

INCH-POUND

MIL-M-45013E
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SUPERSEDING
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MILITARY SPECIFICATION

MACHINE GUN, 7.62MM: M60

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

1. SCOPE

1.1 This specification covers the requirements, examinations and tests for one type of 7.62mm, gas operated, air cooled, link belt fed, lightweight machine gun furnished with one spare interchangeable barrel assembly with bipod assembly (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification 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 ARDEC, ATTN: SMCAR-BAC-S, 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.

AMSC N/A

FSC 1005

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SPECIFICATIONS

MILITARY

MIL-P-116	-	Preservation, Methods of
MIL-I-8754	-	Inhibitors, Corrosion, Volatile, Utilization of
MIL-W-13855	-	Weapons, Small Arms and Aircraft Armament Subsystems, General Specification for
MIL-I-45607	-	Inspection Equipment, Acquisition, Maintenance and Disposition of
MIL-L-45403	-	Link, Cartridge, Metallic Belt, 7.62mm, M13
MIL-L-46000	-	Lubricant, Semi-Fluid (Automatic Weapons)
MIL-C-46477	-	Cartridge, 7.62mm, Nato, Test, High Pressure, M60
MIL-C-46931	-	Cartridge, 7.62mm, Nato, Ball, M80
MIL-B-60107	-	Bandoleer, M4
MIL-D-60573	-	Dummy Cartridge, 7.62mm, M172, Inert Loaded
MIL-W-63150	-	Weapons and Support Material, Standard Quality Assurance Provisions for
MIL-A-70625	-	Automated Acceptance Inspection Equipment Design, Testing and Approval of

STANDARDS

MILITARY

MIL-STD-109	-	Quality Assurance Terms and Definitions
MS 24665-18	-	Pin, Cotter (Split)
MS 39086-81	-	Pin, Sprint-Tubular, Coiled, Heavy Duty
MS 51923-105	-	Pin, Spring-Tubular, Coiled, Standard Duty.

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

2.1.2 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

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

PRODUCT DRAWINGS

7269100 - Machine Gun, 7.62mm: M60

(part drawings referenced in this specification form a part
of drawing 7269100.)

INSPECTION EQUIPMENT DRAWINGS

7273907	Fixture, Targeting and Accuracy
7273911	Specification, Belt Clearance Requirements
7273920	Gage, Timer, Firing Cycle
7273925	Fixture, Fire, Proof, Function and Endurance
7274136	Instruction Sheet for Measuring Headspace
7274295	Gage, Flush Pin
7274381	Gage, Fixture, Holding
7274459	Gage, Indicator
7274515	Fixture, Holding
7318984	Gage. Indicator
7796424	Gage, Weighing
8440920	Cylinder, Pressure

PACKAGING DATA SHEET

8413999 Packaging Data Sheet for Machine Gun,
7.6mm: M60, with Equipment

PUBLICATIONS

U.S. ARMY

TM-9-1005-224-24P - Organizational, Direct Support,
and General Support Maintenance
Manual for Machine Gun, 7.62mm:
M60 w/e (1005-00-605-7710);
Mount, Tripod, Machine Gun,
7.62mm, M122 (1005-00-710-5599);
and Machine Gun, 7.62mm, M60D w/e
(1005-00-909-3002}

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(Copies of other Government documents, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained. (See contract provisions for additional precedence criteria.)

3. REQUIREMENTS

3.1 First article. Requirements for submission of a first article by the contractor shall be as specified in the contract (see 6.2). Unless otherwise specified (see 6.2) the first article shall include the pilot pack (see 5.1).

3.2 Material and construction. Machine guns and parts shall conform to the materials and construction requirements specified herein, on Drawing (dwg) 7269100 and drawings applicable thereto, and shall be in accordance with the applicable materials and construction processes of MIL-W-13855.

3.3 Design. Machine guns and parts shall conform to the design specified herein, on dwg 7269100 and drawings applicable thereto, and shall be in accordance with the applicable design provisions of MIL-W-13855

3.3.1 Barrel assembly with biped assembly (7269027). The barrel assembly with biped assembly shall be capable of being manually assembled to and disassembled from the receiver assembly (11686308) When the barrel lock (11010184) is in the vertical position and when the bolt assembly (11010357) is fully retracted. The barrel assembly with biped assembly shall be so fabricated that when the machine gun is completely assembled, the requirements for targeting and accuracy (3.4.6) shall be met.

3.3.1.1 Barrel assembly (7269028), The barrel assembly shall be free of cracks and seams and the bore and chamber shall be free of pits. The chromium plating shall be free of nodules, flaking, stripping, anode bums and evidence of etched base steel. No mechanical methods for removal of chromium plating are permitted in the tube bore. Burrs and sharp edges shall be removed from chamber edges and scratches or marks, occurring in a chamber which otherwise meets the surface roughness requirements,

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shall be permitted provided they do not cause marks on the case of a M60 High Pressure Test Cartridge (MIL-C-46477) fired in the chamber. The barrel assembly shall be proof and magnetic particle inspection marked in accordance with dwg 7269028.

- a. Tube assembly (7269042). The tube assembly shall be proof, magnetic particle inspection and manufacturing identification marked in accordance with dwg 7269042.
- b. Gas cylinder (7269036). The gas cylinder shall be fastened securely on the tube assembly (7269042) by the gas cylinder rivets (7269039) so that there shall be no relative movement. With the barrel assembly with bipod assembly (7269027) disassembled from the receiver assembly (11686308), the gas piston (7791247) shall move of its own weight through its full range of travel in the gas cylinder.
- c. Front sight (7269040). The front sight shall be fastened securely on the tube assembly (7269042) by the front sight rivets (7269038) so that there shall be no relative movement.
- d. Socket (7269041). The socket shall be assembled to the tube assembly to meet headspace requirements, and torqued to the requirement of dwg 7269028. The socket shall be locked in position with a key (7269037) which is staked in two places. The manufacturer's material and heat treatment lot numbering shall be visible on the socket.

3.3.1.2 Bipod assembly (7793009). The bipod assembly shall be retained on the barrel assembly (7269028) by the flash suppressor (7269034) and when assembled shall be capable, by its own weight, of rotating on the tube assembly (7269042) between its stop positions. The leg assemblies (7269046 and 7269047) shall lock in place in the open or folded positions and shall be capable of being manually released from each position by a pull action within the load limits specified on dwg. 7793009. The foot assemblies (7269055 and 7269061) shall be capable of being manually released from each position by a pull action within the load limits specified on drawings 7269046 and 7269047 respectively and shall lock under spring action of the retainer spring (7269059) in any of the five locking positions. The foot assemblies shall not retract from any locked position unless the retainer springs are manually depressed.

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3.3.1.3 Flash suppressor (7269034). The flash suppressor shall be fastened securely to the barrel assembly (7269028) by the staked pin (12599983) so that there shall be no relative movement.

3.3.1.4 Gas cylinder extension (7269030), nut (7269031) and plug assembly (9362515). The gas cylinder extension and nut shall be assembled securely to the gas cylinder (7269036) so that there shall be no relative movement and shall be retained by the lock washers (7269035). The gas cylinder plug assembly shall be assembled to the gas cylinder and shall be retained by the captive lock washer (9362513).

3.3.2 Rear sight assembly (77914371). The rear sight base assembly (7269278) shall be staked securely to the dovetail recess of the receiver assembly (11686308), after targeting and accuracy firing test, so that there shall be no relative movement of the rear sight base assembly. The rear sight leaf assembly (7269279) shall move manually between the horizontal and vertical positions and shall be held in the vertical position under spring action until manually changed. When the elevation release assembly (7269292) is depressed the aperture slide (7269289) shall move without binding in the leaf (7269290) and when the elevation release assembly is released the aperture slide shall be held in position under spring action. The elevation adjustment knob (7269291) and windage adjustment screw (7269281) shall turn manually through their full range of travel and shall produce position retention perceptible by touch for each detent notch when the rear sight assembly is adjusted. When the elevation adjustment knob is rotated, the aperture slide shall not cant.

3.3.3 Barrel lock (110101841). When in the locked position, the barrel lock shall be capable of being manually unlocked by the application of finger pressure to the barrel lock retaining ring (11010377) so that the barrel lock is moved through its full range of travel to the right. When unlocked, the barrel lock shall be capable of being pivoted manually between the closed (horizontal) and open (vertical) positions. It shall be held in the open position by spring action permitting the barrel assembly with biped assembly (7269027) to be assembled to or disassembled from the receiver assembly (11686308). When the barrel lock is returned to the closed position it shall lock under spring action. When in the closed position, the barrel lock shall be capable of retaining the barrel assembly with biped assembly in the receiver assembly.

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3.3.4 Bolt assembly (11010357). With the cover assembly (7269114) opened and the bolt assembly disengaged from the operating rod yoke (9362509), the bolt assembly shall move of its own weight through its full range of travel in the slideways of the receiver assembly (11686308). Firing pin postrusion shall be as specified on dwg 11010357. The bolt assembly shall be proof and magnetic particle inspection marked in accordance with dwg 11010358.

3.3.4.1 Cam actuator assembly (7269063). The cam actuator assembly shall be retained on the bolt assembly (11919357) by the bolt plug assembly (9362505) and shall rotate without binding on the bolt assembly (9362505) and shall rotate without binding. on the bolt assembly. The bolt guide roller (7269091) and the cam actuator roller (7269090) shall be retained on the cam actuator assembly by the roller rivet (7269089) and shall rotate without binding on the cam actuator assembly.

3.3.4.2 Ejector (11010375). The ejector shall be retained in the bolt (11010358) by the spring Pin (MS 39086-81) and shall be held in the forward position by spring action. the ejector shall move through its full range of travel under spring action without binding.

3.3.4.3 Extractor (7790907). The extractor shall be retained din the bolt (11010358) by the extractor plunger (7269083) and spring (7269086). The extractor shall move through its full range of travel under spring action without binding.

3.3.4.4 Firing pin (11010376). The firing pin shall move through its full range of travel in the bolt (11010358) under spring action without binding.

3.3.5 Buffer assembly (11010518). The buffer assembly shall be retained in the receiver assembly (11686308) by the buffer retaining yoke (11699786). The buffer retaining yoke and the buffer assembly shall disassemble from the receiver assembly without the use of tools. The plunger (11010541) shall be capable of being moved through its full range of travel in the buffer body (11010543) and shall return to its original position by spring action after partial or full travel.

3.3.6 Butt Stock assembly (11686711). The but stock assembly shall be retained on the receiver assembly (11686308) by the buffer assembly (11010518) under spring action of the latch (7269313). The butt stock assembly shall disassemble from the receiver assembly when the latch is depressed using a tool simulating the bullet nose of a cartridge and shall manually reassemble to the receiver assembly without the use of tools.

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3.3.6.1 Sholder rest assembly (7269309). The shoulder rest assembly shall not move manually between the open and closed positions and shall be retained in either position by spring action.

3.3.6.2 Sling swivel assembly (7269089). The sling swivel assembly shall be fastened to the buttstock frame assembly (7269305) by the screws (11010365) so that there shall be no relative movement except that the swivel loop (7269037) shall rotate without binding.

3.3.7 Carrying handle assembly (7269231). The carrying handle assembly shall be retained on the receiver assembly (1168308) by the ring (11010377) and spring pin (MS39086-81). The carrying handle assembly shall be held in the side position or in the carrying position by spring action and shall move manually from one position to the other.

3.3.8 Tray and hanger assembly (8448237). The tray and hanger assembly shall be retained on the receiver assembly (11686308) by the cover hinge pin (7269247).

3.3.8.1 Cartridge retainer pawl (7269332). The cartridge retainer pawl shall be retained in the frame assembly (7792097) by the saft (7790724). The cartridge retainer pawl shall be held normally in position by the spring (7269335) and shall be returned to the original position by spring action after partial or full travel. The pawl shall move through its full range of travel under spring action without binding and shall retain the linked cartridges in the feed mechanism.

3.3.8.2 Bandoleer hanger assembly (8448414). The bandoleer hanger assembly shall be retained in the frame assembly (7792097) by the Shaft (7790724) and shall rotate without binding on the shaft and the M4 Bandoleer shall mount on the bandoleer hanger without the use of tools and be securely retained.

3.3.9 Cocking handle assembly (7791621) and cocking handle guide (11010155). The cocking handle assembly shall be retained on the receiver assembly (11686308) by the cocking handle guide and shall move without binding through its full range of travel in the slideways of the receiver assembly. The cocking handle assembly shall be held in the forward stop position by the spring action of the retaining latch (7269243). When retracted, the cocking handle assembly shall engage the operating rod assembly (11686309) and shall retract the operating rod assembly and the bolt assembly (11010357). The cocking handle guide shall be fastened securely to the receiver assembly by the screw with lock washer (7790559) so that there shall be no relative movement.

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3.3.10 cover assembly (7269114). The cover assembly shall be retained on the receiver assembly (11686308) by the cover hinge pin (7269247). The cover assembly shall be capable of being locked in the closed position by the latch (7269136) only when the bolt assembly (11010357) is fully retracted. The cover assembly shall open when the latch is released, and shall be retained in the fully open position by spring action. All welded, riveted and brazed parts shall be tight, undamaged and without relative movement.

3.3.10.1 Latch lever assembly (7269137). the latch lever assembly shall rotate manually to disengage the cover assembly (7269114) from the receiver assembly (11686308) and shall be returned to the stop position by spring action after partial or full travel. The latch lever assembly shall rotate the cover latch to lock and unlock the cover assembly.

3.3.10.2 Cartridge guides (7269116 and 7269117). The cartridge guides shall be retained in the cover housing assembly (7269118) by the cartridge guide shaft (11010152) and cotter Pin (MS24665-18). The cartridge guides shall operate through their full range of travel under spring action without binding and shall be so positioned as to properly guide cartridges into the chamber.

3.3.10.3 Feed cam assembly (11699814). The feed cam assembly shall be retained in the cover housing assembly (7269118) by the feed cam retainer (7269124) and shall move through its full range of travel under spring action without binding. The feed cam assembly shall return to its stop position by spring action after partial or full travel. Movement of the feed cam assembly shall operate the feed pawl assembly (7269120).

3.3.10.4 Feed pawl assembly (7269120). The feed pawl assembly shall be retained in the cover housing assembly (7269118) by the chassis assembly (7269149) and when disengaged from the feed level assembly (7269119) shall move of its own weight through its full range of travel. The feed pawl assembly shall be capable of feeding linked cartridges into the feed mechanism.

3.3.11 Forearm assembly (11010430). The forearm assembly shall be retained on the receiver assembly (11686308) by the spring catch (7269180). The forearm assembly shall disassemble from the receiver assembly when the spring catch is depressed using a tool simulating the bullet nose of a cartridge when the barrel assembly with biped assembly (7269027) is removed from the

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machine gun. The sling swivel assembly (7269089) shall be fastened to the forearm assembly by the screws (11010365) so that there shall be no relative movement except that the swivel loop (7269037) shall rotate without binding.

3.3.12 Operating rod assembly (9362510).

3.3.12.1. Operational rod assembly with bolt assembly,. With the cover assembly (7269114) opened, the driving spring (9362511) and driving spring guide (9362512) disassembled from the operating rod assembly and the sear (7269209) disengaged, the operating rod assembly, together with the bolt assembly (11010357) shall slide from the open to closed position by its own weight.

3.3.12.2 Operating rod assembly with receiver assembly. The operating rod assembly shall manually assemble to and disassemble from the slideways of the receiver assembly (11686308). The yoke (9362509) and head (7791596) shall be retained on the tube (7259274) by staked rivets (7269272 and 7269271) respectively) so that there shall be no relative movement of these parts. roller (9362506) shall be retained on the yoke by the yoke roller pin (9362507) and shall rotate without binding. The yoke roller pin shall be retained securely by the spring pin (MS51923-105). With the trigger assembly (7269212) released and the operating rod assembly retracted into the cocked position, the sear engagement notch (primary and secondary, each individually) on the operating rod shall be engaged by the sear (7269209) and the operating rod assembly shall be held in the cocked position (both by primary and secondary sear notches, each individually until the trigger assembly is pulled.

3.3.13 Receiver assembly (11686308). The slideways of the receiver assembly shall be smooth and free of burrs. The rear mounting pin (7792975) shall be retained on the receiver assembly by the staked pins (7792971). All riveted parts shall be tight, undamaged and without relative movement. Pin (7792976) shall withstand the minimum force as specified in dwg. 7269100.

3.3.14 Trigger mechanism grip assembly (7269202). The trigger mechanism grip assembly shall be retained on the receiver assembly (11686308) by the retaining pin (7269205) and shall disassemble from the receiver assembly without the use of tools. The retaining pin shall be locked in place by the lock spring (7792398). Use of a tool will be permitted, when required to assist in disassembly of the spring lock.

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3.3.14.1 Safety (7269415) the safety shall move manually between the safe and fire positions, and shall remain in the position set under spring action until reset manually. The firing mechanism shall operate when the safety is positioned at the letter "F" and shall not operate when the safety is positioned at the letter "S".

3.3.14.2 Sear (7269209). The sear shall be capable of full engagement with the sear engagement notch on the operating rod assembly (9362510) and capable of holding the operating rod assembly in a cocked position. When the safety (7269415) is in the firing position and the trigger assembly (7269212) is pulled, the sear shall disengage from the sear engagement notch (primary and secondary, each individually) on the operating rod assembly allowing the operating rod assembly to move forward under spring action. When the trigger assembly (7269212) is released, the sear shall return to the engaging position by spring action of the sear plunger (7269207).

3.3.14.3 Trigger assembly (7269212). The trigger shall return to its normal forward position under spring action after partial or complete trigger pull.

3.4 Performance characteristics.

3.4.1 Headspace. The headspace in the assembled machine gun (see dwg 7269100) shall not be less than 1.6315 inch and not more than 1.6365 inch when measured to the 0.400 diameter datum on the first shoulder of the chamber (see dwg 7269028). Testing shall be as specified in 4.4.3.1.

3.4.2 Firing pin indent. The firing pin indent shall be 0.030 inch minimum and shall not be off center more than one-half the diameter of the firing pin indent (see 7269100). Testing shall be as specified in 4.4.3.2.

3.4.3 Trigger pull. The trigger pull (see 7269100) shall be free of creep and shall be greater than 6 pounds but shall not exceed 11.5 pounds. Creep shall be interpreted to mean any perceptible rough movement between the time the trigger slack is taken up and the sear is disengaged from the operating rod. Testing shall be as specified in 4.4.3.2.

3.4.4 High pressure resistance. Every barrel assembly with bipod assembly, 7269028 and bolt, 11010358 supplied as a repair part, spare part or as an end item's component shall be subjected to a high pressure resistance tests as specified on their respective drawings. Each of these components shall be capable

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of withstanding the firing of one standard 7.62mm M60 High Pressure Test Cartridges (MIL-C-46477). After firing, all components proof tested shall be free of cracks, seams, and defects. Testing shall be as specified in 4.4.3.3.

3.4.5 Functioning. The machine gun shall operate with Government standard 7.62mm, M80 Ball Cartridges (MIL-C-46931); 7.62mm, M13 Links (MIL-L-45403) and M4 Bandoleer (MIL-B-60107) without malfunctions or unserviceable parts and the cyclic rate of fire shall be within 500 to 650 rounds per minute. Testing shall be as specified in 4.4.3.3.

3.4.6 Targeting and accuracy. Using government standard 7.62mm, M80 Ball Cartridges (MIL-C-46931) and 7.62mm, M13 Links (MIL-L-45403), nine rounds of a 10 round burst fired from the machine gun at a range of 100 yards shall be within the extreme spread and targeting area specified on dwg 7269214. Testing shall be as specified in 4.4.3.3.

3.4.7 Interchangeability. Unless otherwise specified on the drawings, all parts shall be interchangeable. Testing shall be as specified in 4.4.3.4.

3.4.8 Endurance. Machine guns shall be capable of firing 10,000 rounds of standard government 7.62mm, M80 Ball Cartridges (MIL-C-46931) linked with M13 Links (MIL-L-45403) without incurring more than three immediately clearable malfunctions and the cyclic rate of fire shall be within the limits specified in 3,4,5. No unserviceable parts, or uncontrolled fire are allowed. No malfunctions which require disassembly of the machine gun or in excess of one minute to correct are allowed. Malfunctions not attributable to the machine gun, as substantiated by a contractor failure analysis and acceptable to the Government, shall be reported and shall not be chargeable. A malfunction is defined as any unplanned cessation of firing or the inability to commence firing. Testing shall be as specified in 4.4.3.5.

3.4.9 Reliability. The machine gun shall demonstrate a Mean Round Between Stoppage (MRBS) of 1538 rounds and a Mean Round Between Failure (MRBF) of 4444 rounds over a minimum receiver service life of 50,000 rounds. Barrel life shall be 15,000 rounds minimum. Testing shall be in accordance with 4.4.3.6.

3.4.9.1 Mean round between stoppage. MRBS is determined by dividing the total number of rounds fired by the total number of stoppages. A stoppage is defined as any unplanned cessation in firing or the inability to commence or cease firing attributable to the gun. All incidents shall be recorded and any considered as not chargeable to the machine gun shall be substantiated by the contractor.

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3.4.9.2 Mean round between failure. MRBF is determined by dividing the total number of rounds fired by the total number of failures. A failure is defined as any stoppage (as described in 3.4.9.1) which involves part replacement or requires in excess of one minute to correct; or involve any unserviceable part detected during scheduled preventive maintenance, the replacement of which is not authorized at the crew or organizational level of maintenance as prescribed by Source Maintenance Recoverability Code and TM-9-1005-224-24P. NOTE: MRBF is a subset of MRBS). Only parts determined unserviceable may be replaced. Simultaneous replacement of unserviceable parts is treated as one changeable failure. Incidents attributable to personnel, test equipment, or unserviceable parts found at the conclusion of testing are not chargeable. However, all parts replacement, whether chargeable or not shall be recorded.

3.4.9.3 Unservicable barrel. A barrel is considered unserviceable when: a) 20 percent of any burst exhibits yaw of 15 degrees or more or, b) a mean velocity of a burst drops 200 feet per second below the mean of the velocity initially recorded at the start of the test. Barrels failing to meet the minimum life criteria shall be considered failures for the MRBS/MRBF computations. Testing for barrel life shall be in accordance with 4.4.3.6.

3.5 Marking. Marking shall be in accordance with the applicable drawings and MIL-W-13855. The bar code label shall be firmly affixed to the weapon receiver. The bar coding shall be clearly defined on the label and shall agree with the serial number stamped on the receiver.

3.6 Workmanship. Workmanship shall be in accordance with the workmanship requirements of MIL-W-63150. Inspection shall be as specified in 4.4.2.

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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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4.1.1 Responsibility for compliance. All items shall 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 ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 General provision. Unless otherwise specified herein, the provisions of MIL-W-63150 apply and form a part of this specification. Reference shall be made to MIL-STD-109 to define quality assurance terms used herein.

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

- a. First article inspection (see 4.3) .
- b. Quality conformance inspection (see 4.4).

4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.3.2. The first article sample shall be representative of the production processes to be used during quantity production. Unless otherwise specified, the pilot pack (see 5.1) shall include all the examinations and tests of MIL-P-116 including the comparability requirements of MIL-I-8754.

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 detail specification and be inspected for compliance with any or all requirements of the applicable drawings.

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4.3.3 Rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure of an assembly, component or test specimen to comply with any of the requirements.

4.4 Quality conformance inspection

4.4.1 Inspection lot formation. The term "inspection lot" is defined as a homogeneous collection of units of product from which a representative sample is drawn or which is inspected 100 percent to determine conformance with applicable requirements. Units of product selected for inspection shall represent only the inspection lot from which they are drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the inspection lot has been produced by one manufacturer, in one unchanged process, using the same materials and methods, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. All material submitted for inspection in accordance with this specification shall comply with the homogeneity criteria specified herein, regardless of the type of inspection procedure which is being applied to determine conformance with requirements.

4.4.1.1 Machine guns. The number of machine guns in an inspection lot shall be either 200 or one month's production, whichever is smaller. Machine guns shall be assembled from lots of component parts that have met all inspection requirements specified herein. Endurance test and interchangeability test lot sizes shall be as specified in 4.4.3.5.1 and 4.4.3.4.1.1 respectively.

4.4.2 Examinations and test

- a. Classification of characteristics. Quality conformance examinations and tests are specified in the following paragraphs. The contractor's quality program or detailed inspection system shall provide assurance of compliance of all characteristics with the applicable drawing and specification requirements utilizing as a minimum the conformance criteria specified.
- b. Alternative quality conformance provisions. Unless otherwise specified herein or provided for in the contract, alternative quality conformance procedures, methods or equipment, such as statistical process

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control, tool control, other types of sampling plans, etc., may be used by the contractor when they provide, as a minimum, the level of quality assurance required by the provisions herein. Prior to applying such alternative procedures, methods or equipment, the contractor shall describe them in a written proposal submitted to the Government for evaluation (see 6.13). When required, the contractor shall demonstrate that the effectiveness of each proposed alternative is equal to or better than the specified quality conformance provisions(s) herein. In case of dispute as to whether the contractor's proposed alternative(s) provides equivalent assurance, the provisions of this specification shall apply. All approved alternative provisions shall be specifically incorporated into the contractor's quality program or inspection system, as applicable.

4.4.2.1 Component parts and concurrent repair parts. Examination of parts shall be performed in accordance with the criteria specified in the contract (see 6.2). The contractor's examination of parts shall be accomplished prior to their assembly into the end item or submission for acceptance as repair parts.

4.4.2.2 Machine guns. Final examination of machine guns shall be performed after completion of all testing and just prior to preservation and packaging. Each machine gun shall be examined as specified below. Unless otherwise specified, all requirements for examination are classified as Major. Each step in the examination shall include a visual examination for proper cleaning and presence of the specified protective coating. Machine guns failing to meet the requirements shall be rejected.

4.4.2.2.1 Visual and manual examination. Visually examine machine gun for cleanliness, workmanship, and completeness of manufacturing, assembly, finish, and marking (identification, bar code marking, proof firing, and magnetic particle inspection). Manually examine the machine gun for functioning of operating parts and visually examine markings for clarity and legibility. (see 3.2 through 3.3.14.3, 3.4, 3.5 and 3.6).

4.4.2.2.2 Butt stock assembly.

- a. Manually examine butt stock assembly for compliance with 3.3.6.
- b. Disassemble butt stock assembly from the receiver.

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- c. Manually examine shoulder rest assembly for compliance with 3.3.6.1.
- d. Manually examine sling swivel assembly for compliance with 3.3.6.2.

4.4.2.2.3 Buffer assembly.

- a. Manually examine for secure retention of buffer assembly in receiver.
- b. Disassemble buffer assembly from receiver by pushing forward and removing buffer retaining yoke. Manually examine to assure that yoke disassembles from receiver freely.
- c. Examine spring action of buffer assembly for compliance with 3.3.5.
- d. visually examine buffer assembly to assure freedom from burrs, cracks, defamations and leakage of hydraulic fluid.

4.4.2.2.4 Operating rod assembly and bolt assembly action.
Examine action of operating rod assembly and bolt assembly for compliance with 3.3.12.1.

4.4.2.2.5 Operating rod assembly

- a. Disassemble operating rod assembly from bolt assembly and visually and manually examine operating rod assembly for compliance with 3.3.12.2.
- b. Visually examine rod for excessive wear or mutilations on both sear engagement notches.
- c. Visually examine yoke for mutilation or burrs on bolt camming surfaces.
- d. Visually examine roller for excessive wear or mutilations.

4.4.2.2.6 Bolt assembly.

- a. Visually and manually examine the bolt assembly for proper functioning and for presence of proof, magnetic particle inspection and manufacturer's identification marks (drawing 11010358).

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- b. Examine firing pin protrusion using the inspection equipment in accordance with drawing 7274295 (see 11010357).
- c. Visually examine to assure that ejector face is flush with or below front of bolt (see 11010357) .
- d. Manually examine cam actuator assembly for compliance with 3.3.4.1.
- e. Manually examine retention and spring action of ejector for compliance with 3.3.4.2.
- f. Manually examine spring action of extractor for compliance with 3.3.4.3.
- g. Manually examine firing pin for compliance with 3.3.4.4.

4.4.2.2.7 Disassembly of bolt assembly.

- a. Disassemble all parts except ejector from bolt assembly.
- b. visually and manually examine all parts for mutilations, breaks, or cracks.
- c. Visually and manually examine bolts ligs, operating cam cut, rollers, guideways, cam actuator assembly, extractor lips, and ejector face for cracks, burrs, sharp edges, or deformations.
- d. Visually examine firing pin striker point; it shall be smooth and free of pits and burrs. Examine fillet radii at spools for cracks and deformation.
- e. Reassemble bolt assembly, assuring that cam actuator assembly is properly assembled with roller end forward on bolt and that extractor is securely retained by the plunger and spring.

4.4.2.2.8 Trigger mechanism grip assembly.

- a. Disassemble trigger mechanism assembly from receiver assembly manually examining for compliance with 3.3.14.
- b. Visually examine for secure riveting of trigger mechanism frame assembly to channel assembly.
- c. Visually and manually examine safety for compliance with 3.3.14.1.

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- d. Visually and manually examine sear for compliance with 3.3.14.2.
- e. Visually examine sear plunger and spring for burrs, cracks and deformations.
- f. Visually and manually examine trigger assembly for compliance with 3.3.14.3.

4.4.2.2.9 Cover assembly. Visually and manually examine cover assembly for compliance with 3.3.10.

- a. Visually and manually examine spring action of latch lever assembly for compliance with 3.3.10.1.
- b. Visually and manually examine retention and spring action of cartridge guides for compliance with 3.3.10.2.
- c. Visually examine cartridge guides for cracks, burrs, sharp edges, or deformations.
- d. Visually and manually examine feed cam assembly for compliance with 3.3.10.3.
- e. Visually examine feed cam assembly for burrs, cracks, sharp edges, or deformations.
- f. visually and manually examine retention and free travel of feed pawl assembly for compliance with 3.3.10.4.
- g. Visually examine feed pawl assembly for cracks, burrs, sharp edges or deformations.

4.4.2.2.10 ~~Tray and hanger assembly.~~

- a. visually examine the tray and hanger assembly for compliance with 3.3.8.
- b. Visually examine feed plate guideways and cartridge stops for cracks, burrs, sharp edges or deformations.
- c. visually and manually examine retention, spring actions, and free travel of cartridge retaining pawl for compliance with 3.3.8.1.
- d. visually examine the cartridge retaining pawl for cracks, burrs, sharp edges, or deormations.

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- e. Manually examine the bandoleer hanger assembly for compliance with 3.3.8.2.

~~4.4.2.2.1 Barrel assembly with bipod assembly (two per gun).~~ Disassemble barrel assembly with bipod assembly from the receiver assembly. Assure that with barrel lock in the vertical position, disassembly from the receiver is readily accomplished. Assemble and disassemble spare barrel assembly with bipod to and from the receiver.

- a. Examine the barrel assembly for compliance with 3.3.1.1.
- b. visually examine the barrel assemblies for mutilations, cracks, and seams. Visually examine bore and chamber for foreign matter, corrosion, pits, burrs, bulges, and deformations. The chrome plating shall be free of nodules, anode bums and flaking or stripping.
- c. Visually examine barrel assemblies for presence of proof and magnetic particle inspection marks on the barrel assembly and tube assembly (see drawing 7269028 and 7269042) .
- d. Visually and manually examine gas cylinder for compliance with 3.3.1.1 paragraph b.
- e. Disassemble gas cylinder nut and extension, lock washers and piston. Visually examine piston and lock washers for cracks, burrs, or deformation. Reassemble assuring that head of piston is assembled toward breech (rear) end.
- f. Examine front sight for compliance with 3.3.1.1 paragraph c.
- g. Visually examine the socket for compliance with 3.3.1.1 paragraph d and presence of manufacturer's identification in accordance with drawing 7269041.
- h. Manually examine bipod assembly for compliance with 3.3.1.2 except that load requirements shall not be checked during this examination.
- i. Examine flash suppressor for compliance with 3.3.1.3.

4.4.2.2.12 Forearm assembly. Visually and manually examine the forearm assembly for compliance with 3.3.11.

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4.4.2.2.13 Receiver assembly group.

- a. Visually and manually examine receiver assembly group for compliance with 3.3.13.
- b. Visually and manually examine cocking handle guide, screw; and lock washer for compliance with 3.3.9.
- c. Manually examine retention and free movement of cocking handle assembly for compliance with 3.3.9.
- d. Visually and manually examine spring action of retaining latch on cocking handle assembly for compliance with 3.3.9.
- e. Examine carrying handle assembly for compliance with 3.3.7.
- f. Visually and manually examine barrel lock for compliance with 3.3.3.
- g. Visually and manually examine rear sight assembly for compliance with 3.3.2.

4.4.2.2.14 Headspace. Prior to reassembly of machine gun, check for headspace requirement (see 3.4.1) using the methods specified in 4.5.1.

4.4.2.2.15 Reassembled machine guns.

- a. While reassembling barrel assembly with biped assembly to receiver assembly, examine to assure when barrel lock lever is set in closed position, the barrel assembly is retained in receiver (see 3.3.3).
- b. Reassemble machine gun without the use of tools and hand operate to assure proper function of all parts.
- c. Manually examine safety for proper function. Safety must move readily, with positive retention in the "D" and "F" positions. When the trigger is pulled, the sear shall not release the operating rod assembly when safety is in "S" position and must release operating rod assembly when safety is in "F" position.
- d. Visually examine the machine gun for presence of one each proof mark and magnetic particle inspection (4.5.1) on the bolt assembly and two each proof marks and magnetic particle inspection marks on both the assigned and spare

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barrel assembly with bipped assembly. Absence of proof marks or magnetic particle inspection marks shall reject the machine gun.

4.4.2.3 Packing. Examination of packaging of machine guns shall be performed in accordance with the classification of characteristics specified in 4.4.2.3.1. Sample size and acceptance criteria for each lot shall be in accordance with Table 1. A visual inspection shall be performed to assure that the criteria specified in the contract (see 6.2) result in the parts and packages meeting the acceptance criteria. Packages opened for examination shall be repackaged by the contractor at the contractor's expense (see 6.2).

TABLE I. Attributes sampling inspection.

<u>Lot Size</u>	<u>Majors</u>	<u>Minors</u>
2 to 8		8
9 to 15		8
16 to 25	20	8
26 to 50	20	8
51 to 90	20	8
91 to 150	20	12
151 to 280	20	19
281 to 500	47	21
501 to 1,200	47	27
1,201 to 3,200	53	35
3,200 to 10,000	68	38

Numbers under Majors or Minors indicate sample size; asterisks indicate one hundred percent inspection. If sample size exceeds lot size, perform one hundred percent inspection. Accept on zero and reject on one or more for all inspection levels.

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~~4.4.2.3.1 Classification of characteristics for packaging.~~

<u>Category</u>	<u>Characteristic</u>
-----------------	-----------------------

Critical: None defined.

Major:

- 101. Marking is legible and correct
- 102. Correct location of marking
- 103. proper level of packaging and packing
(See procurement documents)
- 104. Adequate cleaning and drying
- 105. proper preservative application and drainage
- 106. Proper closure of interior packages
- 107. Proper closure and strapping of shipping containers
- 108. All items of equipment present
- 109. Proper assembly of package: position of assemblies
in supports, position of separator between supports
and assembly of cells

Minor:

- 201. Workmanship

4.4.2.3.2 Repair parts. Examination of packaging of repair parts shall be performed in accordance with the criteria specified in the contract (see 6.2) .

4.4.3 Testing.

4.4.3.1 Headspace testing. The contractor shall test each machine gun for headspace using the test methods specified in 4.5.1. The machine gun failing to meet the requirements shall be rejected and a failure analysis (see 6.2) performed by the contractor.

4.4.3.2 Firing pin indent and trigger pull testing. The contractor shall test a sample of ten machine guns selected by the Government representative from each inspection lot for firing pin indent and trigger pull using the test methods specified in 4.5.2 and 4.5.3, respectively.

4.4.3.2.1 Firing pin indent. If any firing pin indent is not within the requirements (3.4.2), it shall be disregarded and three more impressions shall be taken. The average depth of the three indents of each test shall be within requirements. All firing pin indent impressions shall not be off center more than

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one-half the diameter of the firing pin point as evidenced by visual examination. Failure of any machine gun in the sample to meet the requirements shall cause rejection of the represented lot and a failure analysis (see 6.2) performed by the contractor.

4.4.3.2.2 Trigger pull. Failure of a machine gun to meet the trigger pull requirement (3-4.3) shall cause rejection Of the represented lot and a failure analysis (see 6.2) performed by the contractor.

4.4.3.3 High pressure resistance, functioning, and targeting and accuracy firing testing. The contractor shall test each machine gun for high pressure resistance functioning, and targeting and accuracy with its assigned and spare barrel assembly with its biped assembly using the test methods specified in 4.5.4, 4.5.5, 4.5.6, respectively. A machine gun failing to meet any of the requirements shall be rejected and a failure analysis (see 6.2) performed. The contractor shall test five machine guns from each inspection lot for functioning with the M4 Bandoleer, using the test methods specified in 4.5.5.2. Failure of any machine gun in the sample to meet the requirements shall cause the rejection of the represented lot and a failure analysis (see 6.2) performed by the contractor.

4.4.3.4 Interchangeability testing.

4.4.3.4.1 In plant.

4.4.3.4.1.1 Machine guns. Ten machine guns with only the assigned barrel assembly with biped assembly, selected by the Government representative from each inspection lot shall be tested by the contractor for interchangeability testing and shall have been found satisfactory in all other examinations and tests. Test frequency may be reduced to not less than one test of ten machine guns each month when a record of consistently satisfactory results has been established. The ten machine guns shall be tested for and shall comply with the requirements for headspace, firing pin indent, and trigger pull before and after interchange of parts using the test methods specified in 4.5.1, 4.5.2, and 4.5.3, respectively. In addition, the machine guns shall be tested for functioning and targeting and accuracy requirements after interchange of parts using the test methods specified in 4.5.5 and 4.5.6. No failures shall be allowed in the function firing test. Targeting results shall be recorded and shall not be basis for rejection and the sights shall not be adjusted. At the completion of the interchangeability test, the barrel assembly with biped assembly shall be reassembled to the original machine gun. Failure of the interchangeability test shall cause retest or rejection of the represented lot and a

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failure analysis (see 6.2) performed by the contractor. At the discretion of the Government representative, an interchangeability retest may be allowed without reconditioning the lot of machine guns. Failure in the retest shall cause rejection of the represented lot subject to performance of a failure analysis and reconditioning and further test. A sample of ten machine guns from each retest or reconditioned lot shall be tested using the same procedure described above. Failure of any machine gun in the sample to meet the interchangeability requirement shall cause rejection of the represented lot.

4.4.3.4.1.2 Concurrent repair parts. The contractor shall subject at least two parts from each inspection lot of concurrent repair parts to the interchangeability test specified in 4.5.7.1.2. Failure of any part to meet the requirements shall be cause for rejection of the represented lot of parts subject to reconditioning and further test as a reconditioned lot. A sample of double the number of parts used in the original test shall be tested from each reconditioned lot using the test method specified in 4.5.7.1.2.

4.4.3.4.2 Interplant. When machine guns are manufactured concurrently by more than one contract, each contractor shall forward six machine guns monthly, for the interplant interchangeability test specified in 4.5.7.2 (see 6.2). The contractor will be informed of any failure of the machine guns to meet prescribed requirements. Upon completion of the inspection by the testing agency, samples may be commercially packaged and will be returned to the contractor for packaging in accordance with the contract at the contractor's expense.

4.4.3.5 Endurance testing.

4.4.3.5.1 Lot size. The first five endurance test lots shall each consist of 200 machine guns or a month's production, whichever is smaller. When five successive lots meet the endurance requirements, the lot size shall be increased to 500 machine guns or a month's production, whichever is smaller. When five successive lots of the increased size have met the endurance requirements, the lot size shall be further increased to 1,000 machine guns or a month's production, whichever is smaller. If rejection of a lot occurs at any time, the next smaller test lot size criteria shall be reinstated and the above procedure repeated in returning to the larger lot size.

4.4.3.5.2 Procedure. One machine gun selected by the Government representative from each endurance test lot shall be tested by the contractor for endurance using the test method specified in 4.5.8. If the endurance requirements are not met,

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the represented lot shall be rejected subject to a failure analysis (see 6.2) by the contractor and retest Or reconditioning and further test as a reconditioned lot. An endurance retest of two other machine guns from the same lot shall be made without reconditioning the represented lot, unless in the opinion of the responsible Government representative, the failure indicates serious defects or safety hazards in the item (see 6.4.3 and 6.4.4), in which case retest shall be made only when authorized by the procuring agency. Failure of either machine gun in the retest to meet the requirements shall cause rejection of the represented lot subject to performance of a failure analysis by the contractor, reconditioning and further testing as a reconditioned lot, prior to submission of a lot of machine guns as a reconditioned lot, the cause of failure shall be determined in the lot. Sample size and test methods for reconditioned lot shall be the same as for retests.

4.4.3.6 Reliability testing. Three machine guns randomly selected by the Government shall be each tested to 50,000 rounds using the test method specified in 4.5.9. Barrel life testing shall be performed concurrently as part of reliability testing. Failure of the machine guns to meet collectively the MRBS and MRBF requirements (3.4.9), shall be cause for deferment of acceptance of product and shall cause the contractor to perform a failure analysis (see 6.2) to determine that cause(s) of test failure and to perform the necessary corrective action on all products in house, both finished items and tiems in process. If test failure occurs and is believed to be attributed to other causes than machine guns, The contractor shall submit in his failure analysis report, documentation supporting his contention to the contracting officer for review and final resolution.

4.4.3.7 Component parts and concurrent repair parts testing. Raw material testing, part testing and certification shall be performed in accordance with the criteria specified in the contract (see 6.2). This will include chemical analysis and physical tests of material, and tests of protective finish, heat treatment, bonding, and function of parts as applicable. The contractor shall accomplish these tests prior to assembly of parts into the end item.

4.4.3.8 Load test of front mounting pin (7269100). Upon completion of 100 consecutive load tests of the front mounting pin, the sampling plan for this test shall be in accordance with Table I in 4.4.2.3 utilizing the appropriate sample size under Majors. If any lot is rejected, inspection shall revert to 100 consecutive and successful load tests on the front mounting pin before sampling is reinstituted.

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4.4.3.9 Certification. Unless otherwise specified, the contractor shall furnish the Government representative with certified statements that each inspection lot conforms to the materials and processes specified on the applicable drawings and specifications.

4.4.3.10.1 Machine guns.

- a. The contractor shall furnish the Government representative with certification that the packaging materials conform to the applicable packaging data sheets and specification.
- b. The contractor shall test items from each inspection lot as specified in MIL-P-116.

4.4.3.10.2 Repair equipment. Testing of packaging of repair parts shall be performed in accordance with the criteria specified in the contract (see 6.2).

4.4.4 Inspection equipment. The inspection equipment required to perform the inspections specified herein is identified in 4.4.2.2. Contractor inspection equipment designs shall be submitted for Government approval as specified in the contract. Designs which provide variable measurements instead of attributes data are preferred in order to facilitate the use of statistical process control. The provisions of MIL-A-70625 shall apply to all automated acceptance inspection equipment. See 6.2 herein.

4.4.4.1 Responsibility. Unless otherwise specified in procurement documents (see 6.1), responsibility for acquisition, maintenance and disposition of measuring and test equipment required to perform inspections prescribed by applicable specifications shall be in accordance with MIL-I-45607.

4.4.4.2 Accuracy of standard measuring test equipment (SMTE). When commercial and modified commercial test equipment is used, it shall be capable of repetitive measurement by various experienced inspection/test personnel to an accuracy of 10 percent of the total tolerance of the characteristic being inspected. Accuracy is a term which describes the closeness of test measurements to the true (lab) measurement. Accuracy is normally defined by the two factors, systematic error (or bias) and precision (repeatability). Systematic error (bias) is the difference between the average (mean) reading in a series of measurements and the true lab measurement. Precision

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(repeatability) is a measurement of the closeness together of a series of measurements. For the purpose of this effort, the precision will be defined as the standard deviation of the group of data being analyzed.

4.4.4.3 Ammunition, links and bandoleers (see 6.2).

4.4.4.3.1 Ammunition. Unless otherwise specified in procurement documents, the Government standard 7.62mm, M60 High-Pressure Test Cartridge (MIL-C-46477) shall be used for the high pressure resistance test; the 7.62mm, M80 Ball Cartridge (MIL-C-46931) linked with the M13 Link (MIL-L-45403) shall be used for all other firing tests; and the M172 Dummy Inert Loaded Cartridge (MIL-D-60573) linked with the M13 Link shall be used as required in the functioning firing test to separate belts of linked M80 Ball Cartridges.

4.4.4.3.2 Link. The Government standard 7.62mm, M13 Link (MIL-L-45403) shall be used for linking ammunition required for firing tests.

4.4.4.3.3 Bandoleer. The Government standard 7.62mm, M4 Bandoleer (MIL-B-60107) shall be used to contain the linked M80 Ball Cartridges on the machine gun as required for the firing tests.

4.5 Methods of inspection.

4.5.1 Headspace test. Each machine gun with both its assigned and spare barrel assembly with biped assembly shall be gaged for headspace requirement (see 3.4.1) before and after high pressure resistance firing, prior to acceptance, in accordance with instructions specified on drawing 7274136 using the inspection equipment conforming to drawing 7274515 and 7274459.

4.5.2 Firing pin indent test. Each sample machine gun with d and spare barrel assembly with biped assembly shall be tested for firing pin indent requirement (see 3.4.2) using the inspection equipment in accordance with drawing 7274381 and 7318984. The machine gun shall be cocked and then held in a horizontal position with the cover assembly opened. The holding fixture containing the copper compression cylinder (8440920) shall be inserted unto the barrel chamber, the cover colosed, and the trigger pulled to release the bolt and indent the copper cylinder. The holding fixture shall be removed from the machine gun and the depth of the indent in the copper cylinder computed by measuring the distance from the original surface of the copper cylinder (before indentation) to the bottom of the firing pin impression.

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4.5.3 Trigger pull test. Machine guns shall be tested for trigger pull requirement (see 3.4.3) using the inspection equipment in accordance with drawing 7796424. The machine gun shall be cocked and the safety shall be in the "fire" position. The loads shall then be gradually applied to the trigger in the direction specified on the applicable drawing. The trigger pull shall also be tested for creep by applying pressure manually to the trigger at a uniform rate of increase over a period of not less than 3 seconds.

4.5.4 High pressure resistance test. Fire on M60 High Pressure Test Cartridge in every barrel assembly (7269028), tube assembly (7269042), and bolt (11010358). After firing) apply magnetic particle inspection to these parts. After firing, examine these components for cracks, deformations, and other evidence of damage. After firing, examine cartridge cases from the barrel assemblies and tube assemblies for bulges, splits, rings and other indications of defective barrels. Determine that specific scratches and marks, if present in the chamber which meets surface texture requirements, have not caused marks on the cartridge cases (see 4.4.4.3.1).

4.5.5 Functioning firing test.

4.5.5.1 Firing schedule. Machine guns shall be tested for functioning requirement (see 3.4.5) in accordance with the schedule specified in Table II. The machine guns shall be tested using the firing fixture conforming to drawing 7273925. For the first 500 machine guns, the ammunition shall be linked together in 100-round belts with a dummy cartridge separating each 50 rounds (see 4.4.4.3). The belts of ammunition shall hang unsupported vertically from the firing fixture feed tray for a distance of not less than 4 feet (see drawing 7273911). Subsequent machine guns shall be tested using M172 Dummy Inert Loaded Cartridges every 20 rounds (see Table II).

4.5.5.2 M4 Bandoleer firing. The sample machine guns shall be tested for functioning requirement (see 3.4.5) using the firing fixture specified in 4.5.5.1 and using the M4 Bandoleer attached to the machine gun. Firing shall be accomplished using both the assigned and spare barrel assembly with biped assembly. The M4 Bandoleer shall be loaded with a carton having a 100-round belt of ammunition having a M172 Dummy Inert Loaded Cartridge separating each 50 round (see 4.4.4.3) 1 The first 50 rounds shall be fired in interrupted bursts (see note 1 of Table II) and the next 50 rounds shall be fired in one continuous burst.

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TABLES II. Functioning firing test schedule.

	First 500 Machine Guns	All Other machine Guns	Type of Firing
Assigned Barrel	50 rounds	20 rounds	Interrupted Bursts 1/
	50 rounds	20 rounds	One Continuous Burst 2/
Spare Barrel	50 rounds	20 rounds	Interrupted Burst 11
	50 rounds	20 rounds	One Continuous Burst 21

- 1/ The trigger shall be intentionally released to stop firing at least five times during the 50-round and at least two times firing the 20-round interrupted burst firing.
- 2/ Rate of fire shall be measured and recorded on every tenth machine gun during the continuous burst firing of each barrel using a timer gage conforming to drawing 7273920. Failure of any sample machine gun to meet the cyclic rate of fire requirement shall be cause for measurement of the cyclic rate of fire on the other nine machine guns represented. If any one of the other nine machine guns fail the cyclic rate requirement, the ten machine guns are rejected, and the contractor shall perform a failure analysis and contact the Procuring Agency for instructions. If none of the other nine machine guns fail the cyclic rate requirement, only the sample machine gun that failed shall be rejected.

4.5.6 Targeting and accuracy firing test.

4.5.6.1 Sight setting. Each machine gun shall be tested with both its assigned and spare barrel assembly with biped assembly with the same sight setting for compliance with the targeting and accuracy requirements of 3.4.6. The ammunition and links shall be in accordance with 4.4.4.3.

4.5.6.2 Firing fixture. Machine guns shall be tested using the test fixture conforming to drawing 7273907. With the rear sight set at zero indage and the elevation scale set so that the scale retaining screw is approximately at the midpoint in the slot, the sight aperture slide shall be brought to the elevation setting indicated on the targeting and accuracy diagram. With

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the sights aligned at 6 o'clock on the sighting image of the targeting and accuracy diagram, a 10-round burst shall be fired for the targeting and accuracy measurement. The barrel assembly with biped assembly shall be replaced by the spare barrel assembly with biped assembly and with a 6 o'clock hold on the sighting image of a new target, a 10-round burst shall be fired for the targeting and accuracy requirements. Adjustment of the sights may be made within the limitations of 4.5.6.3 to bring the two barrels within the targeting requirements with the same sight setting. A 3-round warmup burst is allowable when testing each barrel assembly with biped assembly.

4.5.6.3 Rear sight. Adjustment to the rear sight shall not cause overhanging of the rear sight base. Vertical adjustment shall be made by movement of the adjustable elevation scale and, after adjustment, determination shall be made that the required additional adjustment is available (see 3.4.6) . Filing of the top of the front sight base shall be allowed to correct for vertical deviation provided that resulting bright areas are covered with an approved touch-up paint or coating.

4.5.6.4 Rear sight base. Upon satisfactory completion of the targeting and accuracy firing test, the rear sight base shall be staked in place and the adjustable elevation scale shall be set at the correct scale graduation.

4.5.7 Interchange of parts.

4.5.7.1 In plant.

4.5.7.1.1 Machine guns. Machine guns shall be tested for interchange of parts (see 3.4.7) by disassembling and then reassembling parts using the parts and prearranged system prescribed below in Table II. Interchange of parts shall be accomplished by dividing the parts of each Machine gun into 10 groups of nonmating parts as shown below and distributing the groups into 10 different trays until each tray contains a complete machine gun. Groups of parts from machine gun number 1 shall be taken in order and placed in trays 1 through 10; groups of parts from machine gun number 2 shall be taken in order and placed in trays 2 through 10 to 1; groups of parts from machine gun 3 shall be taken in order and placed in trays 3 through 10 to 2; etc. Commercial parts such as screws, nuts, washers, and pins shall be placed in the same tray as their mating or associate part. Any commercial part rendered unserviceable or disassembly shall be replaced without penalty to the interchangeability test. The machine guns shall be reassembled using only those parts which are in the same tray.

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TABLE III. Groups of nonmating parts for interchangeability.

Group I	Actuator assembly, cam (7269063) Barrel assembly w/biped assembly (7269027) (with gas cylinder extension, nut, plug, and lock washers removed) Bearing, firing pin (7269065) Catch, forearm (7269180) Clip, spring lever (7269146)
Group II	Cam assembly, feed (11699814) Extension, gas cylinder (7269030) Plunger safety (7269206) Receiver assembly (11686308) Spring, catch forearm (7269187)
Group III	Extractor (7790907) Guide, drive spring (9362512) Handle assembly, cocking (7791621) Housing assembly, cover (7269118) Housing assembly, trigger (7269203) Spring, helical torsion (11686315) (used with feed lever assembly 7269119)
Group IV	Rod assembly, operating (9362510) Shaft, cartridge guide (11010152) Shaft, cartridge pawl (7790724) Spring, firing pin (7269087) Spring, helical, compression (7269086) (used with extractor plunger (7269083)
Group V	Buffer assembly (11010518) Guide, cartridge, front (7269116) Guide, cocking handle (11010155) Latch hinge pin (7269243) Lever, feed (7269145) Nut, gas cylinder (7269031) Spring, helical compression (7269211) (used with sear plunger 7269207)

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TABLE III Groups of nonmating parts for interchangeability.
(Continued)

Group VI	Forearm assembly (11010430) with catch, pin, and spring removed Hanger, assembly bandoleer (8448414) Pin, hinge cover (7269247) plunger, extractor (7269083) Sear (7269209) Spring, drive (9362511)
Group VII	Guide, cartridge, rear (7269117) pawl assembly, feed (7269120) pawl, cartridge retainer (7269332) pin, catch forearm (7269184) pin, firing (11010376) pin, retaining (7269205) Spring, helical, compression (11010197) (used with barrel lock 11010184)
Group VIII	Bolt (11010358) Plunger, sear (7269207) Safety (7269415) Spring, helical, torsion (7269335) (used with cartridge feed tray assembly 8448415) Spring, lock, retaining pin (7792398) stock assembly, butt (11686711)
Group IX	Lock, barrel (11010184) pin, straight, headless (7792920) (used with bolt plug assembly 7791523) pin, shoulder, headed (7269204) (used with trigger assembly 7269212) piston, gas (7791247) plug assembly, bolt (9362505) Gas cylinder plug assembly (9362515)
Group X	Frame assembly, cartridge tray (7792097) Ring, retaining (11010377) (used with barrel lock 11010184) Spring, helical, compression (7269210) (used with safety plunger 7269206) Spring, helical torsion (7269301) (used with cover assembly 7269212) Trigger assembly (7269212) washer, lock (7269035) yoke, buffer retaining (11699786)

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4.5.7.1.2 Concurrent repair parts. Concurrent repair parts shall be tested for interchangeability requirement (see 4.4.3.4.1.2 or 3.4.7) by disassembling two machine guns, previously tested in 4.4.3.4.1.1, as necessary, and then reassembling them using the concurrent repair parts. No hand refinement of parts will be allowed, and the machine guns shall operate and function properly. This test may be performed independently of machine gun interchangeability test specified in 4.4.3.4.1.1 and at more frequent intervals using accepted machine guns taken from current production.

4.5.7.2 Interplant. Machine guns to be subjected to the interplant interchangeability test shall be given preliminary hand functioning to assure proper operating before parts are disassembled from the machine gun. Machine guns shall be interchanged in a manner similar to the detail plan in 4.5.7.1.1 except that parts shall be divided into six groups and, that when disassembling, every other machine gun shall be one produced by a different manufacturer. The machine guns shall be tested for and comply with the requirements for headspace, firing pin indent, trigger pull, functioning, and targeting and accuracy before and after interchange of parts using the test methods specified in 4.5.1, 4.5.2, 4.5.3, 4.5.5, and 4.5.6, respectively. Parts shall be identified with their manufacturer throughout the test. Before machine guns are returned to the contractors, the original parts shall be reassembled to their respective machine guns and given a hand functioning test to assure proper operation.

4.5.8 Endurance test.

4.5.8.1 Firing fixture. Testing of machine guns for endurance requirements (see 3.4.8) shall be accomplished with the machine guns held in a firing fixture conforming to drawing 7273925;

4.5.8.2 Test duration. A total of 10,000 rounds or until failure occurs, whichever is smaller, shall be fired in the initial test machine gun from each test lot.

4.5.8.3 Firing procedure. Firing shall be accomplished using 100-round belts. Every other belt shall be fired in interrupted bursts with at least 10 intentional interruptions in firing. All other belts shall be fired in one continuous burst. The assigned barrel assembly with biped assembly shall be interchanged with the spare barrel assembly with biped assembly every 299 rounds throughout the entire test. For the first half of the endurance test, the belts of ammunition shall half unsupported vertically from the firing fixture feed tray for a distance of not less than 4 feet (see drawing 7273911); and the

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second half of the test shall be fired using the M4 Bandoleer loaded with a cartoned 100-round belts attached to the machine gun. The ammunition, links and bandoleer shall be in accordance with 4.4.4.3.

4.5.8.4 Maintenance of test hardware. The machine gun shall be cooled to ambient temperature after each 400-round series using cooling aids other than water. The cyclic rate of fire shall be measured and recorded on each fifth series. It shall be permissible to clean and oil the machine gun at intervals of not less than 2,000 rounds. At the close of each day's firing, the machine gun shall be protected against corrosion. No parts shall be altered.

4.5.8.5 Firing records. Complete accurate records shall be kept for each endurance test, showing each malfunction and part replacement including the number of the round at which each occurred and corrective action taken.

4.5.8.6 Disposition of test hardware. At the completion of the endurance test, the machine guns shall be disposed of as specified in the contract (see 6.2) .

4.5.9 Reliability test. The three machine guns are each fired 50,000 rounds in 10,000-round cycles from a Government-approved firing fixture simulating ground tripod mounting. Unless otherwise specified, the firing is conducted in 200-round complements, alternating between firing schedules No. 1 and No. 2 (below). Two barrel assemblies are to be used alternately (change after 200 rounds) with each weapon and are cooled to ambient temperature after each 200 rounds. Firing should be accomplished using 100-round belts contained within the M4 Bandoleer.

4.5.9.1 Firing schedules.

4.5.9.1.1 Schedule No. 1: 10 \pm 1 round burst at a rate of one burst every 6 seconds; used for complete complement of 20 rounds.

4.5.9.1.2 Schedule No. 2: 25 \pm 1 round burst at a rate of one burst every 15 seconds; used for complete complement of 200 rounds.

4.5.9.2 Cleaning schedule. The weapons shall be cleaned, inspected and-lubricated after each 2,000 rounds and relubricated after each 1,000 rounds. Semi-fluid lubricant conforming to MIL-L-46000 is to be used.

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4.5.9.3 Barrel life.

4.5.9.3.1 At the start of test and during the last 30 rounds of each of the final 200-round complements for each barrel in each 10,000-round gun cycle; cyclic rate shall be measured; and accuracy, projectile velocity, and evidence of yaw or keyholding determined. Results shall be compared with the criteria in 3.4.9.3.

- a. For informational purposes, the cyclic rate of fire shall also be recorded over a 20-round burst. Cyclic rate instrumentation shall be the same as for function firing. The accuracy, and projectile velocity and yaw of each barrel shall be measured from the firing of a 10-round burst. Targets shall be placed at a range of 100 yards. Projectile velocities shall be measured and recorded instrumentally at a point 9 yards forward of the muzzle. The yaw or keyholding shall be determined from the 10-round burst. Firing schedules No. 1 and No. 2 do not apply during these 30-round periods.
- b. If a barrel is declared unserviceable, the rounds fired on the barrel shall be recorded and the barrel replaced with a new barrel. When a barrel is suspected of being unserviceable during cycles, a check of 10 projectile velocities and yaw shall be made.
- c. After measure of accuracy, projectile velocity, cyclic rate and yaw, all subsequent firing is per schedule No. 1 and No. 2 until the initial 200-round complement on the assigned barrel is complete. The assigned barrel is then replaced with the spare barrel and the above repeated.
- d. During the final 30 rounds of the last 200-round complement, for each barrel in each 10,000-round gun cycle; cyclic rate, accuracy, velocity, and yaw measurements shall be recorded. The initial 20 rounds of the last 30 rounds of the complement are fired in one burst and the cyclic rate recorded. The remaining 10 rounds are fired in one 10-round burst and accuracy, projectile velocity and yaw determined.

4.5.10 Packaging tests. The level A sample unit packages shall be tested in accordance with the requirements of MIL-P-116.

4.5.11 Load test of front mounting pin. The test shall be performed using standard measuring and test equipment.

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5. PACKAGING

5.1 Pilot pack. A pilot pack consisting of a complete, packed unit, shall be packaged and packed in accordance with the Packaging Data Sheet 8413999 to the level of protection specified in the contract (see 6.2) . The unit pack as specified in 3.1 shall be packed level C and forwarded with the results of all examinations and tests (see 4.3).

5.2 Preservation, packaging, packing and marking. Machine guns with equipment shall be preserved, unit packaged, packed, and marked in accordance with the requirements of Packing Data Sheet 8413999.

5.3 Repair parts. Repair parts shall be prepared for delivery in accordance with the applicable packaging data sheets as specified in the contract (see 6.2) .

6. NOTES

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

6.1 Intended use. This machine gun is an infantry weapon capable of being fired from the shoulder, bipod, pedestal or a tripod mount.

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 2.1.1).
- c. Requirements for submission of first article sample.
- d. List of drawings and specifications pertinent to the machine gun, showing applicable revision dates.
- e. Examination criteria not specified herein (see 4.4.2.1, 4.4.2.3.2 and 4.4.3.7).
- f. That packages opened for examination shall be repackaged by the contractor at the contractor's expense.

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- g. Disposition of tested machine guns (see 4.5.8.6).
- h. Packaging instructions for repair parts (see 5.3).
- i. List of Special Inspection Equipment to be furnished the contractor (see 4.4.4.1 and 4.4.2.1) and responsibilities for other Government property to be furnished the contractor.
- j. Responsibility for furnishing ammunition, links, and bandoleer (see 4.4.4.3).
- k. Responsibility for test firing facilities and operating procedures (see 6.5).
- l. Shipping instructions for machine guns when an interplant interchangeability test is required (see 4.4.3.4.2).
- m. Procedures and methods for demilitarizing and disposing of rejected material.
- n. Disposition of Government furnished property.
- o. Requirement to conduct reliability test.
- p. Requirements for reporting failure analysis (see 4.4.3) and 6.2 paragraphs) on failures to meet specification requirements during testing.
- q. Bar code marking requirements.
- r. Contract data requirements for inspection equipment designs (conforming to Data Item Description DI-DRPR-81000).
- s. Reporting requirements for failure analysis (conforming to Data Item Description DI-R-21598 Tailored).

6.3 Inspection equipment designs Inspection equipment designs are of two types - Government Special Inspection Equipment (SIE) designs and contractor designs. SIE designs are designated by drawing numbers under the "Methods of Inspection" heading in Section 4. Design responsibility for all other inspection equipment is assigned to the contractor. However, the contractor need not furnish any design when a complete Government SIE is part of the Technical Data Package (TDp). Unless otherwise specified, the contractor may submit alternate or modified contractor designs of SIE in accordance with 6.3.2 and 6.3.3 should he elect to do so.

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6.3.1 SIE designs. SIE designs may consist of any of the following:

- a. Detailed drawings which completely depict all information necessary for the fabrication and use of the item of inspection equipment.
- b. A source control drawing or a specification control drawing as defined in DOD-STD-100.
- c. An envelope drawing, as defined in DOD-STD-100, which established the criteria which a detailed design shall meet. When envelope drawings are specified, the contractor shall prepare designs which comply with the criteria therein.

6.3.2 Contractor designs. Contractor designs are required for all inspection equipment for which SIE designs are not specified and may include commercial equipment which the contractor proposed to use. (Commercial equipment is defined as unmodified equipment which is cataloged and available for purchase by the general public.) Contractor designs shall include appropriate operating instructions, calibration Procedures and maintenance procedures. Commercial equipment shall be fully described by catalog listings or other means, which provide sufficient information to permit identification and evaluation by the Government and may include illustrations and engineering data. Designs shall be prepared for any special fixture(s) required to be used with commercial equipment, or with SIE designs if not otherwise covered (see 6.3.3.c). Designs shall be of the category and form (per DOD-D-1000) specified in the Contract Data Requirements List (DD Form 1423). The specification number, paragraph number, and defect number from Section-4 shall be referenced on each contractor design together with the component or assembly drawing number, revision letter and date to which the specific design applies.

6.3.3 Submission of contractor inspection equipment designs for approval. Contractor designs shall be approved by the Government prior to fabricating or procuring the equipment. Designs shall be submitted for approval in accordance with the stipulations, time frame and distribution specified in the Contract Data Requirements Lists (DD Form 1423) or in the contract. Partial submission of inspection equipment designs is permissible and encouraged. However, the completion data for design review will be based on the date of final submission of designs and the required delivery schedule as stipulated in the

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contract. The specific segment of ARDEC to which the contractor designs shall be sent will be SMCAR-QAF-I, Picatinny Arsenal, NJ 07806-5000. This address will be specified on the Contract Data Requirements List, DD Form 1423 in the contract.

When the contractor submits inspection equipment designs to the Government for approval he shall give the following information in his letter of transmittal:

- a. The contract number
- b. The contract item (name, model numbers, etc.).
- c. The designs remaining to be submitted and the expected date of submittal.

6.4 Definitions.

6.4.1 Contractor. Unless otherwise specified, the word "contractor" used throughout this or the item detail specification shall mean any supplier or producer of items or material to the Government. This shall include commercial contractors; subcontractors; Government Owned, Contractor-Operated (GOCO); and Government Owned, Government-operated (GOGO) plants.

6.4.2 Technical data package (TDP). A technical description of the item adequate for use in procurement. The description defines the required design configuration and assures adequacy of item performance. It consists of all applicable technical data such as plans, models, performance requirements, quality assurance provisions, and packaging data.

6.4.3 Critical defect. A defect that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product; or a defect that judgement and experience indicate is likely to prevent performance of the tactical function of a major end item such as an aircraft, tank, land vehicle, missile, artillery, or other major weapon system.

6.4.4 Special defect. A defect, other than critical, that judgment and experience indicate may, depending upon the degree of variance from the design requirement:

- a. Result in hazardous or unsafe conditions for individuals using, maintaining or depending upon the product, or

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- b. prevent performance of the tactical function of a major end item.

6.5 Facilities and Procedures. Test firing facilities and operating procedures should be designed by the contractor in conformance with local, state, and federal regulations. They should be suitable for carrying out prescribed firing tests and insure the safety of operating and visiting personnel. Copies of these contractor designs should be forwarded to the contracting officer. Government facilities may be viewed upon application to the contracting officer.

6.6 Work programming. When action by a testing agency is required, work programming will be affected with the testing agency at the earliest practicable date.

6.7 Supply of ammunition. To avoid delay in test firing, the contractor should maintain a minimum of 2 months supply of ammunition as determined by anticipated firing requirements.

6.8 Results of tests. Reports of the results of final examination and function firing, targeting and accuracy, endurance, and interchangeability tests shall be specified for delivery on the DD Form 1423 included in the contract.

6.9 MIL-O-9858 or MIL-I-452087. When warranted, the contract should specify the application of MIL-Q-9858 or MIL-I-45208, as appropriate, on the Management Control Summary List, DD Form 1660 1

6.10 MIL-I-45607 and MIL-STD-45662. Unless otherwise specified (see 6.2.i) , the contract should specify the application of MIL-I-45607 and MIL-STD-45662 on the Management Control Summmy List, DD Form 1660.

6.11 Drawings. Drawings listed in Section 2 of this specification under the heading US Army Armament Research, Development, and Engineering Center (ARDEC) may also include drawings prepared by, and identified as US Army Armament Research and Development Center (ARDC), US Army Arnanent Research and Development Command (ARRADCOM), Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal, Picatinny Arsenal and Springfield Armory drawings. Technical data originally prepared by these activities are now under the cognizance of ARDEC.

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6.12 Subject term (key word) listing.

Air Cooled
Gas Operated
Infantry Weapon
Link Belt Fed

6.13 Submission of alternative quality conformance provisions. Unless otherwise specified in the contract, proposed alternative quality conformance provisions will be submitted by the contractor for evaluation by the technical activity responsible for the preparation of this specification.

6.14 Changes from Previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issues due to the extensiveness of the changes.

Custodian:
Army-AR
Navy-MC
Air Force-84

Preparing activity:
Army-AR
(Project 1005-0821)

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.

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 document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE

1. DOCUMENT NUMBER

MIL-M-45013E (AR)

2. DOCUMENT DATE (YYMMDD)

28 February 1994

3. DOCUMENT TITLE

MACHINE GUN, 7.62MM: M60

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets if needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)

7. DATE SUBMITTED (YYMMDD)

(1) Commercial

(2) AUTOVON
(If applicable)

8. PREPARING ACTIVITY

a. NAME

US Army, ARDEC

b. TELEPHONE (Include Area Code)

(1) Commercial

201 724-6626

(2) AUTOVON

DSN 880-6626

c. ADDRESS (Include Zip Code)

SMCAR-BAC-S
Picatinny Arsenal, NJ 07806-5000

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Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3468
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