

MIL-G-45500D

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SUPERSEDING
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MILITARY SPECIFICATION

GUN, AUTOMATIC, 20MM: GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 This specification covers the general requirements for multi-barrel, electrically fired, 20 millimeter (mm) automatic guns.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

Military

- MIL-W-13855 - Weapons: Small Arms and Aircraft Armament Subsystems, General Specification For
- MIL-P-14232 - Parts, Equipment and Tools for Army Material Packaging and Packing of.
- MIL-I-45607 - Inspection Equipment, Acquisition, Maintenance and Disposition of.

STANDARDS

Military

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-109 - Quality Assurance Terms and Definitions.

DRAWINGS

Drawings applicable to the individual 20mm Automatic Gun will be as specified in the applicable specification sheets.

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PUBLICATIONS

Publications for Index of Inspection Equipment Lists and Packaging Data Sheets applicable to the individual 20mm Automatic Gun will be as specified in the applicable specification sheet.

3. Requirements.

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets.

3.2 First article. Requirements for submission of the first article shall be as specified in the contract (see 0.1). Unless otherwise specified (see 6.1), the first article shall include the pilot pack (see 5.1).

3.3 Material, construction and design. Guns shall conform to the material, construction and design requirements specified herein on drawings referenced in applicable specification sheet and MIL-W-13855.

3.3.1 Barrels. The finished barrels when assembled to the rotor and housing, and fitted with barrel clamps shall meet the targeting and accuracy requirements specified herein. The barrels shall assemble and disassemble from the rotor assembly Without the use of tools.

3.3.1.1 The barrels shall be free of cracks, seams, and mutilations. The bore and chamber shall be free of foreign matter, corrosion, pits, burs, sharp edges, bulges and deformations. The chromium plating in the chamber and bore shall be free of nodules, anode burns, flaking and stripping. Scratches or marks in the chamber which meets the surface roughness requirements shall be permitted provided they do not cause marks on the case of a high pressure test cartridge fired in the chamber. The barrels shall be marked for proof firing and magnetic particle inspection in accordance with applicable drawings.

3.3.2 Barrel clamps. The barrel clamps shall be fastened securely to the barrels as specified on the applicable drawing.

3.3.3 Breech bolt assemblies. The breech bolt assemblies shall be marked in accordance applicable drawings after being proof fired and magnetic particle inspected. The breech bolt assemblies shall move without binding on the trackways of the rotor. The roller, shaft, locking block, firing pin cam, and the firing pin shall be retained in the breech bolt body and shall move without binding. The firing cam pin insulator and the firing pin insulator assembly shall be retained in the breech

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bolt body. When the shaft assembly is depressed, the locking block shall move into the lock position and shall allow the firing pin cam to be fully depressed. When the firing pin cam is depressed, it shall move the firing pin forward. When the shaft assembly is raised, the locking block shall move to the unlocked position, the firing pin cam shall return to its original position, and the firing pin shall retract into the breech bolt body.

3.3.4 Cams, locking and unlocking. The locking cam and front and rear unlockking cams shall be positioned and securely fastened to the housing assembly in accordance with the applicable drawings.

3.3.5 Clearing sector assembly. The clearing sector assembly shall be retained on the housing assembly by the spring pin and shall function through its full range of travel without binding. When the clearing sector is manually moved into clearing position and the rotor is manually rotated in the direction of the arrow, the breech bolt assemblies shall enter the clearing track of the housing without sticking or binding. When the clearing sector assembly is released out of clearing position by the return spring and the rotor is manually rotated, the breech bolt assemblies shall enter the main cam of the housing without sticking or binding. This is applicable to all guns except the ML97 and ML97EL gun, which does not have a clearing sector.

3.3.6 End plate. The end plate shall be positioned by dowel pins and retained on the housing by the coupling. There shall be no relative movement of these parts.

3.3.7 Firing contact assembly. The firing contact assembly including conductors and insulators shall be securely fastened to the housing in accordance with the applicable drawing.

3.3.8 Guide bar. The guide bar shall be retained on the housing assembly by spring pins.

3.3.9 Housing assembly. The bolts securing the two housing halves shall be torqued as specified on the applicable drawings. The roller guide shall be securely fastened to the housing as specified on the applicable drawings and shall allow free movement after the rotor and bolts are installed. There shall be no interference with bolt assemblies cycling in clearing cam tracks.

3.3.10 Housing cover assembly. The housing cover assembly shall be retained on the housing assembly by the cover lock pins. The hinged housing cover shall move through its full range of travel when opened from either side.

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3.3.11 Indexing pin assembly. The indexing pin assembly shall be as assembled to the housing assembly and lock wired. The indexing pin shall move through its full range of travel without binding when manually depressed, and shall return and be held in the extended position by spring action after positioning the barrels.

3.2.12 Recoil adapters. The recoil adapters shall be fastened securely to the retainer assembly. The recoil adapters shall provide controlled fore-aft deflection of the gun so as to reduce firing loads transmitted to the gun mounts. Spring rates and dampening of the recoil adapters shall be as specified on applicable drawings. The spindle retainer shall be finger tightened to remove end play of the spindle assembly in the housing and lock wired.

3.3.13 Bearing retainer assembly. The bearing retainer assembly shall be securely fastened to the housing assembly as specified on the applicable drawing.

3.3.14 Rotor assembly. The rotor shall be proof tested and magnetic particle inspection marked and serial marked in accordance with the applicable drawings. The rotor gear, rotor assembly, rear well springs and plate, and the front and center bolt-tracks shall be fastened securely to the rotor body as specified on the applicable drawing. There shall be no relative movement of these parts. The rear bolt tracks shall assemble to the rotor body in accordance with the applicable drawing, and disassembly from the rotor body without the use of tools, except for a probe to depress the lock pin. The track lock pins shall move through their full range of travel without binding, and shall be returned to, and held, in the extended position by spring action to retain the rear bolt tracks in the locked position on the rotor body.

3.4 Performance characteristics.

3.4.1 Firing pin protrusion and continuity. With the rotor manually rotated until the firing pin cam is fully depressed and the firing pin protrudes through the bolt face, firing pin protrusion of each bolt assembly shall be not less than .033 inches nor more than .048 inches. When each bolt assembly is in the firing position, there shall be electrical continuity between pin in the firing contact assembly connector and the firing pin, when 1.5 maximum voltage is applied- Testing shall be as as specified in 4.5.3.2.

3.4.2 Headspace. The headspace in the assembled gun shall be not less than 3.467 inches nor more than 3.488 inches when measured to the 0.942inch-diameter datum on the first shoulder of the chamber. Testing shall be as specified in 4.5.3.2.

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3.4.3 High pressure resistance. Guns shall be capable of withstanding the firing of one round of Government standard 20mm, M54A1 high pressure test cartridge in each barrel. Parts shall be free of cracks, seams and other injurious defects after proof firing. Testing shall be as specified in 4.5.3.3.

3.4.4 Functioning. Guns shall operate without malfunctions, except that one misfire shall be allowed in each 100 rounds fired and no parts becoming unserviceable. Guns shall meet the functioning requirements specified herein, and as specified in the applicable specification sheet. Unless otherwise specified herein, the steady state rate of fire shall be calculated using the last fifty percent of the burst excluding stop-ping time. Ammunition used for the function firing shall be Government Standard 20mm, M55A2 cartridges and 20mm, M51A1B1 dummy cartridges. Test-ing shall be as specified in 4.5.3.3.

3.4.4.1 Clearing. The gun shall be capable of being cleared when the clearing sector is manually pivoted into the main cam and the rotor assembly is manually turned by hand to load and clear a minimum of five rounds of Government Standard 20mm, M51A1B1 dummy cartridges

3.4.5 Targeting and accuracy. Using Government standard 20mm, M55A2 cartridges, the targeting and accuracy requirements shall be as specified in the applicable specification sheet. Testing shall be as specified in 4.5.3.3.

3.4.6 Endurance. Guns shall be capable of withstanding the firing of 15,000 or 30,000 rounds as specified in the applicable specification sheet of Government standard 20mm, M55A2 cartridges, with no misfires exceeding 0.5 percent of each series attributable to the gun, and not more than a total of three malfunctions for the entire test. In addition, the gun shall meet the performance requirements of Table 1 as specified in the applicable specification sheet. The schedule for replacement parts during the endurance firing shall be in accordance with the applicable specification sheet. Testing shall be as specified in 4.5.3.4.

3.5 Dielectric strength. With the rotor manually rotated, and each bolt assembly in the firing position, the gun shall withstand without voltage breakdown, a root mean square (rms) voltage of 1200 volts, applied for a period of one minute between pin in the contract assembly connector and gun housing. The 1200 volts rms shall be applied at a frequency of 60 Hertz (Hz) or 1200 volts direct current (vdc). Test-ing shall be as specified in 4.4.

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3.6 Interchangeability. Unless otherwise specified on the drawings, all parts shall be interchangeable. Testing shall be as specified in 4.5.3.5.

3.7 Bolts, Screws and fasteners. Bolts and screws shall be torqued, lock wired and secured to the requirements specified on applicable drawings. Threaded fasteners shall be torqued sufficiently to prevent relative movement between mating components.

3.8 Lubrication. Parts and assemblies shall be lubricated with material specified on the applicable drawings. The amount of lubrication used shall be such that the electrical contacts and circuits will not be affected.

3.9 Marking. Guns and parts shall be clearly marked in accordance with the applicable drawings and MIL-W-13855. Each gun shall be identified by serial numbers assigned by the procuring activity (see 6.1).

3.10 Workmanship. Workmanship shall be in accordance with MIL-W-13855

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or own other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality assurance terms and definitions. Quality assurance terms and definitions used herein are in accordance with MIL-STD-109.

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

- a. First article inspection (see 4.4).
- b. Quality conformance inspection (see 4.5).

4.4 First article inspection. The first article (initial production unit(s)) shall be submittal for inspection in accordance with the contract (see 6.1). The first article shall be representative of the production processes to be used during quantity production. The first article shall be subjected to the quality conformance inspection specified herein and in the applicable specification sheet, the dielectric strength test(see 4.6.8) and such other inspection as necessary to determine that all requirements of the contract have been met.

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4.5 Quality conformance inspection.

4.5.1 Inspection lot. Unless otherwise specified (see 6.1) the formation, size, and presentation of inspection lots shall be in accordance with MIL-STD-105 and MIL-W-13855. (Guns shall be assembled from component parts that have met all inspection requirements specified herein. Endurance test lot size shall be as specified in 4.5.3.4.1.

4.5.2 Examination.

4.5.2.1 Component parts and concurrent repair parts. Examination of component parts and concurrent repair parts shall be as specified in the contract (see 6.1). The contractor's examination of these parts shall be prior to assembly into the end item or acceptance as repair parts.

4.5.2.2 Guns. Visually and manually examine each gun to determine conformance with the following requirements. Each step in the examination shall include a visual examination for proper cleaning and presence of the specified lead protective coating and to determine the general quality, completeness of manufacture, assembly, clarity and legibility of markings and workmanship. The examination provisions shall be applied at the earliest practical point in manufacture at which it is feasible to inspect for acceptance without risk of change in the characteristic by subsequent operations. Reinspection of these characteristics on the completed product is not required provided assurance exists that the characteristic has not been changed, degraded or damaged by subsequent manufacturing, assembly or handling and that adequate inspection records are maintained. Guns failing to meet the requirements shall be rejected.

<u>Part or assembly</u>	<u>Reference paragraph</u>
Materials, construction and design	3.3
Barrels	3.3.1, 3.3.1.1
Barrel clamps	3.3.2
Breech bolt assemblies	3.3.3
Cams, locking and unlocking	3.3.4
Clearing sector assembly	3.3.5 (except M197 & M197E1)
End plate	3.3.6
Firing contact assembly	3.3.7
Guide bar	3.3.8
Housing assembly	3.3.9
Housing cover assembly	3.3.10
Indexing pin assembly	3.3.11
Recoil adapter assemblies	3.3.12
Bearing retainer assembly	3.3.13
Rotor assembly	3.3.14

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4.5.2.2.1 All markings (see 3.9) required by final assembly drawings shall be visually examined for clarity and legibility. The identification plate shall be examined for compliance with the applicable drawings, secure assembly, and serial number.

4.5.2.2.2 The housing cam walls, rotor tracks rear surface of front locking wells, unlocking cams, gear teeth, and the bolt shaft assemblies shall be examined to assure that lubricant (see 3.8) has been applied as required by final assembly drawing.

4.5.2.2.3 The bolts holding the two housing halves together shall be manually examined for torque specified on the applicable drawings using a torque wrench (see 3.7).

4.5.2.3 Historical records. When specified (see 6.1), upon completion of all examinations and tests, the required data shall be recorded on DD Form 329, Historical Record for Aeronautical Equipment and DD Form 829-1, Historical Record - Technical Instructions Compliance Record, and shall be examined to assure that all pertinent data has been entered. One each of the completed forms shall be provided with each gun assembly.

4.5.3 Testing.

4.5.3.1 Failure data. Unless otherwise specified herein, all tests shall be conducted on a complete gun. If test requirements cited herein are not met, acceptance of the gun shall be deferred and the contractor shall accomplish as applicable, the following actions:

- a. Conduct a failure analysis study performing a dimensional physical and visual examination of the components which are suspected to be the cause of failure or malfunction.
- b. Evaluate correct the applicable production processes and procedures to prevent recurrence of the same defect(s) in future production.
- c. Examine guns, partially assembled guns, and components (including components and subassemblies at in-process or final assembly) to insure that material containing the same defect is purged from the inventory and is not presented to the Government for acceptance.
- d. Submit the results of the failure analysis and the corrective actions taken to the Government for review and approval prior to submitting a reconditioned lot or reconditioned gun for retest.

4.5.3.2 Firing pin protrusion and continuity and headspace testing. Each gun shall be tested for firing pin protrusion and continuity (see 3.4.1) and headspace (see 3.4.2) using the test methods specified in 4.6.1 and 4.6.2. Failure of any gun to pass these requirements shall be cause for rejection.

4.5.3.3 High-pressure resistance, functioning, targeting and accuracy. testing. Each gun shall be tested for high-pressure resistance (see 3.4.3) functioning (see 3.4.4), targeting and accuracy (see 3.4.5) using the test methods specified in 4.6.3, 4.6.4 and 4.6.5 respectively. Guns failing to meet these requirements shall be cause for rejection.

4.5.3.4 Endurance testing.

4.5.3.4.1 Lot size. The initial endurance test lot size shall consist of the initial month's production; subsequent endurance test lots shall consist of 100 guns. The initial test gun shall be taken from the first month's production. When five successive lots meet the requirements, the endurance test lot size shall be increased to guns.

4.5.3.4.2 Procedure. One gun selected at random from each endurance lot shall be tested for endurance (see 3.4.6 and applicable specification sheet) using the test specified in 4.6.6. If the endurance test requirements are not met, the represent lot shall be rejected.

4.5.3.5 Interchangeability testing.

4.5.3.5.1 Intra-plant

4.5.3.5.1.1 Guns. A sample of three guns, selected at random from each month's production shall be tested for interchangeability (see 3.6 and applicable specification sheet) using the test method specified in 4.6.7.1.1. Guns taken for interchangeability testing shall have met all other inspection requirements specified herein and in the applicable specification sheet. The three guns shall be inspected for compliance with firing pin protrusion, headspace, functioning, and targeting and accuracy requirements after interchange of parts using the test methods specified in 4.6.1, 4.6.2, 4.6.4, and 4.6.5 respectively. Failure of interchangeability shall be cause for rejection of the represent lot. Sample size and test methods shall be the same for retest.

4.5.3.5.1.2 Concurrent repair parts. At least two parts from each inspection lot shall be subjected to the test method specified in 4.6.7.1.2. Failure of any part to meet the requirements shall be cause for rejection of the represented lot. Parts subject to reconditioning and further test shall become a recondition lot and 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 4.6.7.1.2.

4.5.3.5.2.2 Inter-plant. When guns with concurrent repair parts are manufactured by more than one contractor, each contractor shall forward monthly one gun and a sufficient quantity of repair parts for the inter-

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plant interchangeability test specified in 4.6.7.2 (see 6.1). The contractor shall be informed of test results, which indicate failure of the gun or parts to meet prescribed requirements.

4.5.3.6 Certification. Unless otherwise specified, the contractor shall furnish the Government representative with certified statements that each inspection lot of guns, parts and assemblies shall conform to applicable drawings, specifications of the materials and processes specified on the final assembly drawing and applicable specification sheet.

4.5.3.7 Component parts and concurrent repair parts testing. Raw material testing part testing, and certification shall be as specified in the contract (see 6.1). This will include chemical analysis, physical tests of materials, tests of protective finishes, heat treatment, bonding, and fraction of parts as applicable. These tests shall be accomplished prior to assembly of parts into the end item.

4.5.4 Packaging examination and testing. Unless otherwise specified (see 6.1) the packaging examination and testing shall be in concurrence with MIL-P-14232.

4.5.5 Inspection equipment.

4.5.5.1 Unless otherwise specified in the procurement documents (see 6.1), responsibilities for acquisition, maintenance and disposition of measuring and testing equipment prescribed on lists contained on the Index of Inspection Equipment Lists specified on the applicable specification sheet and for all other inspection equipment required by applicable specifications, shall be in accordance with MIL-I-45607.

4.5.5.2 Ammunition feeding. The contractor shall be responsible for feeding and driving the gun using Government standard auxiliary equipment furnished on the contract (see 6.1).

4.5.5.3. Mounts. Unless otherwise specified, all firing tests shall be accomplished with the gun affixed to a Government approved mount. The mount shall have a rigidity of approximately 50,000 pounds per inch deflection. The design of the mount shall be such that the two recoil adapters carry all the longitudinal load. The rear socket mounting of the end plate or drive unit shall provide the rear mounting surface for the gun on a plane perpendicular to the centerline of the gun, and allow freedom of movement in a longitudinal direction. Torsional deflection of the mount shall not affect targeting and accuracy.

4.5.5.4 Power supply and control equipment. The power supply and control equipment shall be capable of allowed maximum torque and capable of controlling the steady state rate of fire within plus or minus one percent. In addition, a braking device shall be provided to stop the gun drive when power is removed. The drive used in the gun test shall be calibrated with adjustable power input versus torque output to assure that cyclic rate requirements are met or a calibrated torque transducer may be used to measure torque. Drives or torque transducer shall be re-calibrated prior to each day's testing or as required. Instrumentation shall record the readings necessary to establish that performance requirements are met for each gun tested. Additional equipment shall be as specified on the applicable specification sheet.

4.6 Test methods.

4.6.1 Firing pin protrusion and continuity test. Guns shall be tested using the inspection equipment in accordance with Drawing F7273689 or Government approved test equipment. The spring loaded plug shall be placed in the gun and fed into each barrel by manually rotating the gun until the barrel containing the plug is in the firing position with the breech bolt assembly locked. The low test voltage shall then be applied across the contact pin of the firing contact assembly and the gun housing. The minimum firing pin protrusion requirements and electrical continuity requirement has been met if electrical continuity is indicated on the test equipment.

4.6.2 Headspace test. Guns shall be tested using the inspection equipment specified on Drawing F7273689 or Government approved test equipment. The spring loaded plug shall be placed in the gun into each barrel by manually rotating the gun until the barrel containing the plug is in the firing position with the breech bolt assembly locked. The thickness gage shall then be inserted through the housing assembly to check the distance between the plug head and sleeve. The headspace is within the requirements if the minimum thickness end of the gage enters and the maximum thickness end of the gage does not enter between the plug head and sleeve.

4.6.3 High-pressure resistance test. Guns shall be tested by firing one high-pressure cartridge in each barrel after the guns have been given the clearing test as specified in 4.6.4.1. This proof firing shall be accomplished with the gun held in a mount in accordance with 4.5.5.3. Barrels and bolts to be assembled into production guns shall be proof fired as part of the completed guns, inspected and proof marked in accordance with applicable drawings. Barrels and breech bolt assemblies to be used as repair parts shall be proof firing independently of production guns and inspected and proof marked in accordance with applicable drawings. After proof firing, the guns shall be examined for cracks, deformation or other evidence of damage. Cartridge cases shall be visually examined for bulges, splits, and other defects caused by defective barrels. All parts shall be reassembled to the guns from

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which they were removed and proof marked in accordance with the applicable drawings.

4.6.4 Functioning test. Unless otherwise specified, guns shall be tested held in mounts in accordance with 4.5.5.3 and using the power supply and control equipment specified in 4.5.5.4. and applicable specification sheet.

4.6.4.1 Clearing test. Guns shall be function checked for clearing action (see 3.4.4.1) using a 12 round belt of dummy cartridges prior to the high-pressure resistance test (4.6.3). The clearing action shall be checked by manually rotating the gun to load five rounds in the gun, manually moving the clearing cam sector assembly into clearing position, and clear the remainder of the belt by manually rotating the gun. During clearing, the clearing cam sector assembly shall be fully depressed to prevent damage to the bolt shaft assemblies.

4.6.4.2 Function firing test. Guns shall be tested for function firing using one six round belt for warn-up and to test for proper functioning. A 100 round belt shall be fired to test for acceleration, stopping time, cyclic rate of fire, torque, targeting and accuracy and functioning to determine compliance with requirements of 3.4.5, 3.4.4, and Table I of applicable specification sheet. At the completion of firing, the gun shall be checked to assure that all breech bolt assemblies are in the clearerd position.

4.6.4.3 Function firing test procedure. The function firing test procedure shall be as specified on the applicable specification sheet.

4.6.5 Targeting and accuracy test.

4.6.5.1 Guns shall be tested with the gun held in a mount in accordance with 4.5.5.3 and using a boresight in accordance with Drawing C7797956 or Government approved test equipment. The barrels shall be foresighted by inserting the boresight in the muzzle end of the barrel when the gun is in each of the three or six indexed positions. The boresight point of the gun is then determined by the geometrical center of three boresight points. The boresight shall then be removed and a 100 round belt of target practice cartridges fired from the gun. The target shall be checked to determine whether the targeting and accuracy requirements have been met.

4.6.5.2 Guns may be fired at a range of 2,000 or 3,000 inches provided that suitable correlations, approved by the contracting officer, are made. In addition, if the contractor's range facilities permit, this test shall be fired as part of the functioning test (see 4.6.4).

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4.6.6 Endurance test.

4.6.6.1 Unless otherwise specified, guns shall be tested with the gun held in a Government approved mount in accordance with 4.5.5.3.

4.6.6.2 All guns shall be fired in a series of 1000 rounds using five (5) burst of 200 rounds each; except the ML97 and M197E1 guns shall be fired in a series of 500 rounds using (5) burst of 100 rounds each. The performance requirements of Table I as specified on the applicable specification sheet shall be measured and recorded for the last burst using instrumentation in accordance with 4.5.5.4 and applicable specification sheet.

4.6.6.3 After each 200 round burst the gun shall be allowed to cool for approximately 15 seconds. After each five burst series the gun shall be cooled to within 25°F of room temperature (using cooling aids other than water).

Barrels may be alternated with a spare set of barrels to expedite cooling. After each 15,000 rounds fired the gun shall be cleaned, inspected and lubricated.

Parts removed from the gun during inspection shall be replaced in original position from which they were removed. Headspace and firing pin protrusion shall be measured and recorded at the start of the test, after each 15,000 rounds fired, and at the end of the test. At the end of each day's firing, the gun shall be cleaned and protected against corrosion.

The recoil spring shall be measured and recorded at the start of the test, 15,000 rounds, and at the end of the test. The gun shall be disassembled as necessary to replace parts in accordance with the applicable specification sheet.

4.6.6.4 No alteration or replacement of parts except as scheduled shall be made unless the parts are broken or worn to the extent that they cause malfunctions or impair the safety of the gun. A complete record shall be kept for each endurance test, showing each malfunction, and all parts replaced including the number of the gun round at which they occurred.

4.6.6.5 Endurance tested guns and parts shall be disposed of as specified in the contract (see 6.1).

4.6.7 Interchangeability test.

4.6.7.1 Intra-plant.

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4.6.7.1.1 Guns. Guns shall be tested by disassembly and reassembly of parts, using parts from a prearranged system. Interchangeability of parts shall be accomplished by dividing the parts of each gun into three groups of nonmating parts distributing the groups into three different trays until each tray contains parts for a complete gun. Groups I, II and III of non-mating parts shall be as specified on the applicable specification sheet. Groups of parts from the first gun shall be taken in order and placed in trays 1 through 3; groups of parts from the second gun shall be taken in order and placed in trays 2, 3, and 1; groups of parts from the third gun shall be taken in order and placed in trays 3, 1, and 2. Commercial parts such as screws, spring pins, etc., shall be placed in the same tray as their mating or associate part. New laminated shims may be used for reassembly of guns during the interchangeability test. Any commercial part rendered unserviceable by disassembly shall be replaced without penalty to the interchangeability test. The guns shall be reassembled using only those parts which are in the same tray.

4.6.7.1.2 Concurrent repair parts. Concurrent repair parts shall be tested for interchangeability by disassembling two guns previously tested in 4.6.7.1.1 and reassembling, using the concurrent repair parts. This test shall be performed independently of the interchangeability test required in 4.6.7.1.1 using accepted guns taken from current production.

4.6.7.2 Inter-plant

4.6.7.2.1 Guns. Guns subjected to the inter-plant interchangeability test shall be given a preliminary firing test of 12 cartridges, 20mm, Target Practice, M55A2 to assure proper operation before parts are interchanged. Parts shall be disassembled from the guns and identified as to manufacture. Dissembled parts shall be mixed and guns reassembled by random selection of parts. After assembly, the guns shall be tested for functioning, targeting and accuracy requirements using the tests specified in 4.6.4 and 4.6.5. Before guns are returned to the contractors, the original parts shall be reassembled to their respective weapons and given a functioning test using a belt of 50 cartridges, 20mm, Dummy M51A1B1.

4.6.7.2.2 Repair parts. The concurrently manufactured repair parts submitted for tests shall be assembled in the guns previously tested in 4.6.7.1.1. Guns shall be assembled using different combination of parts to insure parts are interchangeable. After assembly, the guns shall be tested for functioning, targeting and accuracy requirements specified in 4.6.4 and 4.6.5.

4.6.8 Dielectric strength test. Guns shall be tested by manually rotating the rotor assembly until each bolt assembled is in firing position and then applying 1200 volts rms at 60 Hz or 1200 volts dc for one minute in the contract assembly connector and ground. The guns shall then be inspected for evidence of voltage breakdown to determine compliance with the requirement of 3.5.

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5. PREPARATION FOR DELIVERY

5.1 Pilot pack. The pilot pack shall consist of a complete gun packaged in accordance with Packaging Data Sheet as specified in the applicable specification sheet for the level of protection specified in the contract (see 6.1), packed level C and forwarded in accordance with 3.1.

5.2 Preservation, packaging, and marking. Guns shall be preserved, packaged, packed and marked in accordance with the requirements of Packaging Data Sheet as specified in the applicable specification sheet or other requirements and for the level of protection specified in the contract (see 6.1).

5.3 Repair parts. Repair parts shall be preserved, packaged, packed and marked in accordance with the Packaging Data Sheet as specified in the applicable specification sheet or other requirements and for the level of protection specified in the contract.

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification
- b. Lists of drawings and specifications pertinent to the gun showing applicable revision dates.
- c. Examination criteria for components (see 4.5.2.1 and 4.5.3.7).
- d. Index to lists of inspection gages and parts gaged pertinent to the gun, showing applicable revision dates.
- e. Historical records, when required (see 4.5.2.3).
- f. Disposition of endurance tested parts (see 4.6.6.5).
- g. Shipping instructions for first article, and pilot pack if different (see 3.1 and 5.1).
- h. Selection of applicable levels of preservation, packaging and packing (see 5.1 and 5.2).
- i. Packaging instructions for repair parts (see 5.3).
- J. Packaging examination and testing, if different (see 4.5.4)
- k. List of acceptance inspection equipment to be furnished the contractor (see 4.5.5.1) and responsibilities for other Government property to be furnished the contractor.
- l. Responsibilities for furnishing ammunition, links, feeders and drives or other equipment (see 4.5.5.2, 4.5.5.3 and 4.5.5.4).
- m. Shipping instructions for guns and parts when an interplant interchangeability test is required (see 4.5.3.5.2).
- n. Block or serial numbers (see 3.9).
- o. Disposition of Government furnished property.
- p. Inspection lots, if different (see 4.5.1).

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6.2 Contract data requirements. When warranted, requirements for reports of examination and testing function firing, targeting and accuracy, endurance and interchangeability, etc.) shall be specified on a DD Form 1423 included in the contract.

6.3 Unless otherwise specified (see 6.1k), the contract should specify the application of MIL-I-45607 and MIL-C-45662 on the Management Control Summary List, DD Form 1660.

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

Custodians:
Army - WC
Navy - OS
Air Force - 84

Preparing activity:
Army-WC

Project number:
1005-0525

Review activities:
Navy- OS
Air Force - 84

User activity:
Navy - MC

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<p>INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. 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. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.</p>		
DOCUMENT IDENTIFIER AND TITLE		
MIL-G-45500D; Gun Automatic, 20MM: General Specification For		
NAME OF ORGANIZATION AND ADDRESS		CONTRACT NUMBER
		MATERIAL PROCURED UNDER A
		<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT
1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?		
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MIL-G-45500D
AMENDMENT 2
3 OCTOBER 1988
SUPERSEDING
MIL-G-45500D
AMENDMENT 1
17 December 1976

MILITARY SPECIFICATION SHEET

GUN, AUTOMATIC, 20MM: GENERAL SPECIFICATION FOR

This amendment forms a part of Military Specification MIL-G-45500/D, dated 30 July 1974 and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 3

Para 3.3.10: Add "This requirement is not applicable to M197 and M197E1 Guns."

PAGE 4

Para 3.3.12: Add "This requirement is not applicable to M197 and M197E1 Guns."

Paragraph 3.4.1: Delete in its entirety and substitute:

"3.4.1 Firing pin protrusion and continuity. With the rotor manually rotated until the firing pin cam is fully depressed and the firing pin protrudes through the bolt face, firing pin protrusion of each bolt assembly shall be .033 inches minimum. With the locking block in the unlocked position and firing cam pin fully depressed against block, the firing pin shall not protrude beyond the face of the bolt. With the locking block in the locked position (down 15° 30') and the cam pin depressed until the firing pin extends .028 to .030 inches there shall be electrical continuity between the cam pin and the firing pin, when 1.5 maximum voltage is applied. Testing shall be as specified in 4.5.3.2."

PAGE 5

Para 3.4.6, Line 2: Delete "15,000" and substitute "25,000."

Para 3.5: Delete in its entirety.

PAGE 6

Para 4.4, Line 6: Delete "the dielectric strength test (see 4.6.8)."

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AMENDMENT 2

PAGE 7

Paragraph 4.5.2.2, under Part or Assembly List:

Delete "Housing Cover Assembly 3.3.10" and substitute
"Housing Cover Assembly 3.3.10 (except M197 and M197E1)"

Delete "Recoil Adapter Assemblies 3.3.12" and substitute
"Recoil Adapter Assemblies 3.3.12 (except M197 and M197E1)"

PAGE 9

Para 4.6.8: Delete in its entirety.

The margins of this amendment are marked with an asterisk or vertical lines to indicate where changes (additions, modification, corrections, deletions) from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

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Navy-OS
Air Force - 99

Preparing activity:
Army-AR

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(Project 1005-A726)