

METRIC
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MIL-PRF-71167A(AR)  
14 APRIL 2000  
SUPERSEDING  
MIL-C-71167(AR)  
23 September 1993

## PERFORMANCE SPECIFICATION

### CARTRIDGE, 7.62MM, XM973 BALL SHORT RANGE TRAINING AMMUNITION

This specification is approved for use by the U.S. Army Armament Research Development and Engineering Center, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers the XM973 Cartridge, 7.62mm Short Range Training Ammunition (see 6.1).

#### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

#### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

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 TACOM-ARDEC, ATTN: AMSTA-AR-QAW-E, Picatinny Arsenal, New Jersey 07806-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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AMSMC N/A

FSC 1305

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## SPECIFICATIONS

## FEDERAL

A-A-59104                      Insect Repellent, Clothing and  
Personal Application

## DEPARTMENT OF DEFENSE

MIL-PRF-372                      Cleaning Compound, Solvent, for Bore of  
Small Arms and Automatic Aircraft  
Weapons  
MIL-PRF-2104                      Lubricating Oil, Internal Combustion  
Engine, Tactical Service  
MIL-L-14107                      Lubricating Oil, Weapons, Low  
Temperature  
MIL-PRF-63460                      Lubricant, Cleaner and Preservative for  
weapons and Weapon Systems (Metric)

## STANDARDS

## FEDERAL

FED-STD-595                      Colors used in Government procurement.

## DEPARTMENT OF DEFENSE

MIL-STD-286                      Propellants, Solid: Sampling,  
Examination and Testing  
MIL-STD-636                      Visual Inspection Standards for Small  
Arms Ammunition through Caliber .50  
MIL-STD-650                      Explosives: Sampling, Inspection and  
Testing  
MIL-STD-810                      Environmental Engineering Considerations  
and Laboratory Tests  
MIL-STD-1168                      Ammunition Lot Numbering and Ammunition  
Data Card  
MIL-STD-1751                      Safety and Performance Tests for  
Qualification of Explosives  
MIL-STD-1904                      Design and Test Requirements for Level A  
Ammunition Packaging  
MIL-STD-1916                      DOD Preferred Methods for Acceptance of  
Product

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications, form a part of this document, to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

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## DRAWINGS (see 6.5)

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING  
CENTER (ARDEC)

## PRODUCT DRAWINGS

6006874	-	"E" Cardboard Silhouette Target
6109086	-	"F" Cardboard Silhouette Target
7553221`	-	Pin, Firing, 7.62mm, 9mm, Cal .30 & Cal. 50
7643674	-	Classification of Cartridge Case Defects
8421679	-	M31A2, Trainfire Target Holding Mechanism
10520006	-	Ball, 3.94 Oz
12002898	-	"E" Polyethylene Silhouette Target
12002899	-	"F" Polyethylene Silhouette Target

## INTERFACE DRAWING

12992286	-	Cartridge, 7.62mm Short Range Training Ammunition (SRTA), M973 Ball
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(Copies of other Government drawing required by contractors in connection with specific acquisition functions, should be obtained from U.S. Army TACOM-ARDEC, AMSTA-AR-QAD, Picatinny Arsenal, NJ 07806-5000).

## PUBLICATIONS

## DEPARTMENT OF DEFENSE

SCATP-7.62	-	Ammunition Ballistic Acceptance Test Methods Test Procedures for 7.62mm Cartridges
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(Application for copies should be addressed to Quality Engineering Directorate, ARDEC, Picatinny Arsenal, NJ 07806-5000, ATTN: AMSTA-AR-QAC-C.)

TB-700-2	-	Department of Defense Explosives Hazard Classification Procedures
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(Application for copies should be addressed to Department of Defense Explosive Safety Board, Room 856C, Hoffman Building 1, VA 22331-6000).

TOP-1-2-608	-	Sound Level Measurements
TOP-2-2-614	-	Toxic Hazards Tests for Vehicles and

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Other Equipment  
TOP-3-2-045 - TECOM Test Operating Procedure,  
Automatic Weapons, Machine Guns, Hand  
and Shoulder Weapons  
TOP-4-2-604 - Range Firing of Small Arms Ammunition  
TOP-4-2-827 - Time of Flight and Ballistic Coefficient

(Application for copies should be addressed to U.S. Army Test and Evaluation Command (AMSTE-TC-M) Aberdeen Proving Ground, MD 21005-5055).

DMWR 9-1300-0017-D1 -Depot Maintenance Work Requirements for Demilitarization of Miscellaneous Small Arms Ammunition

(Application for copies should be addressed to U.S. Army Armament and Chemical Acquisition and Logistics Activity, ATTN:AMSTA-AC-MAS-L, Rock Island, IL 61299-7630).

TM 60A-1-1-31 - Explosive Ordnance Disposal (EOD) Procedures  
- General Information on EOD Disposal Procedures

(Copies are available from NAVEODTECHDIV, Code 60, ATTN: Jim Altier (Bldg. 2172), Indian Head, MD 20640)

#### DEPARTMENT OF INTERIOR

Bureau of Mines Report of  
Investigations 5624 - Laboratory Equipment and Test  
Procedures for Evaluating  
Explosibility of Dusts

(Copies of the above Department of Interior publication are available from The Department of Interior, U.S. Bureau of Mines, Pittsburgh Research Center Explosive Group, Cochrans Mill Rd., P.O. Box 18070. Pittsburgh, PA 15236.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are issues of the documents cited in the solicitation.

ASTM D1141 - Standard Specification for Substitute Ocean Water

(Application for copies of ASTM publications should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959).

2.4 Order of precedence. In the event of a conflict

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between the text of this document and the references cited herein the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Design verification. When specified in the contract (see 6.2), a sample of cartridges shall be subjected to design verification test inspection in accordance with 4.2.

3.2 First article. When specified in the contract (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.

3.3 Product uniformity. The usage, storage and disposal processes involved with the cartridge require a high degree of product uniformity. To achieve this uniformity, the manufacturing processes must keep unit-to-unit variability to the minimum by controlling the key characteristics. Key characteristics fall into two categories: (1) those relating to the product; and (2) those inherent in the manufacturing process. They include performance, features, reliability, conformance, durability serviceability, aesthetics, quality and safety. The contractor shall identify key characteristics of the design and establish variability limits, or baseline during design or first article qualification. The variability of key characteristics for the cartridges submitted for lot acceptance shall conform to the baseline established for them during design or first article verification.

3.4 Interface and interoperability requirements. Each cartridge shall accommodate the following inputs and interfaces.

3.4.1 Interface and compatibility. The cartridge shall be functionally compatible with the standard issued M60 and M240B machine gun. The cartridge shall be capable of being linked with the XM974, Trace, 7.62mm cartridge by using M13 links, loaded, chambered, fired in the M60 and M240B machine guns and extracted after firing without binding or use of undue force; without damage to the weapon and without cartridge-induced malfunctions.

3.4.2 Physical characteristics. The cartridge dimensions shall conform with interface control drawing 12992286.

3.4.3 External surface. External surface of the cartridge shall be free of dent, fold, wrinkle, buckle, bulge, chips, dirt, grease, rust and foreign material. External surface shall be free of burrs, scratch and sharp edges, which may affect performance or result in personnel injury during handling.

3.4.3.1 Cartridge identification. The cartridge shall be readily identified by having one or more components or portions thereof of being blue in color as defined FED-STD-595 series

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15,000, 25,000 and 35,000. No visible cartridge component shall be white in color. The manufacturer's initial or registered trade mark (upper case), last two digits of the year of manufacture and a lower case "S" shall be legibly stamped on the cartridge head surface. Stamping shall not encroach the primer pocket or head bevel.

3.4.4 Primer sensitivity. The average height (h) and standard deviation (s) of the height of fire shall be such that  $h + 3(s) \leq 33 \text{ cm}$  and  $h - 3(s) \geq 6 \text{ cm}$ .

3.5 Operating requirements. Each cartridge shall provide the following functional, operational, and performance capabilities when fired from an unmodified standard issue M60 and M240B machine gun without any ancillary devices, sighting systems or modifications.

3.5.1 Chamber pressure. The mean chamber pressure of cartridges conditioned for 6 to 12 hours at  $21^\circ\text{C} \pm 1^\circ\text{C}$  and fired at that temperature shall not exceed 365 MPa. The average chamber pressure plus three standard deviations of the chamber pressure shall not exceed 400 MPa. The chamber pressure of an individual sample cartridge shall not exceed 400 MPa.

3.5.1.1 Chamber pressure at extreme temperatures. The mean chamber pressure of cartridges conditioned for 6 to 12 hours at  $-20^\circ\text{C} \pm 1^\circ\text{C}$  and  $40^\circ\text{C} \pm 1^\circ\text{C}$  and fired at those temperatures, shall not increase more than 50 MPa above the mean chamber pressure obtained at  $21^\circ\text{C} \pm 1^\circ\text{C}$ .

3.5.2 Velocity. The mean velocity of cartridges conditioned for 6 to 12 hours at  $21^\circ\text{C} \pm 1^\circ\text{C}$ , fired at that temperature and measured at 23.77 meters from the muzzle of the weapon shall not vary by more than  $\pm 6$  percent from the design velocity. The design velocity is the mean velocity (uncorrected) obtained during design verification at  $21^\circ\text{C} \pm 1^\circ\text{C}$ .

3.5.2.1 Velocity at extreme temperature. The mean velocity of cartridges conditioned at  $-20^\circ\text{C} \pm 1^\circ\text{C}$  and  $40^\circ\text{C} \pm 1^\circ\text{C}$  for 6 to 12 hours and fired at those temperatures shall not vary by more than  $\pm 10$  percent from the mean velocity at  $21^\circ\text{C} \pm 1^\circ\text{C}$ .

3.5.3 Action time. The action time (overall primer ignition, propellant burning, plus the time taken for the bullet to exit the barrel) of cartridges conditioned for 6 to 12 hours at  $21^\circ\text{C} \pm 1^\circ\text{C}$ ,  $-20^\circ\text{C} \pm 1^\circ\text{C}$  and  $40^\circ\text{C} \pm 1^\circ\text{C}$  and fired at those temperatures shall not exceed 4 ms.

3.5.4 Dispersion. The average mean radius of the impact of 10 rounds at a distance of 100 meters shall not exceed 78mm.

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3.5.5 Cyclic rate. The cartridges shall function in the M60, in the M240B with standard buffer, and in the M240B with hydraulic buffer machine guns at a minimum cyclic rate of 500, 650 and 500 shots per minute respectively within the temperature range of  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $40^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

3.5.6 Noise level. The noise level of the cartridges at the gunner's ear position shall not exceed 164 decibels and the duration shall not exceed 20 ms.

3.5.7 Bullet integrity. The bullet of the cartridge shall not burst or fragment in the barrel or during its flight.

3.5.8 Target kill. When the target is hit, the projectile shall mark the target sufficiently to indicate a target hit and activate a standard target mechanism at a range of 100 meters.

3.5.9 Maximum range. The maximum range of the cartridge (when fired at standard atmospheric conditions) shall be no greater than 600 meters. All bullets of cartridges fired at the maximum range shall impact the ground within a safety fan defined as  $5^{\circ}$  to the left and  $5^{\circ}$  to the right of the line of fire.

3.5.10 Port pressure. The average port pressure of the cartridges when conditioned for 6 to 12 hours at  $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and fired at that temperature, shall not be greater than 85 MPa and shall not be less than 45 MPa.

3.5.11 Match/Time of flight. The trajectory of the projectile shall match within  $\pm 1$  mil the service cartridge at a range out to 100 meters from the muzzle.

3.5.12 Bullet extraction. The force required to separate the bullet from the cartridge case shall not be less than 20.4kg.

3.5.13 Chemical compatibility. The cartridge shall maintain its function in the M60 and M240B machine gun after exposure to commonly encountered chemicals in the field.

3.5.14 Explosive ordnance disposal (EOD). When specified in the contract or purchase order (see 6.2), the cartridge shall undergo an EOD disposal test during design verification by EOD personnel in accordance with EOD procedures prescribed by Army TM 60A-1-1-31.

3.6 Ownership and support requirements. Each cartridge shall possess the following life-cycle ownership characteristics.

3.6.1 Function and casualty. The cartridge shall function without casualty when fired at ambient temperature and within the temperature range from  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $40^{\circ}\text{C} \pm 1^{\circ}\text{C}$  in the M60 and M240B machine guns. The cartridge shall not cause any safety



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problem to the operator or result in critical defect as defined in Table VI when fired within the temperature range from  $-55^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $68^{\circ}\text{C} \pm 1^{\circ}\text{C}$ .

3.6.2 Safety. The cartridge shall not create any hazards that would adversely impact upon the health, safety, and performance of the user/operator. The hazards include misfires, delayed ignition, cook-off, cartridge case stuck inside chamber, projectile lodged in-bore, excessive low or high muzzle velocity and ruptured cartridge cases. The contractor shall submit the Material Safety Data Sheet (MSDS). The cartridge components shall be lead free.

3.6.2.1 Final hazard classification. The XM973 shall comply with the following Hazard Classification when packaged in line with the packaging requirements specified in the contract:

DOD Hazard Class/Div: 1.4  
DOD Hazard Compatibility Group: S  
DOT Hazard Class: 1.4S

3.6.2.2 Energetic material qualification. The energetic material shall be qualified by the Army Service Qualification Authority, see 6.10.

3.6.2.3 Energetic materials compatibility. All energetic materials (explosives, propellants, pyrotechnics) utilized must be compatible with all combinations of directly contacting energetic and non-energetic materials. In addition, they must be compatible with all combinations of materials that have the potential for contact in the system's life cycle.

3.6.2.4 Propellant stability. All propellants shall be stable over a minimum time period of 5 years.

3.6.3 Toxic fumes. The toxic fumes produced by the cartridge shall not exceed those produced by firing similar quantities of 7.62mm, M80 Ball ammunition. Personnel shall not be exposed to heavy metal levels in excess of the most stringent limits established by the Occupational Safety and Health Administration (OSHA).

3.6.4 Ammunition lot identification. Ammunition lot identification shall be assigned.

3.6.5 Residual stress. The cartridge shall not split when subjected to residual stress for the applicable materials.

3.7 Environmental requirements. Each cartridge shall operate without evidence of cracking, distortion, or damage that may impair its intended operation or loss of performance, under the following environmental conditions.



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3.7.1 Waterproofness. The cartridges after submersion in  $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$  water for 2 hours shall maintain its functional reliability in the M60 and M240B machine gun. The mean velocity obtained shall not vary by more than  $\pm 30$  m/s from the velocity at  $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$  (see 3.6.2).

3.7.2 Sequential rough handling. The cartridge shall be capable of withstanding the following rigors of rough handling and transportation:

- a. Secured-cargo vibration test
- b. Loose cargo test
- c. 2.13 meter drop test
- d. 12.20 meter drop test

3.7.3 Long term high temperature storage. The cartridge shall be safe to store and fire (no critical defects as defined in Table VI) after being subjected to 30 days of continuous heating at  $63^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The reliability of the cartridge (when compared with the reliability obtained at ambient temperature's function and casualty testing for the requirement in 3.6.1) shall not degrade by more than 5 percent (see 6.7.2), and the cyclic rate shall not change by more than 15 percent, when the cartridge is subjected to continuous heating.

3.7.4 Long term low temperature storage. The cartridge shall be safe to store and fire (no critical defects as defined in Table V) after being subjected to 30 days continuous cooling at  $-35^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The reliability of the cartridge (when compared with the reliability obtained at ambient temperature's function and casualty testing for the requirement in 3.6.1) shall not degrade by more than 5 percent (see 6.7.2) and the cyclic rate shall not change by more than 15 percent when the cartridge is subjected to continuous cooling.

3.7.5 Thermal shock. The cartridge shall exhibit no evidence of corrosion and shall function in the M60 and M240B machine gun, after exposure to alternately high and low temperature extremes.

3.7.6 Temperature humidity. The cartridge shall be safe to fire (no critical defects as defined in Table VI) after being subjected to a 10-day temperature/humidity cycle.

3.7.7 Sand and dust. The cartridge shall be safe to fire (no critical defects as defined in Table VI) after being subjected to sand and dust conditions.

3.7.8 Salt spray (fog) exposure. The cartridge shall be

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safe to store and fire (no critical defects as defined in Table VI) after being subjected to a 5 percent salt spray (fog).

3.7.9 Hot chamber effects (cook-off). A cartridge inserted into the chamber of the M60 and M240B machine guns following the firing of 200 cartridges in each weapon shall not fire (cook off). In addition, the cartridge shall not deform to the extent that clearing of the weapons is made difficult.

3.7.10 Attitude. The cartridge shall be safe to fire in the M60 and M240B machine guns (no critical defect as defined in Table VI) and the reliability shall not degrade by more than 10 percent (see 6.7.2) when fired at elevations between  $\pm 85^\circ$ .

3.7.11 Barrel erosion. The life of each of the 3 barrels shall not be less than 5,000 rounds. The barrel life shall be considered as having ended when any one of the following conditions take place (whichever comes first):

- a. The average velocity of an individual burst in the test drops 61 meters/sec or more with respect to that of the initial burst in the barrel's history.
- b. When the bullets from twenty percent or more of the cartridges in any burst show keyholing which is defined as yaw exceeding  $15^\circ$  at 25.4 meters range.

3.7.12 Demilitarization. The Small Arms Technical Manual (DMWR 9-1300-0017-D1) shall be followed for demilitarization procedures. The item design shall ensure that the materials specified and the assembly methods chosen allow for an environmentally safe and cost effective demilitarization process, not to exceed 10 percent of the item's manufacturing cost. The design should allow maximum recovery of valuable materials and components or when recovery is not feasible, require methods of destruction with no environmental impact. The use of materials containing Environmental Protection Agency (EPA) designated hazardous materials shall be avoided. Open burning and open detonation are no longer considered desirable demilitarization methods and shall not be employed.

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## 4. Verification

Table I. REQUIREMENTS/VERIFICATION CROSS REFERENCE MATRIX

## METHOD OF VERIFICATION

N/A - Not applicable

1 - Analysis

2 - Demonstration

3 - Examination

4 - Test

## CLASSES OF VERIFICATION

A - Design verification

B - First Article inspection

C - Conformance inspection

Section 3 Requirement	Verification Methods					Verif. class			Section 4 Verification Procedures
	NA	1	2	3	4	A	B	C	
3.1		x	x	x	x	x			4.2
3.2			x	x	x		x		4.3. Table III
3.3			x	x	x			x	4.2.4, 4.2.4.1
3.4.1		x		x	x	x	x	x	Tables V & VI
3.4.2					x	x	x	x	Tables IV & V
3.4.3					x	x	x	x	Tables IV & V
3.4.3.1		x			x	x	x	x	Table V
3.4.4					x	x	x	x	4.5.1
3.5.1					x	x	x	x	4.5.5
3.5.1.1					x	x	x	x	4.5.5
3.5.2					x	x	x	x	4.5.5
3.5.2.1					x	x	x	x	4.5.5
3.5.3					x	x	x	x	4.5.5
3.5.4					x	x	x	x	4.5.6
3.5.5					x	x	x	x	4.5.8
3.5.6					x	x	x		4.5.9
3.5.7					x	x	x	x	4.5.11
3.5.8					x	x	x		4.5.12
3.5.9					x	x	x		4.5.13
3.5.10					x	x	x	x	4.5.5
3.5.11					x	x	x		4.5.21
3.5.12					x	x	x	x	4.5.3
3.5.13					x	x	x		4.5.10
3.5.14		x			x	x	x		4.2.5
3.6.1					x	x	x	x	4.5.7
3.6.2					x	x	x	x	4.5.6, 4.5.7, 4.5.8, 4.6.1
3.6.2.1					x				4.6.1
3.6.2.2					x				4.6.2
3.6.2.3					x				4.6.3
3.6.2.4					x				4.6.4
3.6.3					x	x	x		4.5.20
3.6.4					x	x	x		4.4.1.1
3.6.5					x	x	x	x	4.5.2
3.7.1					x	x	x	x	4.5.4
3.7.2					x	x	x		4.5.19
3.7.3					x	x	x		4.5.17
3.7.4					x	x	x		4.5.18
3.7.5					x	x	x		4.5.22
3.7.6					x	x			4.5.16
3.7.7					x	x	x		4.5.14
3.7.8					x	x	x		4.5.15
3.7.9					x	x			4.5.23
3.7.10					x	x			4.5.24
3.7.11					x	x			4.6.5
3.7.12					x	x			4.6.6

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

- a. Design verification (see 4.2)
- b. First article inspection (see 4.3)
- c. Conformance inspection (see 4.4)

4.2 Design verification. When specified in the contract, a sample of the XM973 cartridges shall be subjected to the design verification in accordance with Requirement/Verification cross-reference matrix Table I and Table II.

4.2.1 Design verification quantity. Design verification shall be performed on 114,000 XM973 cartridges.

4.2.2 Verifications to be performed. See MIL-STD-1916 and Table I in this specification. Examination for critical characteristics shall be performed in accordance with Table II and MIL-STD-1916 paragraph 4.4 and 4.5. Examination for major and minor defects shall be performed in accordance with Table II. The sample to be examined shall be drawn in such a way that it is representative of the entire quantity submitted. Nonconforming cartridges shall be rejected and put aside for further examination and disposition.

4.2.3 Design verification rejection. If any item of the sample fails to comply with the design verification requirements, the sample shall be rejected.

4.2.4 Product uniformity baseline. Subject five sets of components, subassemblies and assemblies to a physical configuration audit (PCA). Identify key characteristics. There shall be no discrepancies between the samples and their corresponding configuration descriptions (drawings, specifications, etc.). For each key characteristics, establish tolerances (upper and lower limits) that do not exceed any of the measurements obtained from the samples. These tolerances shall be used for evaluating variability of key characteristics test conducted during conformance verification.

4.2.4.1 Variability of key characteristics. For each key characteristic, the contractor shall provide objective evidence to demonstrate, with at least an 80 percent confidence, that as a minimum, 95 percent of the product meets its product uniformity baseline established during PCA.

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TABLE II. Design Verification

## CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST	CONFORMANCE CRITERIA		REQUIREMENT PARAGRAPH	INSPECTION METHOD
	SAMPLE	ACC-REJ		
Examination for Defects <u>1</u> /				
Critical defect	100%	0-1	See	Table V
Major defect (101-104)	100%	0-1	See	Table V
Major defect (105-121)	Level V	0-1	See	Table V
Minor defect	Level III	0-1	See	Table V
Primer Sensitivity	50		3.4.4	4.5.1
Residual Stress	50	0-1	3.6.5	4.5.2
Bullet extraction	50	0-1	3.5.12	4.5.3
Waterproof +21°C ± 1°C	120		3.7.1	4.5.4
EPVAT (Electronic Chamber & Port Pressures, Velocity, Action Time, 1-test barrel)				
			3.5.1	4.5.5
-20°C ± 1°C	50		3.5.2	4.5.5
+21°C ± 1°C	50		3.5.3	4.5.5
+40°C ± 1°C	50		3.5.10	4.5.5
Dispersion +21°C ± 1°C				
(3 wpns) Test barrel	180		3.5.4	4.5.6
(3 wpns) M60 4:1	150	<u>2</u> /		
(3 wpns) M240B 4:1	150	<u>2</u> /		
Function and Casualty				
At ambient temperature			3.6.1	4.5.7
(3 wpns) M60 4:1	30,000	<u>2</u> /		
(3 wpns) M240B 4:1	45,000	<u>2</u> /		
Cyclic Rate		<u>3</u> /	3.5.5	4.5.8
Noise (1 wpn) M60 4:1	10	<u>2</u> /	3.5.6	4.5.9
(1 wpn) M240B 4:1	10	<u>2</u> /		
Thermal shock (1 wpn) M60	200		3.7.5	4.5.22
(1 wpn) M240B	200		3.7.5	4.5.22
Barrel erosion M240B 4:1		<u>3</u> /	3.7.11	4.6.5

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TABLE II. Design Verification  
CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST	CONFORMANCE CRITERIA			REQUIREMENT PARAGRAPH	INSPECTION METHOD
	SAMPLE ACC-REJ				
High-Low Temp Functioning				3.6.1	4.5.7
(3 wpns) +40°C ± 1°C	4:1	M60	3000	<u>2</u> /	
(3 wpns) +40°C ± 1°C	4:1	M240B	3000	<u>2</u> /	
(1 wpn) +68°C ± 1°C		M240B	250		
(3 wpns) -20°C ± 1°C	4:1	M60	6000	<u>2</u> /	
(3 wpns) -20°C ± 1°C	4:1	M240B	6000	<u>2</u> /	
(1 wpn) -55°C ± 1°C		M240B	250		
Chemical Compatibility			100	3.5.13	4.5.10
Bullet Integrity				<u>3</u> /	4.5.11
Target Kill				3.5.8	4.5.12
	(1 wpn)	M60	80		
	(1 wpn)	M240B	80		
Maximum Range				3.5.9	4.5.13
	(1 wpn)	M60	10		
	(1 wpn)	M240B	10		
Sand & Dust				3.7.7	4.5.14
	(1 wpn) 4:1	M60	500	<u>2</u> /	
	(1 wpn) 4:1	M240B	500	<u>2</u> /	
Corrosion (Salt & Fog)				3.7.8	4.5.15
	(1 wpn)	M60	200		
	(1 wpn)	M240B	200		
Hot chamber effects (cook off)					
	(1 wpn) 4:1	M60	1500	<u>2</u> /	4.5.23
	(1 wpn) 4:1	M240B	1500	<u>2</u> /	4.5.23
Attitude	(1 wpn) 4:1	M60	450	<u>2</u> /	4.5.24
	(1 wpn) 4:1	M240B	450	<u>2</u> /	4.5.24

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TABLE II. Design Verification  
CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST	CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
	SAMPLE ACC-REJ		
Temperature/Humidity Cycling		3.7.6	4.5.16
(1 wpn) M60	500		
(1 wpn) M240B	500		
Long Term High Temperature Storage			
28 Days Hot +63°C ± 1°C	M60 1000	3.7.3	4.5.17
	M240B 1000	3.7.3	4.5.17
Long Term Low Temperature Storage			
28 Day Cold -35°C ± 1°C	M60 1000	3.7.4	4.5.18
	M240B 1000	3.7.4	4.5.18
Sequential Rough Handling			
-35°C ± 1°C, +63°C ± 1°C		3.7.2	4.5.19
(1 wpn)4:1 M60	2000	<u>2/</u> <u>3/</u>	
(1 wpn)4:1 M240B	2000	<u>2/</u> <u>3/</u>	
Toxic Fumes		3.6.3	4.5.20
(1 wpn)4:1 M60	500	<u>2/</u>	
(1 wpn)4:1 M240B	500	<u>2/</u>	
Explosive Ordnance Disposal		3.5.14	4.2.5
Match/Time of flight	100	3.5.11	4.5.21
Final Hazard Classification	7040	3.6.2.1	4.6.1
Energetic Mat. Qualification	300	3.6.2.2	4.6.2
Energetic Mat. Compatibility	300	3.6.2.3	4.6.3
Propellant Stability	300	3.6.2.4	4.6.4

## NOTES:

1/ Level III or Level V refers to Verification Level III or Verification Level V respectively of Table II Attributes Sampling Plans in MIL-STD-1916.

2/ This test shall be carried out in conjunction with the design verification test of the XM974 Tracer cartridge in 4:1 ratio of Ball to Tracer. The quantity specified is the total of XM973 Ball and XM974 Tracer cartridges combined.

3/ This test shall be conducted simultaneously with Function and Casualty.



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4.2.5 Explosive ordnance disposal (EOD). The contractor shall provide the following XM973 cartridge samples to the EOD Technology Division for EOD design verification tests, as specified in the contract (see 6.2).

a. One sample cartridge and one cutaway cartridge with technical information (giving detailed operation and functioning descriptions).

b. 6 - 90 degree inert cutaway models.

c. 11 - inert models.

4.3 First article. When specified in the contract, a sample of the cartridges shall be subjected to First Article Verification in accordance with Table III.

4.3.1 First article quantity. First article verification shall be performed on the following.

<u>Name</u>	<u>Drawing</u>	<u>Quantity</u>
Cartridge, 7.62mm, XM973 Ball, Short Range Training Ammunition	12992286	1,400

4.3.2 Inspections to be performed. As determined by the Government, the first article assemblies, components and test specimens may be subjected to any or all of the examinations and tests specified in this specifications (see Table III) and be inspected for compliance with any or all requirements of the specification and the applicable drawings.

4.3.3 First article rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected.

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TABLE III. First article inspection

EXAMINATION OR TEST	CONFORMANCE CRITERIA		REQUIREMENT PARAGRAPH	INSPECTION METHOD
	SAMPLE	ACC-REJ		
Examination for Defects <u>1/</u>				
Critical defect	100%	0-1	See	Table V
Major defect (101-104)	100%	0-1	See	Table V
Major defect (105-121)	Level V	0-1	See	Table V
Minor defect	Level III	0-1	See	Table V
Primer Sensitivity	25		3.4.4	4.5.1
Residual Stress	50	0-1	3.6.5	4.5.2
Bullet extraction	25	0-1	3.5.12	4.5.3
Waterproof	50		3.7.1	4.5.4
EPVAT (Electronic Pressure, Velocity, Action Time)				
	+21°C ± 1°C	50	3.5.1	4.5.5
	-20°C ± 1°C	50	3.5.2	4.5.5
	+40°C ± 1°C	50	3.5.3	4.5.5
			3.5.10	4.5.5
Dispersion	25		3.5.4	4.5.6
M60 Function & Casualty			3.6.1	4.5.7
	+21°C ± 1°C <u>2/</u>	120		Table V
	-20°C ± 1°C <u>2/</u>	120		Table V
	+40°C ± 1°C <u>2/</u>	120		Table V
M240B Function & Casualty			3.6.1	4.5.7
	+21°C ± 1°C <u>2/</u>	120		Table V
	-20°C ± 1°C <u>2/</u>	120		Table V
	+40°C ± 1°C <u>2/</u>	120		Table V
Cyclic Rate	<u>3/</u>		3.5.5	4.5.8
Bullet Integrity			3.5.7	4.5.11
	M60 <u>3/</u>	<u>4/</u>		
	M240B <u>3/</u>	<u>4/</u>		
Maximum range (1wpn) M60	10		3.5.9	4.5.13
(1wpn) M240B	10		3.5.9	4.5.13
Target kill (1wpn) M60	25		3.5.8	4.5.12
(1wpn) M240B	25		3.5.8	4.5.12
Barrel erosion M240B		<u>3/</u>	3.7.11	4.6.5

## NOTES:

1/ Level III or Level V refers to verification Level III or verification Level V respectively of Table II Attribute Sampling plans in MIL-STD-1916.

2/ The sample is divided equally among 3 weapons.

3/ Conducted simultaneously with function and casualty.

4/ Out of each 120 cartridges tested for function and casualty, the first 50 cartridges shall be evaluated at each temperature +21°C ± 1°C, -20°C ± 1°C, +40° ± 1°C in each weapon (M60 and M240B) for bullet integrity. The results of all 3 temperatures combined for the two weapons shall meet the sampling

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plan, 300-10-11 (sample size, acceptance no., rejection no.).

4.4 Conformance verification.

4.4.1 Lot formation. The lot formation shall be in accordance with MIL-STD-1916

4.4.1.1 Lot identification. Visually verify that each lot of ammunition is identified as the type, caliber, model and lot number in accordance with MIL-STD-1168.

4.4.2 Classifications of characteristics.

a. Reference the definitions of Critical, Major, and Minor characteristics in MIL-STD-1916.

b. Conformance examinations and tests are specified in Table IV.

c. Alternative conformance provisions. The contractor may use contractor proposed alternative conformance acceptance provisions in accordance with MIL-STD-1916 in lieu of the verification provisions of this specification. Prior to applying the alternative conformance provisions, the contractor shall submit the proposed alternative conformance provisions for Government approval (see 6.8).

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TABLE IV. Conformance inspection

## CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST	CONFORMANCE CRITERIA		REQUIREMENT PARAGRAPH	INSPECTION METHOD
SAMPLE ACC-REJ				
Examination for Defects				
Critical defect	100%	0-1	See	Table V
Major defect (101-104)	100%	0-1	See	Table V
Major defect (105-121)	192	0-1	See	Table V
Minor defect	32	0-1	See	Table V
Primer Sensitivity	25	<u>1</u> /	3.4.4	4.5.1
Residual Stress	50	<u>2</u> /	3.6.5	4.5.2
Bullet extraction	25	<u>3</u> /	3.5.12	4.5.3
Waterproof	50	<u>1</u> /	3.7.1	4.5.4
EPVAT (Electronic pressure, velocity, action time)				
21°C ± 1°C	50	<u>4</u> /	3.5.1	4.5.5
-20°C ± 1°C	50	<u>4</u> /	3.5.2	4.5.5
+40°C ± 1°C	50	<u>4</u> /	3.5.3	4.5.5
		<u>4</u> /	3.5.10	4.5.5
Dispersion	25	<u>1</u> /	3.5.4	4.5.6
M60 Function & Casualty				
+21°C ± 1°C <u>5</u> /	100	Table V	3.6.1	4.5.7
-20°C ± 1°C <u>5</u> /	100	Table V		
+40°C ± 1°C <u>5</u> /	100	Table V		
M240B Function & Casualty				
+21°C ± 1°C 5/	100	Table V	3.6.1	4.5.7
-20°C ± 1°C 5/	100	Table V		
40°C ± 1°C <u>5</u> /	100	Table V		
Cyclic Rate	<u>6</u> /		3.5.5	4.5.8
Bullet Integrity				
	M60 <u>6</u> / <u>7</u> /		3.5.7	4.5.11
	M240B <u>6</u> / <u>7</u> /			
Maximum range (1wpn)	M60	10	<u>1</u> /	3.5.9
(1wpn)	M240B	10	<u>1</u> /	3.5.9
Target kill (1wpn)	M60	25	<u>1</u> /	3.5.8
(1wpn)	M240B	25	<u>1</u> /	3.5.8

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## NOTES:

- 1/ Failure to comply with the applicable requirement shall be cause for rejection of the lot subject to testing of a second sample consisting of double the quantity used in the first test. Failure of the cartridges in the second sample to comply with the applicable requirement shall be cause for rejection of the lot.
- 2/ Failure of 2 or more cartridges to comply with the applicable requirement shall be cause for rejection of the lot. If one cartridge fails in the first test, a second sample consisting of double the number of cartridges in the first sample may be tested. If any failing cartridges are found in the second sample, the lot shall be rejected.
- 3/ Failure of 2 or more cartridges to comply with the applicable requirement shall be cause for rejection of the lot. If one or two cartridges fail in the first test, a second sample consisting of double the number of cartridges in the first sample shall be tested. The lot shall be rejected if in the combined first and second sample 2 or more cartridges fail to comply with the applicable requirement.
- 4/ Failure of the cartridges in any sample to comply with the applicable requirements, shall be cause for rejection of the lot, subject to testing of a second sample consisting of double the quantity of cartridges used in the first test, for the temperature or temperatures at which the failure occurred. The lot shall be rejected if the cartridges in the second sample fail to comply with the applicable requirements.
- 5/ Divided equally between 2 weapons.
- 6/ Conducted simultaneously with function and casualty.
- 7/ Out of each 100 cartridges tested for function and casualty, the first 25 cartridges shall be evaluated at each temperature ( $+21^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,  $+40^{\circ}\text{C} \pm 1^{\circ}\text{C}$  in each of the M60 and M240B Machine Guns. In the combined results (150 rounds), failure of 15 or more cartridges to comply with the applicable requirements shall be cause for rejection of the lot. If more than 2 but less than 15 cartridges fail in the first test, a second sample consisting of double the number of cartridges in the first sample shall be tested for bullet integrity. The lot shall be rejected if in the combined first and second sample (450 total cartridges), 15 or more cartridges fail to comply with the requirement.

4.4.3 Test samples. Only cartridges having met the visual and dimensional requirements shall be used in the ballistic tests, and shall have been selected in such a manner that the sample is representative of the entire lot. The cartridges shall

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be thoroughly mixed before being divided into samples for the various tests.

4.4.4 Function and casualty retest. The lot shall be rejected when function and casualty defects plus firing defects observed in all other firing tests exceeds the acceptance criteria of Table V. A second sample, consisting of double the quantities specified under the function and casualty test, shall be fired. The retest quantity shall be fired in accordance with 4.5.7. If the total number of defects in the combined first and second samples exceeds the acceptance criteria of Table VI, the lot shall be rejected. If, in testing a second sample, defects other than those for which the second sample is being retested should occur to the extent that they exceed the acceptance criteria, the lot shall be rejected.

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TABLE V. Cartridge inspection

## CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST <u>1/</u>		CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Critical:</u>		SAMPLE		
1.	Case split in K, L or M location (6)	100%	3.6.2	Gage
2.	Case split in S or J location with loss of powder (6)	100%	3.6.2	Gage
3.	Perforated case (7)	100%	3.6.2	Gage
4.	Low charge <u>2/</u>	100%	3.6.2	Gage
5.	Other <u>3/</u>	100%		Gage
<u>Major:</u> <u>4/</u>				
101.	Primer missing (32)	100%	3.4.1	Visual
102.	Primer cocked (33)	100%	3.4.1	Visual
103.	Primer inverted (34)	100%	3.4.1	Visual
104.	Case split in S or J location with no loss of powder	100%	3.4.1	Visual
105.	Corroded or stained(if etched) case(2)	Level IV	3.4.3	Visual
106.	Round head (4)	Level IV	3.4.1	Visual
107.	Dented case (5)	Level IV	3.4.1	Visual
108.	Draw scratch in case (8)	Level IV	3.4.3	Visual
109.	Beveled underside of head (10)	Level IV	3.4.1	Visual
110.	Scaly metal on case (12)	Level IV	3.4.3	Visual
111.	No chamfer on head (rim) (13)	Level IV	3.4.2	Visual
112.	Loose primer (35)	Level IV	3.4.1	Visual/Manual
113.	Diameter of extractor groove, max, incorrect	Level IV	3.4.2	Gage
114.	Diameter of head, incorrect	Level IV	3.4.2	Gage
115.	Thickness of rim, incorrect	Level IV	3.4.2	Gage
116.	Length to shoulder datum, incorrect	Level IV	3.4.2	Gage
117.	Depth of primer, incorrect	Level IV	3.4.2	Gage
118.	Primer cup missing	Level IV	3.4.1	Visual
119.	Overall length, max, incorrect	Level IV	3.4.2	Gage
120.	Cartridge Identification Marking missing/incorrect	Level IV	3.4.3.1	Visual
121.	Other <u>5/</u>	Level IV		



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TABLE V. Cartridge inspection

## CLASSIFICATION OF CHARACTERISTICS

EXAMINATION OR TEST		CONFORMANCE CRITERIA	REQUIREMENT PARAGRAPH	INSPECTION METHOD
<u>Minor:</u>		SAMPLE		
201.	Discolored, dirty, oily or smeared (waterproofing) (1)	Level II	3.4.3	Visual
202.	Dented case (5)	Level II	3.4.3	Visual
203.	Draw scratch in case (8)	Level II	3.4.3	Visual
204.	Scratch in case (9)	Level II	3.4.3	Visual
205.	Scaly metal on case (12)	Level II	3.4.3	Visual
206.	Fold, wrinkle, buckle or bulge in case (14, 15, 16, 17)	Level II	3.4.3	Visual
207.	Head stamp missing or illegible (18)	Level II	3.4.3	Visual
208.	Defective head (19)	Level II	3.4.1	Visual
209.	No waterproofing material (primer pocket joint) (37)	Level II	3.4.1	Visual
210.	Defective crimp (primer) (38)	Level II	3.4.1	Visual
211.	Diameter of extractor groove, min, incorrect	Level II	3.4.2	Gage
212.	External surface	Level II	3.4.3	Visual

## Notes for Table V:

- 1/ Numbers in parenthesis after defect descriptions refer to visual standards in MIL-STD-636. For case split locations see DWG. 7643674.
- 2/ The contractor shall submit an analysis that establishes the minimum charge required to preclude the possibility of a bullet in bore. Cartridges containing less than this minimum charge are critically defective.
- 3/ Any other defect which is likely to result in hazardous or unsafe conditions.
- 4/ Level II or Level IV refer to verification level II or verification Level IV respectively of Table II Attributes sampling plans in MIL-STD-1916.
- 5/ Any other defect that is not critical but is likely to result in failure or to reduce materially the usability of the cartridge for its intended purpose. This can be either a Major or a Minor defect.

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**TABLE VI. Firing defects.**

<b>Class</b>	<b>Criteria <u>1</u>/</b>
Critical: 1. Bullet in bore 2. Complete or partial rupture (DWG. 7643674, locations S, J, K, and L) 3. Detached material (upon firing) 4. Burn through 5. Slamfire <u>2</u> / 6. Uncontrolled fire (3 rounds or greater) <u>3</u> / 7. Other critical <u>4</u> /	None allowed.
Major: 101. Blown or dropped primer 102. Split body or head (dwg. 7643674, locations J, K, L, and M) 103. Gas leak at body/head interface 104. Misfire 105. Uncontrolled fire (2 rounds or less) <u>5</u> / 106. Other major <u>6</u> /	Total majors allowed per 1000 rounds = 2.5
Minor: (Group A) 201. Split neck, shoulder or mouth (DWG. 7643674, locations I and S) 202. Gas leak through or around primer cup 203. Detached material (upon extraction) 204. Other minor <u>7</u> /	Total Group A minors allowed per 1000 rounds = 10
Minor: (Group B) 205. Stoppage (attributable to ammunition)	Total Group B minors allowed per 1000 rounds = 10

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NOTES: For Table VI

- 1/ This table shall be applied separately to the results of each weapon type at each temperature condition.
- 2/ A slamfire occurs when a round is unintentionally fired by manually closing the weapon bolt, without depressing the trigger of the weapon.
- 3/ Uncontrolled fire of 3 rounds or greater occurs when 3 or more rounds are fired in excess of that expected to be fired. For example, if in single shot mode, one trigger pull produces 4 or more rounds to fire, or in three round burst mode, one trigger pull causes 6 or more rounds to fire.
- 4/ Any other defect that is likely to result in hazardous or unsafe conditions.
- 5/ Uncontrolled fire of 2 rounds or less occurs when 1 or 2 rounds are fired in excess of that expected to be fired. For example, if in single shot mode, one trigger pull produces 2 or 3 rounds to fire, or if in three round burst mode, one trigger pull produces 4 or 5 rounds to fire.
- 6/ Any other defect that is not critical but is likely to result in failure or to reduce materially the usability of the round or weapon for its intended purpose.
- 7/ Any other defect that is not likely to reduce materially the usability of the round or weapon for its intended purpose or is a departure from established standards having little bearing on the effective use or operation of the round.

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4.5 Methods of verification.

4.5.1 Primer sensitivity. Test in accordance with the SCATP-7,62mm, Chapter 4, Section 1 utilizing the ball and firing pin identified on drawings 10520006 and 7553221.

4.5.2 Residual stress.

4.5.2.1 Cartridges with brass cases. Test in accordance with SCATP-7.62, Chapter 1, Section 11. Prior to testing, all lubricants and coatings shall be removed from the cartridge case using solvents or cleaning techniques appropriate to the particular lubricant or coating being used.

4.5.2.2 Cartridges with polyethylene cases. Test in accordance with Appendix A.

4.5.2.3 Cartridges with cases of other materials. Test in accordance with procedures approved by the Government appropriate for the materials(s) used to manufacture the cartridge.

4.5.3 Bullet extraction. The cartridge shall be tested in a bullet extraction machine in accordance with SCATP-7.62, Chapter 7, Section 6. the rate of travel of the test machine head shall be from 75mm to 150mm per minute.

4.5.4 Waterproofness. The cartridges shall be submerged in water at  $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for 24 hours, wiped dry, then placed in a temperature controlled room or chamber at  $20^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $22^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for at least 2 hours. Fire the cartridges one shot at a time in a universal receiver, measure the velocity at 23.78 meters in accordance with SCATP-7.62, Chapter 1, Section 13.

4.5.5 Chamber pressure, port pressure, velocity and action time. The test samples shall be conditioned at the specified test temperatures in Section 3 allowing  $\pm 1^{\circ}\text{C}$  tolerance for each test temperature. The test shall be conducted in accordance with SCATP-7.62, chapter 1, section 21.

4.5.6 Dispersion. The test shall be conducted in accordance with SCATP-7.62, Chapter 1, Section 3, with the following amendments:

a. Equipment lists for dispersion testing can be found in ARDEC drawing 8657272.

b. Ten round targets shall be fired with the targets located 100 meters from the muzzle of the test barrel. The target shall be of a size applicable to the expected dispersion of the bullet holes.

4.5.7 Function and casualty. Function and casualty tests shall be conducted in accordance with SCATP-7.62 and the

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following:

4.5.7.1 Function and casualty acceptance criteria. The ammunition shall be temperature conditioned at the specified temperature and the following shall be employed:

a. The occurrence of any critical defect shall be cause for rejection.

b. Function and Casualty design verification testing at  $-55^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and  $+68^{\circ}\text{C} \pm 1^{\circ}\text{C}$  shall be conducted with the ammunition conditioned at the test temperature. The acceptance criteria on Table VI, for all defect classes, shall be applied to the results of this testing.

c. If acceptable performance in accordance with Table VI at  $-55^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and  $+68^{\circ}\text{C} \pm 1^{\circ}\text{C}$  is achieved, the remainder of the function and casualty tests at  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,  $+21^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,  $40^{\circ}\text{C} \pm 1^{\circ}\text{C}$  shall be conducted. The results of these firings shall meet all acceptance criteria in Table VI.

4.5.8 Cyclic rate. The cyclic rates (rounds or shots per minute) shall be measured during Function and Casualty testing.

4.5.9 Noise. Test in accordance with Appendix C.

4.5.10 Chemical compatibility. Test the following commonly encountered chemicals in the field in accordance with Appendix B:

- a. MIL-PRF-372      Cleaning compound, solvent
- b. A-A-59104      Insect repellent,
- c. MIL-L-14107      Lubricating oil, weapons, low temperature,
- d. MIL-PRF-63460      Lubricant (CLP)
- e. ASTM D1141      Standard specification for substitute ocean water,
- f. MIL-PRF-2104      Lubricating Oil Internal Combustion Engine, Tactical

4.5.11 Bullet integrity. Observe for bullet integrity during function and casualty. As part of the Function and Casualty firings, a quantity of rounds (as specified in Tables I, II, and III) shall be evaluated in accordance with the following procedure. A paper sheet (1.83 meters x 1.83 meters minimum) shall be stretched tightly over a rigid frame of the same size. The sheet shall be placed perpendicular to the barrel of the weapon, 25 meters from the muzzle. The sheet shall be replaced as necessary to facilitate observation. Any evidence of bullet fragmentation indicated by irregular perforations or by the number of perforations exceeding the number of rounds fired shall be observed. All irregular perforations shall be measured. All irregular perforations greater than .254 cm shall be classed as defects.

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4.5.12 Target kill. The test is to be conducted using the M60 and M240B Machine Guns, four target types (polyethylene "E", polyethylene "F", cardboard "E" and cardboard "F") and two target supports (M31A1 target mechanism, and any suitable stationary target support). Targets shall be placed 100 meters from the muzzle of the weapons. Twenty rounds shall be fired using each possible weapon, target type, target support combination (for a total of 160 rounds). Cartridges shall be fired single shot from the M60 and M240B Machine Guns. Observers should be present down range to determine if fired projectiles actually strike the targets. If it is determined that a shot missed the target, a non-penalty replacement shot shall be fired. The results of each shot regarding the activation of the mechanism and the impact on the target shall be identified as follows:

M - Marked target	A - Activated Mechanism
P - Penetrated target	NH - No Hit (missed target)
NM - No Mark	NA - No Mechanism Activation

## Equipment List:

M31A1 - Trainfire Target Holding Mechanism	DWG. 8421679
"E" Cardboard Silhouette Target	DWG. 6006874
"F" Cardboard Silhouette Target	DWG. 6109086
"E" Polyethylene Silhouette Target	DWG. 12002898
"F" Polyethylene Silhouette Target	DWG. 12002899

The criteria will be considered met if both:

- a. All targets held by stationary supports are either marked or penetrated by every shot.
- b. The target mechanism is activated by every round that strikes a target supported by the target mechanism.

4.5.13 Maximum range. The maximum range test will be conducted with test ammunition conditioned at the temperature that has yielded the greatest average muzzle velocity as determined in the velocity section of the verification test. The test shall be performed with the M60 and M240B Machine Gun using a bipod or tripod. The maximum range test will be conducted in a large, flat impact area, which will afford easy location of the projectiles. The area will be cleared of all debris that may hamper test efforts. The test shall not be conducted when the wind velocity is greater than 8.05 km/h in any direction.

4.5.13.1 Weapon elevation. The weapon elevation will be varied between 15° and 45° in 5° increments until the maximum range of the projectiles is obtained. Ten rounds of the test cartridges will be fired at each elevation increment. A Weibel Tracker (Doppler radar) will be used to measure the projectile's velocity and will be positioned adjacent to the mount with the

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antenna aligned to the line of fire (LOF). The test cartridges will be fired single shot with the radar illuminating and tracking the rounds for a minimum of 5 seconds. Each projectile will be located and its position will be noted relative to the weapon. An electronic digital theodolite will be used to locate the position of the projectiles. A reflector will be placed at the spot of each projectile found and with the head of the theodolite aligned with the deflector, a laser range finder (LRF) will be used to measure the distance to the recovered projectile. The theodolite will be used to measure the azimuth of the recovered projectile relative to the weapon muzzle. Each projectile will be recovered, weighed, and measured for overall length and diameter for use in ballistic match calculations. If less than 8 rounds are found per sample, the sample shall be repeated. The mean distance plus 3 standard deviations shall be calculated for each 10-round sample. The greatest of these mean distances plus 3 standard deviations is the maximum range for the sample cartridge.

4.5.14 Sand and dust. The procedures outlined in TOP 3-2-045, Type A, shall be followed. The sand and dust mixture in the TOP shall be used with the sand and dust feeder calibrated to dispense the mixture at a rate of  $100 \pm 25$  grams per minute per square meter over the area concerned. One lubricated M60 shall be placed in a mount inside the dust chamber, along with the required ammunition. The dust dispenser shall be turned on and allowed to operate for one minute before firing. The function and casualty firing schedule for 500 rounds shall be followed. All fired cases shall be inspected for defects. The criteria shall be considered met if there are no critical defects in accordance with Table VI.

4.5.15 Salt spray (fog) exposure. The sample shall be subjected to the salt-fog test outlined in Method 509 of MIL-STD-810. After 48 hours of exposure to the 5 percent mixture, the sample shall be examined and its condition analyzed. It shall then be loaded into links. The rounds shall then be chambered and fired in the specified weapons. Failure of the rounds to safely function (critical defects in accordance with Table VI) shall be cause for rejection.

4.5.16 Temperature/humidity cycling. The temperature/-humidity cycling test shall be conducted as follows:

a. One half of the sample shall be subjected to the schedule below for a period of four days.

<u>Hours</u>	<u>Temperature °C</u>		<u>Relative Humidity (percent)</u>
2	increase to	40.6	and 90
16	maintain at	40.6	and 90
2	decrease to	21.1	and 95
4	maintain at	21.1	and 95



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b. Following the conditioning period, the conditioned cartridges shall be fired in accordance with the function and casualty firing schedule for 500 rounds with the cyclic rates measured as indicated. The same shall be repeated with the unconditioned cartridges in the exact same weapon.

c. For each weapon type, the average cyclic rate obtained with conditioned cartridges shall be statistically compared to the average cyclic rate obtained with unconditioned cartridges. The cyclic rates and their difference shall be measured and retained.

d. The estimated time required to clear all jams and stoppages shall be measured for each incident.

4.5.17 Long term high temperature storage. The long term high temperature storage test shall be conducted as follows:

a. One half the sample shall be subjected to continuous heating at  $+63^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and 15 percent relative humidity for 30 days.

b. Following the conditioning period, the conditioned cartridges shall be fired in accordance with the function and casualty firing schedule for 500 rounds with the cyclic rates measured as indicated. The same shall be repeated with the unconditioned cartridges in the same exact weapon.

c. For each weapon type, the average cyclic rate obtained with conditioned cartridges shall be compared to the average cyclic rate obtained with unconditioned cartridges. The cyclic rates and their difference shall be measured.

d. The estimated time required to clear all jams and stoppages shall be measured for each incident.

4.5.18 Long term low temperature storage. The long term low temperature storage test shall be conducted as follows:

a. One half the sample shall be subjected to continuous cooling at  $-35^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for 30 days.

b. Following the conditioning period, the conditioned cartridges shall be fired in accordance with the function and casualty firing schedule for 500 rounds with the cyclic rate measured as indicated. The same shall be repeated with the unconditioned cartridges in the exact same weapon.

c. For each weapon type, the average cyclic rate obtained with conditioned cartridges shall be statistically compared to the average cyclic rate obtained with unconditioned cartridges. The cyclic rates and their difference shall be

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measured.

d. The estimated time required to clear all jams and stoppages shall be measured for each incident.

4.5.19 Sequential rough handling. A minimum of three packaged configurations per temperature shall be subjected to the sequential rough handling tests in accordance with MIL-STD-1904. A total of 880 rounds shall be packaged in each packaged configuration in accordance with drawings 8595244 and 12960962. Prior to each test one set of packaged configurations shall be conditioned at a temperature of  $63^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and the other set shall be conditioned at  $-35^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for a minimum of 16 hours. The tests are as follows:

a. Secured cargo vibration test in accordance with paragraph 6.3.1 of MIL-STD-1904.

b. Loose cargo test in accordance with paragraph 6.13 of MIL-STD-1904.

c. The 2.13 meter drop test in accordance with paragraph 6.4 of MIL-STD-1904. If there are only two packs to be tested, then a corner drop and an edgewise drop shall be performed. Any other packs shall be subjected to the other drop orientations at the discretion of the tester.

At the conclusion of the testing, the containers shall be unpacked and the cartridges visually examined for damage. Failure of the cartridges to comply with the criteria specified in paragraph 7.3 of MIL-STD-1904 shall be cause for rejection. A random sample of 150 cartridges shall be selected from each packaged configuration and test fired to determine functioning. The rounds shall meet the requirements of paragraph 3.6.1. and 3.5.

d. The 12.2 meter drop shall be tested in accordance with paragraph 6.12.1. of MIL-STD-1904. A minimum of three untested packaged configurations shall be dropped from a height of 12.2 meters. One pack at each of the following temperatures  $63^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ,  $22^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and  $-35^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . Each pack shall be dropped in a different orientation as described in Fig 4 of MIL-STD-1904. After packaged cartridges are subjected to a 12.2 meter drop test, the cartridges shall not detonate or burn and the ammunition shall be safe to handle and dispose by the applicable handling and disposal regulations without injury to personnel. Containers and ammunition are not expected to be used for functional purposes but only safe to dispose of.

4.5.20 Toxic fumes. The toxic fume test will be conducted in general accordance with TOP 2-2-614 paragraph 5.1. Each M240B and M60 machine gun will be cleaned and lubricated prior to testing. The weapon to be fired will be placed in a test fixture

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enclosed in a sealed toxic fumes chamber. All firing will be done remotely. Each type of ammunition will be fired to obtain five valid trials from the appropriate weapon. All toxic fumes and heavy metal concentration will be analyzed to determine if concentrations have declined to an acceptable level. The test chamber will be cleaned of spent brass and vacuumed between trials. Testing will be repeated using standard ammunition for comparison. The contractor shall submit the toxic fume test results to the US Army Surgeon General for approval.

4.5.21 Match/time of flight. 100 XM973 cartridges will be tested in accordance with the procedures in TOPS 4-2-604 and 4-2-827 and ballistic results analyzed to determine the trajectory match with the service round at a range out to 100 meters. Ten XM973 Ball cartridges shall be fired from each of three 7.62mm accuracy test barrels. The accuracy test barrels will be secured to a V-block recoil mechanism mounted on a Frankford rest. The test barrels will be fired at a constant elevation between 15° and 20°. A Weibel tracker (Doppler radar) will be positioned adjacent to the mount with the antenna aligned to the line of fire (LOF). The test barrels will be fired single shot with the radar illuminating and tracking the rounds for a minimum of 5 seconds. Testing will be repeated using standard M80 Ball test cartridges.

4.5.22 Thermal shock test. This test shall be conducted in accordance with APPENDIX D.

4.5.23 Hot chamber effects (cook off). Using the M60 Machine gun and the M240B Machine gun fire 200 rounds in 40-round bursts in each weapon as quickly as possible. The last round shall be chambered but not fired. The maximum time allowed for the firing of 120 rounds shall be 2 minutes. If the round fires (cooks-off), the time shall be measured. After 25 minutes, the weapon shall be cleared by either manually ejecting or firing the cartridge. Failure to readily clear the gun shall be cause for rejection. If 120 rounds cannot be fired in 2 minutes, the weapon shall be cooled, and the test shall be repeated.

4.5.24 Attitude. The M60 and M240B Machine Guns shall be fired from a mount which allows the elevation to vary from -85° to +85°. The test shall be conducted with one weapon of each type. In each weapon, 150 rounds shall be fired at each of 3 weapon altitudes (+85°, 0°, -85°) and the firings shall take place as follows:

M60 and M240B Firing Schedule

30 Rounds	Full Auto
30 Rounds	Full Auto
30 Rounds	Single Shot
30 Rounds	Short Bursts
30 Rounds	Full Auto

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150 Rounds for each attitude

All fired cases shall be inspected, and all weapon stoppages shall be examined. The criteria shall be considered met if:

a. No critical defects occur upon firing.

b. The reliability at either +85° or -85° does not degrade by more than 10 percent from the reliability at 0° for both weapons.

4.6 Safety. Review the Material Safety Data Sheet(MSDS) submitted by the contractor. The presence of lead in the cartridge components shall cause rejection of the cartridges.

4.6.1 Final hazard classification. Compliance with the FHC requirements specified at paragraph 3.6.2.1 shall be validated during the Performance Verification Test (PVT). PVT tests shall be in accordance with TB 700-2, Department of Defense Ammunition and Explosives hazard Classification Procedures. The following UN test series as defined in TB 700-2, shall be used: 6(a) for single package test, 6(b) for stack test, 6(c) for external fire test, 4(a) for thermal stability and 4(b)(ii) for 12 meter drop test.

4.6.2 Energetic material qualification. If the selected energetic material is not currently qualified for military use, qualification tests shall be conducted in accordance with the test procedures listed below:

Test Procedures/Energetic Materials

<u>Test</u>	<u>Reference Document</u>	<u>Test Procedure Description</u>
Friction Sensitivity (Apparatus & Comparison Values)	TB 700-2	Para 5-4.b
Impact Sensitivity (Apparatus & Comparison Values)	TB 700-2	Para 5-4.a
Electrostatic Sensitivity (Apparatus & Comparison Values)	MIL-STD-1751	Chap. 5.2.3, 5.4.7 or 5.5.4
Autoignition Temperature	MIL-STD-1751	Chap. 5.3.9
Explosion Temperature (5 sec.)	MIL-STD-650	Method 506.1
Explosibility of Dusts	BOM Rpt. 5624 Page 12	Minimum Explosive Concentration

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Gap Test for Solids and Liquids	TB 700-2	Para 5-3.a
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Small Scale Burn Test	TB 700-2	Para 5-4.d
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Thermal Stability @75°C ± 1°C	TB 700-2	Para 5-4.c
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Cap sensitivity test	TB 700-2	Para 5-6.a
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4.6.3 Energetic material compatibility. Compatibility tests shall be conducted in accordance with Method 504.1.1 of MIL-STD-650 or Method 408.1.1 of MIL-STD-286. Compatibility is demonstrated when results reflect negligible reactivity.

4.6.4 Propellant stability. Propellant stability tests shall be conducted in accordance with the test procedures listed below. Stability is demonstrated when results comply with the requirements listed below.

<u>Test</u>	<u>Reference Document</u>	<u>Test Procedure Description</u>	<u>Requirement</u>
Heat	MIL-STD-286	Method 404.1.2	For Single Base Propellants - Methyl violet paper shall not change to salmon pink in less than 40 minutes, and the sample shall not explode in less than 5 hours at 134.5°C ± 1°C. For Double Base Propellants - Methyl violet paper shall not change to salmon pink in less than 40 minutes, and no fumes given in less than 1 hour at 120°C ± 1°C.
Storage Degradation/ Surveillance		Method 407.1	No fumes in less than 30 days of storage at 65.5°C ± 1°C.

4.6.5 Barrel erosion. The test shall be conducted in accordance with SCATP-7.62 and the following: Firing in any barrel shall be terminated when either the drop in average velocity of an individual burst or percentage of keyholing bullets in an individual burst exceeds the limits specified in 3.7.12.

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4.6.6 Demilitarization. One unit shall be chosen and Demilitarized to demonstrate compliance with requirements. Alternately, the contractor may submit an engineering analysis including the level and method of intended disassembly, the list and quantity of recoverable components/materials, and the destruction process, including list of methods and materials, when recycling techniques are not feasible. The analysis shall include the associated costs for the "Item's" demilitarization procedure. In addition, the analysis must verify the list of EPA designated hazardous materials if any are included in the design and evaluate the ease of disposal of non-recoverable components/materials.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DOD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

### 6.1 Intended use.

a. The development of the Short Range Training Cartridge covered by this specification will provide a substitute for service ammunition, ballistically comparable to the 7.62mm, M80 Ball ammunition at a range of 100 meters. The cartridge was developed for the U.S. Armed Forces live-fire training on scaled ranges, restricted maneuver areas and military operations on urbanized terrain scenarios.

b. The cartridge is military unique. Operational requirements mandate an environmental performance window of from  $-20^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $40^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . The cartridge must also be able to withstand storage temperatures from  $-35^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $63^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and be safe to fire after exposure to these extreme temperatures. The cartridges are packaged in military containers for use integral to the M60 and M240B machine gun systems. The packaging container becomes a part of these weapon systems. While the cartridge may be used individually by commercial sources, its intended use is in a 4 ball to 1 tracer linked configuration for

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the military.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and, if required, the specific issue of individual documents referenced (see 2.2.1)
- c. Requirements for submission of first article sample when required (see 3.1).
- d. Requirements for submission of design verification sample when required (see 3.1).
- e. Provision for submission of Inspection Equipment Designs and test equipment.
- f. Provisions for submission of acceptance inspection results for each lot of ammunition presented to the Government (see 6.7).
- g. Packaging requirements. See 5.1 and applicable contract requirements. Packaging can be done in accordance with reference packaging drawing 8595244 and 12960962.
- h. When EOD test is required (see 3.5.14, 4.2.5 and 6.5).
- i. Information needed to satisfy the requirements for qualification of energetic materials by the Army service Qualification Authority, see 6.10. This information can be obtained in the desktop guide titled Explosive Hazard Classification Requirements for Performance Specifications that is available from AMSTA-AR-QAW-S.

6.3 Contractor acceptance inspection equipment (AIE). Provisions concerning the contractor's AIE used to verify the requirements of this specification should be specified in the contract.

6.4 Data cards. Distribution of data cards will include the following: Commander, U.S. Army Armament Research, Development and Engineering Center, ATTN: AMSTA-AR-QAC-C, Picatinny Arsenal, NJ 07806-5000.

6.5 Explosive ordnance disposal (EOD). When specified in the contract or purchase order, the cartridge will undergo an EOD test, by EOD personnel in accordance with EOD procedures prescribed by Army TM 60A-1-1-31 during design verification. The contractor is to demonstrate that the cartridge with the new



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design is capable of being successfully disposed of by EOD in all field environments. This task, addressed in the contract, will require samples to be tested to EOD procedures, design information and test data. The point of contact for further information on EOD qualification can be obtained from The Commander, US Army TACOM-ARDEC, ATTN: AMSTA-AR-FSX, Picatinny Arsenal, NJ 07806-5000.

6.6 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 U.S. Army Armament, Research and Development Command (ARRADCOM), Frankford Arsenal, Rock Island Arsenal or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under cognizance of ARDEC.

#### 6.7 Definitions.

6.7.1 Interfix. A commodity made to one unchanged design which encompasses unchanged drawing(s), material(s) and specification(s), manufactured by a specific manufacturing process by a single manufacturer at a single location.

6.7.2 Reliability. For the purpose of this specification, the following measure of reliability will be used.

$$\text{reliability} = 1 - \frac{\text{number of stoppages (ammunition related)}}{\text{number of rounds fired}}$$

6.8 Submission of alternative conformance provisions. All contractor proposed alternative conformance provisions will be submitted to the Government for evaluation/approval as directed by the contracting activity.

6.9 Inspections to be performed. Lot testing requirements, if necessary, for explosive materials unique to the cartridge will be provided by the ARDEC Safety Office through the contracting agency prior to contract award.

6.10 Energetic material qualification information. Qualification of energetic materials by the Army Service Qualification Authority requires the contractor to demonstrate that the energetic material meets the requirements of MIL-STD-1751 or STANAG 4170. This task is addressed in the statement of work in the contract. Points of contact for the Army Service Qualification Authority can be obtained from AMSTA-AR-QAW-S.

#### 6.11 Subject term (key word) listing.

Bullet  
Function and Casualty

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Small Arms  
Testing

6.12 Demilitarization instruction to Contracting Officer.  
The POC for this requirement is AMSTA-AR-WEA. If the contractor chooses to demil a sample, arrangements must be made to conduct the demonstration at a Government facility. The contract should include the following language. "To assure that new items are designed for demilitarization and to assure that the Government obtains the necessary data for MIDAS, it is recommended that the Contractor obtain and make reference to the joint service regulation AMC-R 75-2/NAVSEAINST8027.2/AFLCR136-5 "DEMILITARIZATION/DISPOSITION REQUIREMENTS RELATING TO THE DESIGN OF NEW OR MODIFICATION OF AMMUNITION ITEMS." This regulation captures the essence of "design for demil."

6.13 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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APPENDIX A

Residual Stress Test Procedure

A10.0 SCOPE

A10.1 Scope. This appendix gives test procedure for performing the residual stress test.

A20.0 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

A30.0 PURPOSE

A30.1 Purpose. The residual stress test is performed to determine if the residual stress in polyethylene cases is great enough to cause splits or cracks in service or during long term storage.

A40.0 EQUIPMENT

A40.1 Equipment. The Government prior to testing (see 6.2) shall approve equipment used in this test.

A40.2 Material. Detergent, Nonylphenoxy Poly, (Ethyleneoxy) Ethanol is required for this test.

A40.3 Test samples. Test samples shall consist of complete sets of the quantity of parts specified with the exception of propellant and primer (inert cartridge). Process the components on the production line and assemble to meet all final assembly dimensional requirements.

A40.4 Safety requirements. Heat resistant gloves shall be worn when handling heated test samples and trays.

A50.0 TEST PROCEDURES

A50.1 Test procedures. The following test procedure shall be followed:

a. Immerse the test samples in the detergent. Seal the detergent coated samples in a polyethylene bag to minimize evaporation and place them in an aluminum tray. Place the tray with the sealed bags of test samples in an oven set at  $68^{\circ}\text{C} \pm 1^{\circ}\text{C}$  to  $74^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for seven days.

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b. After seven days, remove the tray from the oven and cool for one hour. Rinse the inert test samples in running water to remove the detergent. Dry with clean rags or paper towels. Coat the surfaces with machinist's dye and wipe with rags or towels, removing all excess dye from the surfaces.

c. Examine the surfaces for cracks, splits and crazing using a 7-power eye loop or magnifying glass.

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APPENDIX B

Chemical Compatibility Test Procedure

B10.0 SCOPE

B10.1 Scope. This appendix gives test procedures for performing the Chemical Compatibility Test.

B20.0 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

B30.0 PURPOSE

B30.1 Purpose. To determine the durability of cartridges when brought into contact with various lubricants, cleaners and solvents used or available for use, in weapon and military vehicle maintenance.

B40.0 EQUIPMENT

B40.1 Equipment. The Government prior to testing (see 6.2) shall approve equipment used in this test.

B40.2 Weapons. Weapons shall conform to the dimensions shown on the applicable drawings.

B40.3 Lubricants. The lubricants, solvents and chemicals to be used are as indicated in Section 3 and 4.

B50.0 TEST PROCEDURES

B50.1 Pre-firing. The following procedure shall be followed:

- a. The weapon shall be assembled in the test fixture.
- b. One thousand cartridges shall be divided equally among the required chemicals. The cartridges shall be immersed in the assigned chemical for one hour at a depth of 2.54 cm above the case rim with the cartridge laid horizontally to the chemical. After one hour, the cartridges are removed, set base down in a storage rack and allowed to drain naturally for 24 hours.

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## APPENDIX B (continued)

c. After the 24-hour dripping period, the cartridges shall be wiped of the assigned chemical, and inspected for abnormalities.

B50.2 Firing. The following procedure shall be followed:

a. Each cartridge shall be fired as designated from each gun and observed for functioning. The firing sequence in each weapon shall be as follows: 100 rounds of control ammunition (unexposed to the chemicals) shall be fired in short bursts. The weapon shall be cleaned and 100 rounds of ammunition from the first test condition shall then be fired in short bursts. The fired cases shall be inspected, and all ammunition related stoppages recorded. The weapon shall be cleaned and the firing sequence repeated for the next test condition. If functioning problems are encountered with any of the test conditions, the weapon shall be inspected and cleaned and an additional 100 control rounds fired before the test continues. The sequence shall be repeated until all test conditions are fired.

B50.3 Criteria. The criteria will be considered met if no critical defects are observed, and if the Reliability (see 6.7.2) of the test cartridges does not degrade by more than 10 percent from the control firings for each individual test chemical.

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APPENDIX C

Noise Level Test Procedure

C10.0 SCOPE

C10.1 Scope. This appendix gives test procedures for performing the Noise Level Test.

C20.0 APPLICABLE DOCUMENTS

TOP 1-2-608 - Sound Level Measurements, 17 July 1981

C30.0 PURPOSE

C30.1 Purpose. To determine the impulse noise levels produced by test ammunition when fired from various service weapons.

C40.0 EQUIPMENT

C40.1 Equipment. The Government (see 6.2) prior to testing shall approve equipment used in this test.

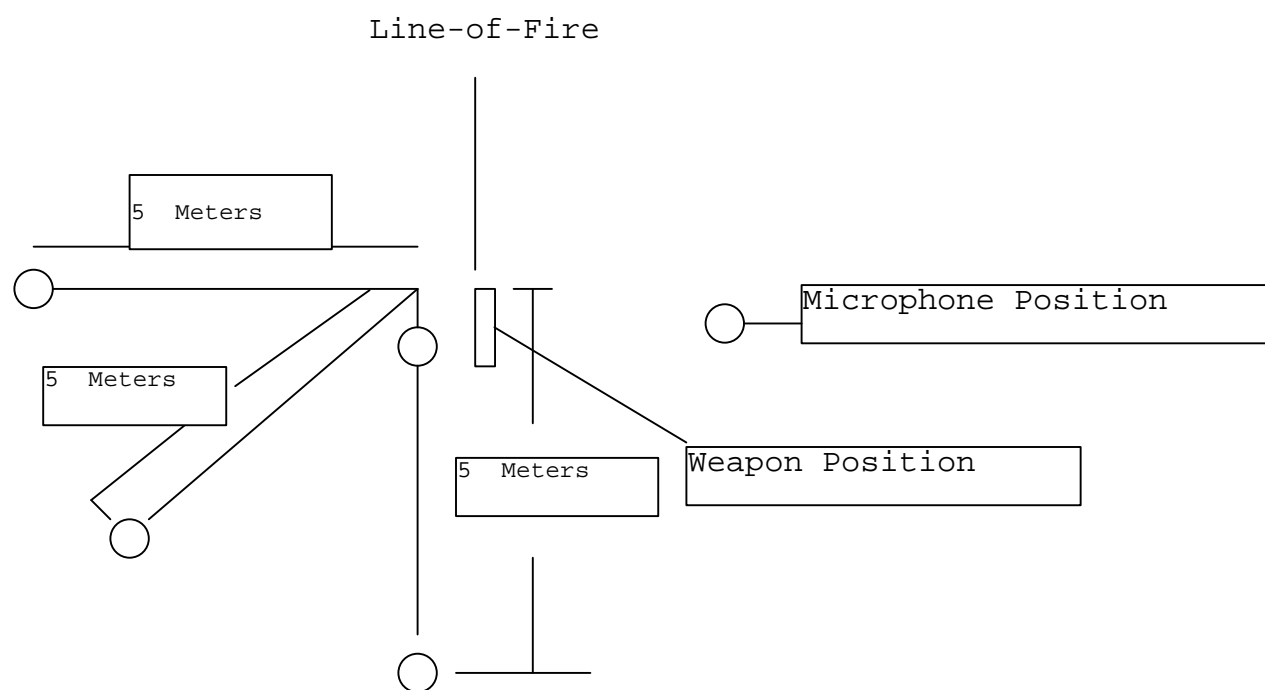
C40.2 Weapons. Weapons shall conform to the dimensions shown on the applicable drawings.

C50.0 TEST PROCEDURES

C50.1 Pre-firing (preparation for test). The Noise test will be conducted in accordance with TOP 1-2-608 paragraph 4.2. Testing will be conducted in an area free of any sound-reflecting surfaces within 15 meters.

C50.2 M60 and M240B Machine Guns. Testing will be conducted from one weapon of each type. For all test firings, the shooter will fire from the prone position from the shoulder. Three microphones will be placed as shown in Figure 1 and simultaneous analysis of impulse noise levels will be made at the three locations. In addition evaluation of the impulse noise levels will be made at the shooter's ear (left ear, weapon fired right-handed). With the exception of the shooter's ear position, all distances are from the weapon's muzzle. Five single shots of test ammunition and five rounds of standard M80 Ball ammunition will be fired single shot.

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**Figure 1. Microphone Locations for the Noise Test**



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## APPENDIX D

## Thermal Shock Test Procedure

D10.0 SCOPE

D10.1 Scope. This appendix gives test procedures for performing the thermal shock test.

D20.0 APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

D30.0 PURPOSE

D30.1 Purpose. To determine if the short range training ammunition will function safely and reliably after experiencing thermal shock.

D40.0 EQUIPMENT

D40.1 Equipment. The Government prior to testing (see 6.2) shall approve the equipment used in this test.

D40.2 Weapons. The weapons used shall be M60 and M240B Machine guns.

D50.0 TEST PROCEDURES

a. The thermal shock test shall be conducted in accordance with MIL-STD-810, test method 503.3.

b. Four hundred short-range training cartridges of each type (ball and tracer) shall be subjected to thermal shock. The test samples shall be placed inside an environmental chamber set at  $-55^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for initiation of thermal shock test sequence.

At the completion of the first 4 hour cycle, the cartridges shall be transferred to a high temperature chamber set at  $68^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for a 4 hour cycle. This process shall be repeated until 6 cycles (48 hours of exposure) are completed. The cartridges shall be visually inspected for any signs of deterioration. The cartridges shall then be stored under standard room temperature  $21^{\circ}\text{C} \pm 1^{\circ}\text{C}$  for 48 hours.

c. At the conclusion of the 48 hours storage, the sample cartridges shall be visually inspected for evidence of corrosion. The test cartridges shall then be function fired from both the M60 and M240B machine guns.

Custodian  
Army-AR

Preparing activity:  
Army-AR

(Project 1305-0212)

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced documents(s) or to amend contractual requirements.

<b>I RECOMMEND A CHANGE:</b>	1. DOCUMENT NUMBER <b>MIL-PRF-71167A</b>	2. DOCUMENT DATE (YYYYMMDD) <b>14 APRIL 2000</b>
DOCUMENT TITLE <b>CARTRIDGE, 7.62MM, XM973 BALL SHORT RANGE TRAINING AMMUNITION</b>		
4. NATURE OF CHANGE ( <i>Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.</i> )		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME ( <i>Last, First, Middle Initial</i> )	b. ORGANIZATION	
c. ADDRESS ( <i>Include Zip Code</i> )	d. TELEPHONE ( <i>Include Area Code</i> ) (1) Commercial (2) DSN ( <i>if applicable</i> )	7. DATE SUBMITTED (YYYYMMDD)
8. PREPARING ACTIVITY		
a. NAME <b>U.S. Army TACOM-ARDEC Standardization Team</b>	b. TELEPHONE ( <i>Include Area Code</i> ) (1) Commercial (973) 724-5822 (2) DSN 880-5822	
c. ADDRESS ( <i>Include Zip Code</i> ) <b>Attn; AMSTA-AR-QAW-E Picatinny Arsenal, NJ 07806-5000</b>	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	