8) hours of production. Sampling of the propellants shall be in accordance with MIL-STD-286, Method 101.1.2. In addition, if the volatiles content fails to comply with the requirement specified on the applicable drawing and loading has not begun, charge assemblies loaded with the non-conforming propellant shall be rejected. This determination shall be performed as specified in 4.4.4.

4.3.3.6 Check test for volatiles content of grenade container assembly (See 3.3 and dwgs. C8881922 and P-119549), Major Defect (Code No. 18001) .-The quantity of container assemblies issued to the production line shall be only that max quantity necessary for four (4) hours' production. The contractor shall provide adequate controls to assure compliance with the specified volatiles content requirement for the grenade container assembly. In addition, the following shall apply: All packages with container assemblies shall be stored in a heated (100°F to 120°F) ventilated area for not less than seventy-two (72) hours prior to issuance for production. Boxes shall be opened and inner packaging removed and opened to permit circulation of the atmosphere. Not more than twenty-four (24) hours prior to the start of each shift, the quantity of container assemblies to be used in that shift shall be segregated and five (5) assemblies selected and subjected to the volatiles content determination as specified in 4.4.5. The remaining container assemblies shall be retained in the heated, ventilated area as specified above. If the container assemblies exceed the maximum specified for volatiles content and assembling of the container assemblies into the grenade housing assemblies has not begun, the container assembly lot shall not be used in production until corrective action has been taken as verified by repeating the volatiles content determination. If loading of the container assemblies into the housing assemblies has begun, grenades loaded with non-conforming container assemblies shall be rejected.

4.3.3.7 Ballistic functioning (see 3.4) Major Defect

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4.3.3.7.1 Radiographic inspection of projectiles (for engineering information only).-Prior to forwarding the projectiles to the proving ground for ballistics testing, as specified in 4.3.3.7.2.d, they shall be subjected to radiographic examination for engineering information only. Radiography shall be performed after assembly of the base plug and less the charge assembly. The projectile assembly shall be radiographically examined for loose stacks, missing forward plate, gap between forward plate, gap between forward plate and adjacent grenade layer, and presence of safety clips. (Safety clips should not be present.) Examination shall be as specified in 4.4.6. Projectiles subjected to this examination shall be suitably marked to permit future reference.

4.3.3.7.2 Sampling.-Following successful completion of the first article testing specified in 4.2, and with the approval of the Contracting Officer, the Government inspector shall select projectiles for ballistic testing from each projectile lot in the following sequence for proving ground acceptance tests to be performed as specified in 4.4.7:

a. First lot.-Four (4) projectiles shall be selected (includes one (1) projectile for replacement). Forward the four (4) projectiles to the proving ground for test as specified herein.

b. Second lot.-Fulfill same requirements as for first lot as indicated in a above.

c. Third lot.-Twelve (12) projectiles shall be selected (includes three (3) projectiles for replacement). Forward the twelve (12) projectiles to the proving ground for test as specified herein.

d. The selection of samples as indicated above for the 1st, 2nd, and 3rd lot, requiring, respectively, 4, 4, and 12 projectiles for proving ground acceptance testing, shall be continued in that sequence with every third lot requiring twelve (12) projectiles for proving ground acceptance testing. (These figures include replacement projectiles.) All projectiles selected shall be radiographed as previously specified prior to forwarding to the proving ground.

NOTE: First article sampling (see 4.2) shall be re-instated when a lot is ballistically rejected.

4.3.3.7.2.1 Ballistic sample of four (4) projectiles.-The four (4) projectiles, selected from the applicable lot, shall be tested as follows: Three (3) of the projectiles shall be tested at Zone 7 (see 4.4.7.2). If the projectile replacement provisions of 4.3.3.7.4 are not utilized, the replacement projectile shall be fired at Zone 7X. (Safety phase) (see 4.4.7.3).

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4.3.3.7.2.2 Ballistic sample of twelve (12) projectiles.- The twelve (12) projectiles, selected from the applicable lot, shall be tested at the following charge zones:

a. Three (3) of the projectiles in the sample shall be tested at Zone 1 as specified in 4.4.7.1.

b. Three (3) of the projectiles in the sample shall be tested at Zone 7 as specified in 4.4.7.2.

c. Three (3) of the projectiles in the sample shall be tested at Zone 7X (safety phase) as specified in 4.4.7.3. This phase shall be performed after the Zone 1 and Zone 7 tests have been completed. If replacement projectiles are required for Zone 1 and Zone 7 testing, as specified in 4.3.3.7.4, the number of projectiles tested in Zone 7X shall be reduced accordingly.

4.3.3.7.3 Rejection

4.3.3.7.3.1 Ballistic sample of four (4) projectiles.-Any lot subjected to the ballistic tests specified in 4.3.3.7.2.1 shall be rejected if the ballistic test results for the lot reveal any one of the following defects:

a. Any premature burst occurs (see 6.6.2) Code No. 01001.

b. Two (2) or more projectiles fail to function satisfactorily (excluding fuze malfunctions) (see 6.6.1) Code No. 01002.

c. Any separation of metal parts occurs prior [illegible] initiation of the time fuze. Code No. 01003.

d. A total of thirty-one (31) or more grenad[illegible] [illegible]s-in-housing occur (see 6.7.3) (not applicable to Zone 7X tests) [illegible] No. 01004.

e. A total of thirty-three (33) or more grenades fail to function satisfactorily (see 6.7.1) (excluding bursts-in-housing) (not applicable to Zone 7X tests) Code No. 01005.

NOTE: Defects 01004 and 01005 each refer to the total occurrences of that type of defect in the cumulative results of the three (3) rounds tested at Zone 7.

4.3.3.7.3.2 Ballistic sample of twelve (12) projectiles.- Any lot subjected to the ballistic tests specified in 4.3.3.7.2.2 shall be rejected if the ballistic test results for the lot reveal any one of the following defects:

a. Any premature burst occurs (see 6.6.2) Code No. 01001.
b. Two (2) or more projectiles fail to function satisfactorily (excluding fuze malfunctions) (see 6.6.1) Code No. 01002.

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c. Any separation of metal parts occurs prior to initiation of the time fuze. Code No. 01003.

d. A total of seventy-two (72) or more grenade bursts-in-housing occur (see 6.7.3) (not applicable to Zone 7X tests) Code No. 01004.

e. A total of forty-two (42) or more grenades fail to function satisfactorily (see 6.7.1) excluding bursts-in-housing. (Not applicable to Zone 7X tests.) Code No. 01005

NOTE: Defects 01004 and 01005 each refer to the total occurrences of that type of defect in the cumulative results of the six (6) rounds tested as specified in 4.3.3.7.2.2.a and b. If any grenade air detonations (see 6.7.2) occur in two (2) or more projectile firings (regardless of the number of air detonations), such air detonations shall be considered as grenades failing to function satisfactorily.

4.3.3.7.4 Projectile replacement.-If any grenade air detonations occur in one (1) projectile firing, or if one projectile functions below 1500 feet, additional projectiles will not be required, provided the total score of all defects does not exceed the prescribed acceptance criteria. If the acceptance criteria are exceeded in either of the above circumstances, the results of that firing shall not be considered for that particular requirement, and an additional projectile shall be fired (not applicable to safety phase). Fuze malfunctions shall not be considered for projectile functioning acceptance. Where fuze malfunctions occur, an additional projectile shall be fired in the applicable phase for grenade functioning acceptance.

4.3.3.7.5 Retest.-If, for any reason, the proving ground considers that the test conditions have affected the test results, the results may be declared invalid and a new test performed on additional sample projectiles, as required.

4.3.4 Inspection equipment.-Equipment Tabulation (ET) number 133333 and Equipment Lists (EL's) referenced thereon identify the inspection equipment required to perform the examinations and tests prescribed in this section. The contractor shall design inspection equipment in accordance with the instructions in 6.3.

4.3.4.1 Government rights to documentation.-Inspection equipment drawings and lists provided and revised in accordance with the requirements of this specification may be used by DOD activities for design, procurement, manufacture, testing, evaluation, production and receiving inspection, overhaul, shipping, storage, identification of stock, ordering and storage of replacement parts, inspection of items at overhaul, general maintenance of equipment, construction, survey, and whenever inspection equipment drawings are needed.

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4.4 Test methods and procedures.

4.4.1 Air pressure test of projectile.-The loaded projectile shall be placed in a chamber and a pre-determined volume of air shall be introduced to produce the specified pressure between the inside of the chamber and the outside of the projectile. The projectile satisfactorily passes this test if the pressure does not drop during the specified time interval. This equipment shall be calibrated on an approved periodic basis to confirm accuracy of the equipment. All tests and calibration equipment and instructions shall be approved in accordance with 4.3.4.

4.4.2 Leakage test of charge bag.-The charge bag shall be placed in a fixture as specified in the Equipment List and a measured quantity of air applied to produce the required air pressure specified on the applicable drawing. Observation shall be made for any evidence of leakage. Bags so tested shall be discarded.

4.4.3 Moisture content of charge propellant.-The moisture content of the charge propellant shall be determined at the time and place of loading and in accordance with MIL-STD-286, Method 101.1.2.

4.4.4 Volatiles content of charge propellant.-The volatiles content of the charge propellant shall be determined at the time and place of loading and in accordance with MIL-STD-286, Method 101.1.2.

4.4.5 Total volatiles of grenade container assembly propellant.-The total volatiles content of the propellant sample shall be determined as specified in MIL-STD-286, Method 101.1.2.

4.4.6 Radiographic inspection of projectile assembly (engineering information only).-The projectile assembly, prior to forwarding to the proving ground, shall be radiographed after assembly of the base plug and less the charge assembly. In all exposures, the radiographic beam shall be focused at the centerpoint of the projectile and parallel to the face of the forward plate. (This point may be determined by observing the position of the forward plate in the body cavity through the nose of the projectile.) The radiograph shall be examined for evidence of any of the conditions specified in 4.3.3.7.1. Results of this examination shall be forwarded as specified in 6.4.

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NOTE: Radiographic equipment, operations and procedures shall be qualified in accordance with MIL-STD-453. In addition, the sensitivity of radiographic techniques shall be at least two (2) percent, and the radiographic density of the film used shall be of a quality which will produce a sharp definition of internal structure. In the event the original radiograph prevents a suitable examination, the projectile shall be reradiographed at an angle of ninety degrees (90°) from that of the original exposure and in the same plane.

4.4.7 Ballistic functioning (see 6.8).-The following tests shall be performed at a Government-owned proving ground in accordance with the applicable U.S. Army Test and Evaluation Materiel Test Procedures. The projectile shall be fired from a weapon for which it is standard. Time fuzes and quadrant elevation shall be set such that the minimum burst height shall be not less than one-thousand five hundred (1500) feet, over a prepared impact field. The sample projectiles shall be tested in the specified zones in accordance with the applicable procedures. A record shall be made for each round fired and shall include an accounting for the defects listed in 4.3.3.7.3.

4.4.7.1 Zone 1.-Three (3) of the sample projectiles shall be subjected to this firing using the Zone One propelling charge. Fuzes shall be set to achieve the desired burst height. Observation shall be made to determine compliance with requirements of 3.4.

4.4.7.2 Zone 7.-Three (3) of the sample projectiles shall be subjected to this firing. The projectiles shall be fired with the proper fuze setting as specified in 4.4.7 and appropriate Zone 7 propelling charge increments. When requested, equipment shall be provided to measure velocities of projectiles fired in this test with velocity results recorded. Observation shall be made to determine compliance with 3.4.

4.4.7.3 Zone 7X (safety phase).-Three (3) of the sample projectiles shall be subjected to this firing, using a propelling charge adjusted to give 112 percent of the rated pressure produced by the propelling charge at Zone 7. (This value of pressure appears on the data card of each propelling charge lot.) Observation shall be made to determine compliance with 3.4, excluding requirements pertaining to grenade functioning (see 6.5).

4.4.7.4 Records of ballistic tests (see 6.5).-In addition to the data recorded for evaluation of the sample projectiles, a record shall be made of fuzes with excessive off-times. A copy of all ballistic test results shall be forwarded as specified.

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5. PREPARATION FOR DELIVERY

5.1 Packing (Level A).-The projectiles shall be packed in accordance with dwg. F-7548346. (3 sheets)

5.2 Marking.-Marking shall be in accordance with dwg. F-7548346 and Code of Federal Regulations, Title 49 (Parts 171-179).

5.3 Shipping.-When shipments from more than one lot are made at one time, such as in a carload, each lot shall be kept separate and the division between lots clearly indicated to prevent mixing of the lots in transit.

6. NOTES

6.1 Ordering data.-Procurement documents shall specify the following:

a. Title, number and date of this specification.

b. Data cards shall be prepared for each lot in accordance with the information specified in Standard MIL-STD-1167.

c. Provisions for submission of First Article Samples.

6.2 Inspection code numbers.-The five-digit code numbers assigned to the inspections herein are to facilitate future data collection and analysis by the Government. These code numbers are also used to correlate the characteristics cited on Equipment Lists with the inspections listed in this specification. These code numbers shall be listed on drawings of equipment designs submitted by the contractor (see 6.3.5).

6.3 Inspection equipment.-The contractor shall design inspection equipment as required by the referenced Equipment Lists (EL) in accordance with the instructions of paragraphs 6.3.1 through 6.3.5.

6.3.1 Equipment lists.-Equipment lists indicate the availability of inspection equipment designs by showing in the "Part Number" column of the list of inspection equipment (Form SMUPA 1010) the number of drawings or Federal Stock numbers of existing equipment designs, or codes as indicated in paragraph 6.3.2. Design action required of the contractor is described in paragraphs 6.3.3 and 6.3.4. The contractor will be required to prepare detailed drawings in accordance with 6.3.4 for all the equipment coded as "Contractor Design" in the "Part Number" column. These contractor designs must be approved by the Government prior to fabrication or procuring of the equipment. Designs shall be submitted for approval as specified in 6.3.5.

6.3.2 Equipment list codes.-The inspection equipment as defined in 6.3.3 and 6.3.4 will be designated in the EL by the following codes:

CD - Contractor design on controlled contractor format and/or commercial equipment.

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MU - Army design, mandatory for use.

6.3.3 Army designs.-Army designs are reflected on detailed drawings which completely depict all the information necessary for the fabrication of the item of inspection equipment. The contractor need provide no design when an Army design is listed for an item of inspection equipment. Army designs fall into two basic classifications: mandatory (designated "MU") and non-mandatory (indicated by drawing or Federal Stock Number). When an equipment list references mandatory Army designs, the contractor shall comply with and use these designs accordingly. The contractor may, however, in connection with non-mandatory designs, and with the approval of the Government, design alternate inspection equipment or use comparable commercial equipment to facilitate his operations. Such contractor-prepared designs or commercial equipment selections must be approved by the Government prior to fabrication or procuring of the equipment. Designs shall be submitted for approval as specified in 6.3.5.

6.3.4 Contractor designs.-Contractor designs are designs of inspection equipment for which the Government has assigned design responsibility to the contractor. Contractor designs shall be supported by detailed drawings which depict all information necessary to completely fabricate, calibrate and operate an item of inspection equipment. This requires that the necessary views, dimensions, materials, finishes, notes, and operating and calibration instructions be properly depicted in accordance with approved practices to the extent that further calculation or clarification will not be required. Unless otherwise specified, contractor designs may be developed on the format the contractor normally employs in his equipment design procedure provided such format reflects the detail and information specified above, subject to the following controls: All submitted contractor designs shall conform to Specification MIL-D-1000, Category A, Form 2. Legibility and reproducibility shall permit conventional making of clearly understandable, high-contrast reproductions. Contractors shall submit one copy of final designs as a rolled set. Designs shall be submitted for approval as specified in 6.3.5.

6.3.5 Submission of contractor designs.-All submitted designs shall contain a reference to the applicable five-digit code number contained in Section 4 of this specification and the appropriate component or assembly drawing number and revision letter to which the specific design applies. Unless otherwise

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specified on the EL, all designs of equipment for inspection of defects classified as critical and major shall be submitted for approval to the Commanding Officer, Picatinny Arsenal, ATTN: SMUPA-ND13. All other designs of inspection equipment shall be approved by the inspection element of the agency administering the contract. Submission shall be as directed by the contracting officer. Partial submission of inspection equipment designs is permissible and encouraged. However, the Arsenal completion date for design review will be based on the date of the final submission of designs. Picatinny Arsenal design review will be accomplished, normally, within one month after receipt.

6.4 Submission of results of contractor-conducted examinations and tests.-Unless otherwise specified by the Contracting Officer, the contractor shall forward requested records of examinations or tests to Commanding Officer, Picatinny Arsenal, ATTN: SMUPA-ND3.

6.5 Submission of test data.-In addition to the normal distribution of records, when the projectile is procured by the U.S. Army Munitions Command, one (1) copy of all ballistic data shall be forwarded to: Commanding Officer, Picatinny Arsenal, ATTN: SMUPA-ND3.

6.6 Projectile functioning.

6.6.1 Projectile.-Satisfactory functioning of the projectile is defined as complete ejection of the grenades from the projectile as intended, at a pre-determined time after firing.

6.6.2 Premature burst.-A premature burst is considered to have occurred if the projectile functions in the gun bore, or if the time of flight is less than 1.5 seconds.

6.7 Grenade functioning.

6.7.1 Grenade.-Satisfactory functioning of the grenade is defined as detonation of the grenade body assembly in the air after ground impact and ejection from its housing assembly.

6.7.2 Air detonation (AD).-A grenade air detonation is defined as functioning of the grenade in the air during the time after ejection from the projectile and prior to ground impact.

6.7.3 Burst in housing (BIH).-A grenade burst-in-housing is defined as functioning of the grenade body assembly in its housing assembly upon grenade impact with the ground. (Grenade body assembly functions prior to ejection from its housing.)

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6.8 Barricades.-Approved barricades shall be utilized for all inspections performed, when applicable.

6.9 Supersession data-This specification includes the requirements of Purchase Specification AEI-189, dated 3 May 1965.

Custodian:
Army-MU

Preparing activity:
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