

MIL-C-70600(AR)
15 January 1987

MILITARY SPECIFICATION

CARTRIDGES, CALIBER .22

This Specification is approved for use within the U.S. Army Armament Munitions and Chemical Command and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the performance, design and quality assurance requirements for the testing, inspection and packaging for caliber .22 cartridges (rimfire).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specification and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

PPP-B-636 - Boxes, Shipping Fiberboard

MILITARY

MIL-B-117 - Bags, Sleeves and Tubing-Interior Packaging

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Armament, Munitions and Chemical Command, Attn: AMSMC-QA, Dover, New Jersey 07801-5001 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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MIL-A-2550 - Ammunition, General Specification for
 MIL-A-48078 - Ammunition, Standard Quality Assurance
 Provisions, General Specifications for

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for
 Inspection by Attributes
 MIL-STD-129 - Marking for Shipment and Storage
 MIL-STD-636 - Visual Inspection Standards for Small Arms
 Ammunition through Caliber .50
 MIL-STD-1168 - Ammunition Lot Numbering

2.1.2 Other Government documents, drawings and publications.

The following other Government drawings and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of solicitation.

DRAWINGS

12561438 - Cartridge, Caliber .22 Long Rifle, Ball,
 Match Grade for Rifle
 12561439 - Cartridge, Caliber .22 Long Rifle, Ball,
 Match Grade for Pistol
 12561440 - Cartridge, Caliber .22 Long Rifle, Ball,
 Standard Velocity
 12561441 - Cartridge, Caliber .22 Long Rifle, Ball,
 High Velocity
 12561549 - Pin, Firing
 12551637 - Cartridge, Caliber .22 Long Rifle, Ball

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

2.2 Order of precedence. In the event of a conflict between the text of this specification and the reference cited herein (except for associated detail specification, specifications sheets or MS standards) the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Cartridge. The cartridge shall comply with all requirements specified on the applicable drawing, all associated drawings and with all requirements specified in applicable specifications and standards.

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3.2 Material. Materials shall be in accordance with the applicable drawings and specifications.

3.3 Primed case sensitivity. The energy imparted by a steel ball, $1.94 \pm .02$ ounces falling 14 inches onto the test fixture firing pin shall cause initiation of the primed cartridge case. The energy imparted by a steel ball $1.94 \pm .02$ ounces falling 1.5 inches onto the test fixture firing pin shall not cause initiation of the primed cartridge case. The test fixture firing pin details are as specified on drawing 12561549.

3.4 Velocity. The average velocity of the sample cartridges at fifteen (15) feet from the muzzle of the test weapon temperature conditioned at ambient (60°F to 80°F) for four hours minimum (unpacked cartridges) shall be as specified on cartridge drawing No. 12551637.

3.5 Pressure. The maximum average pressure and the maximum individual pressure of the cartridges, temperature conditioned for 4 hours minimum at the following conditions (unpacked cartridges), shall be as specified on cartridge drawing No. 12551637.

3.5.1 Ambient. Conditioned at 60° to 80° F.

3.5.2 Hot. Conditioned at $125^{\circ} \pm 5^{\circ}$ F.

3.5.3 Cold. Conditioned at $\text{minus } 20^{\circ} \pm 5^{\circ}$ F.

3.6 Accuracy. The average extreme spread shall not exceed that specified on cartridge drawing No. 125516337.

3.7 Function and casualty. The cartridge shall function without casualty when conditioned at ambient temperature 60° to 80°F , for 4 hours minimum (unpacked cartridges).

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3.8 First article test. This specification contains technical provisions for first article examination and testing. Requirements for submission of the first article sample by the contractor shall be as specified in the contract.

3.9 Workmanship. The requirements for workmanship shall be in accordance with MIL-A-2550 and as specified on the applicable drawing.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may utilize 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.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of any defective material.

4.3 Classification of inspection. The following types of inspection shall be conducted on this item.

- a. First article inspection
- b. Quality conformance inspection

4.4 First article inspection

4.4.1 First article sample. The First Article Sample shall be subjected to the first article inspection and tests as specified in Table I to determine contract compliance. The first article sample shall be representative of the manufacturing methods and processes to be used for quantity production. The first article samples shall be submitted and tested prior to the beginning of production.

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4.4.2 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with the provisions of Table I. The first article sample shall consist of the following items in sample quantities-as indicated.

<u>PART DESCRIPTION</u>	<u>DRAWING</u>	<u>QUANTITY</u>
Cartridges	(As specified In Contract)	550
Empty primed cartridge cases (no propellant or projectile)	(As applicable)	150

4.4.3 Inspections to be performed. First article cartridges shall be tested in accordance with Table I. Any test samples may additionally be subjected, by the government, to any or all of the examinations and tests specified herein, or in the contract or on the applicable drawings.

4.4.4 Rejection. If any cartridge samples fail to comply with any of the applicable requirements, the First article sample shall be rejected. MIL-A-48078 shall apply.

TABLE I. First article inspections

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET 1 OF 1		DRAWING NUMBER 12551637	
	Cartridge, Caliber .22			NEXT HIGHER ASSEMBLY	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Examination for defects	550		3.1	4.5.5.1
	Primed case Sensitivity 3/	150		3.3	4.6.1
	Velocity, Pressure Ambient 1/ 2/	50		3.4, 3.5	4.6.2, 4.6.3
	Pressure, Hot 1/ 2/	50		3.5.1 3.4	4.6.3
	Pressure, Cold 1/ 2/	50		3.5 3.5.2	4.6.3
	Accuracy 1/ 2/ Function and casualty, Ambient 1/ 2/	100 300		3.4 3.5 3.5.3 3.6 3.7	4.6.4 4.6.5
NOTES: 1/ All sample cartridges shall be subjected to examination for defects prior to performing other tests specified. 2/ Firing defects for these tests shall be subject to the acceptance criteria specified in Table II. 3/ Empty primed cartridge cases (no propellant or projectile).					

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4.5 Quality conformance inspection

4.5.1 Lot information.

4.5.2 Lot submission. The product shall be submitted in accordance with MIL-STD-105.

4.5.3 Lot size. Unless otherwise specified in the contract, the size of the ammunition lot shall be no more than 1,000,000 cartridges.

4.5.4 Lot identification. Each lot of ammunition shall be identified as to type, and model, as well as with a lot number in accordance with MIL-STD-1168.

4.5.5 Examination for defects.

a. Major and minor defects. Examination for major and minor defects shall be performed on a sampling basis in accordance with classification of defects using applicable sampling plans and acceptance criteria of MIL-STD-105, Normal Inspection Level II. The Acceptance Quality Level (AQL) for the major class and the minor class shall be as specified in the appropriate Classification of Defects and Tests Criteria. All non-conforming cartridges (or components) shall be rejected.

b. Critical defects. Unless otherwise specified, one hundred percent examination shall be performed for all critical defects.

c. Order of test. All cartridges shall have been submitted to and passed the criteria specified in 4.5.5.1 prior to being tested in 4.5.5.2.

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET 1 OF 1		DRAWING NUMBER 12551637	
4.5.5.1	Cartridge Caliber .22			NEXT HIGHEN ASSEMBLY	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
CRITICAL					
1.	Head or rim split <u>1</u> /		100%		Visual
MAJOR					
101.	Perforated or split case <u>1</u> /		.25%		Visual
102.	Crooked projectile <u>1</u> /		.25%		Visual
103.	Cartridge length, max		.25%		SMT or Gage
104.	Rim, thickness, max		.25%		SMT or Gage
105.	Head diameter, max		.25%		SMT or Gage
106.	Case diameter, max		.25%		SMT or Gage
107.	Projectile diameter, max		.25%		SMT or Gage
MINOR					
201.	Workmanship		.40%		Visual
NOTE: <u>1</u> / Refer to cartridge section of MIL-STD-636 for Visual Standards of defects.					

QUALITY CONFORMANCE INSPECTION

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	SHEET 1 OF 1		PARAGRAPH REFERENCE / INSPECTION METHOD
				AQL OR 100%	REQUIREMENT PARAGRAPH	
4.5.5.2	Testing					
CATEGORY	TEST Primed case sensitivity a/ Velocity, Pressure ambient 1/ Pressure Hot 1/ Pressure, cold 1/ Accuracy 1/ Function and casualty, ambient 1/		150 50 50 50 100 300		3.3	4.6.1
					3.4 3.5, 3.5.1	4.6.2, 4.6.3
					3.4 3.5 3.5.2	4.6.3
					3.4 3.5 3.5.3	4.6.3
					3.6	4.6.4
					3.7	4.6.5
NOTE: a/ Empty primed cartridge cases (no propellant or projectile). 1/ Firing defects for these test shall be subjected to the acceptance criteria specified in Table II.						

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TABLE II.

Acceptance Criteria

Firing defects. Firing defects and acceptance criteria shall be as specified in the following table:

<u>Firing Defects</u>	<u>Acceptance Numbers</u>
1. Body split or rupture (lower 1/3)	0
2. Rim or Head split or rupture	0
3. projectile remaining in bore	0

NOTE 1: For defects 1, 2, and 3 no failures are permissible regardless of sample size. There is no retest permitted; the lot is rejected.

<u>Firing Defects</u>	<u>Acceptance Numbers</u>
4. Mouth split (greater than 1/8 inch)	1
5. Body split (upper 2/3)	1
6. Body rupture (upper 2/3)	1
7. Other	1

NOTE 2: For defects 4, 5, 6, and 7 the cumulative acceptance number shall not exceed 2. If the cumulative firing defects and individual firing defects 4, 5, 6, or 7 exceed the acceptance number, the tests in paragraph 4.5.5.2 shall be performed again with a double sample. If the double sample meets the acceptance numbers above for defects 1, 2, 3, 4, 5, 6, and 7, the lot is acceptable.

4.6 Methods of inspection.

4.6.1 Primer sensitivity. The sample of empty primed cartridge cases shall be tested for primer sensitivity with one firing pin and one test fixture. Two-thirds of the sample shall be tested at a height of 14 inches and one-third of the sample shall be tested at the height of 1.5 inches. If one or more cartridge primers fail at either height, the sample fails and a sensitivity rundown test shall be conducted. The sensitivity rundown test shall consist of 50 cases tested at each 1 inch increment of height between 0% and 100% firing. If the average critical height (H) plus four standard deviations (4 sigma) exceeds 16.5 inches, or if the average critical height (H) minus 2 standard deviations (2 sigma) is less than 1 inch, the lot of cartridges shall be rejected. The average critical height (H) is defined as the mean height at which 50% of the primers being tested will fire.

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4.6.2 Velocity. The velocity test shall be fired through government approved horizontally mounted test barrels. Test barrel length shall be as specified on the drawing no. 12551637. The time of flight shall be measured using 100 kHz (minimum) electronic counter chronographs with screens separated 20 feet. The first screen shall be placed 5 feet from the muzzle of the test barrel.

4.6.3 Pressure. The ambient pressure and the velocity test shall be conducted concurrently. The pressures shall be determined using piezoelectric transducers or copper crusher cylinders.

4.6.4 Accuracy. The accuracy test shall be conducted through unaltered commercial weapons or test weapons whose barrel length is as specified on drawing No. 12551637.

4.6.5 Function and casualty. All Cartridges shall be fired in a ratio of 50% - 50% through two unaltered commercial weapons. For standard velocity cartridges and high velocity cartridges, one weapon shall have a semiautomatic auto-loading action and one shall have a manually operated bolt action. Both weapons shall have a total chamber and magazine capacity of five (5) cartridges minimum. Cartridges for Match Grade Rifle shall be fired from match grade rifles with manually operated bolt actions. Cartridges for Match Grade Pistol shall be fired from match grade pistols-which have a semiautomatic autoloading action and a chamber and magazine capacity of five (5) cartridges minimum. All weapons shall be loaded to capacity and the test performed.

4.6.6 Defect penalty. In any ballistic test (except function and casualty,) in which the occurrence of a firing defect listed in Table II prevents the obtaining of a reliable result for the characteristic being tested, an additional shot shall be fired. That particular test shall not be penalized but the total ballistic sample shall be penalized for such defects in accordance with Table II.

5. PACKAGING

5.1 Packaging. Packaging shall be Level B, unless otherwise specified in the contract or other. Unless otherwise specified drawing 12561438, 12561439, 12561440 and 12561441 shall apply.

5.1.1 Level B. Cartridges shall be unit packed in accordance with the manufacturer's best commercial practice in quantities of fifty (50) per fiberboard box. The packed cartridges shall then be overpacked into a close fitting fiberboard box in accordance with the manufacturer's best commercial practice and closed such that the total cartridge quantity shall be five hundred (500). The boxes containing five hundred cartridges shall be overpacked by either Alternative 1, or Alternative 2.


Alternative 1. Ten of these boxes shall be overpacked in accordance with the manufacturer's best commercial practice in a close fitting fiberboard box and closed such that the total cartridge quantity shall be five thousand (5000). This box shall

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be sealed in a Type I, Class E bag per MIL-B-117. The sealed bag shall be overpacked in a close fitting fiberboard box conforming to PPP-B-636 Class CF, Grade W5c and closed per Method VI.

Alternative 2. Ten of these boxes shall be sealed in a Type I, Class E bag per MIL-B-117 such that the total cartridge quantity shall be five thousand (5000). The sealed bag shall be overpacked in a close fitting fiberboard box conforming to PPP-B-636 Class CF, Grade W5c and closed per Method VI.

5.2 Marking. Unless otherwise specified, marking shall be in accordance with MIL-STD-129. The required DOT marking will be: "Small Arms Ammunition". The required UN marking for the Level B packaging is as follows:

	4G/Y45/S/*/ USA/DOD/AYD/
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* Insert year packed.

6. NOTES

6.1 Intended use. The rimfire cartridges covered by this specification are intended for use in training and marksmanship applications.

6.2 Ordering data. See MIL-A-48078.

6.3 Submission of inspection equipment designs for approval. See MIL-A-48078. Submit equipment designs, test set-ups, test weapon descriptions and appropriate test procedures as required to perform testing and inspection to Commander, DEC, Dover, NJ 07801-5001 ATTN: AMSMC-QAF-I (D). Request letter of submittal should state, contractor, contract number, specification number, item nomenclature, drawing number and classification of defects and test paragraph number.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading U.S. Army Armament Research, Development and Engineering Center (ARDEC) may also include drawings prepared by and identified as: Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal, ARRADCOM or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under the cognizance of ARDEC.

6.5 Subject term (key word) listing.

Cartridge
Caliber .22
Rimfire

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project 1305-AB65)

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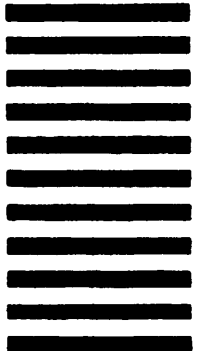
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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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1. DOCUMENT NUMBER MIL-C-70600 (AR)		2. DOCUMENT TITLE Cartridges, Caliber .22	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
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