

MIL-L-45935A

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SUPERSEDING

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(see Section 6)

MILITARY SPECIFICATION

LAUNCHER, GRENADE, 40MM: DETACHABLE, M203

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

1. SCOPE

1.1 This specification covers one type of detachable, pump-action single-shot, grenade launcher which is shoulder-fired when attached to the M16 and M16A1, 5.56mm Rifle.

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, Snail Arms and Aircraft Armament Subsystems, General Specification for.
MIL-P-14232	Parts, Equipment and Tools for Army Materiel, Packaging and Packing of.
MIL-I-45607	Inspection Equipment, Acquisition, Maintenance and Disposition of.
MIL-L-46000	Lubricating Oil, Semi-Fluid Automatic Weapons.

STANDARDS

Military

MIL-STD-105	Sampling Procedures for Inspection by Attributes.
MIL-STD-109	Quality Assurance Terms and Definitions.
MIL-STD-781	Reliability Tests: Exponential Distribution.

FSC 1010

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DRAWINGS

*U.S. Army Weapons Command
448300 - Launcher, Grenade, 40M: M203.

PUBLICATIONS

U.S. Army Weapons Command
P11838703 - Packaging Data Sheet for Launcher,
Grenade, 40MM: Detachable, M203.

(Part drawings referenced in this specification form a part of Drawing F8448300; inspection equipment drawings form a part of List IEL8448300.)

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

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

* 3.2 Materials, construction and design. Launcher and parts shall conform to the material, construction and design requirements specified herein, on Drawing F8448300 and MIL-W-13855.

* 3.2.1 Barrel. The barrel shall be free of cracks and seams, and the lands, grooves, and chamber shall be free of nicks, burs and pits. Electrical plating contact marks shall be allowed only on the surface where electrical connections are permitted. The anodic coating shall be uniform in appearance and free of flaking, powdery areas and discontinuities such as breaks and scratches.

3.2.2 Barrel assembly group

3.2.2.1 Pump actuation. The barrel assembly shall be capable of pump-actuation when the barrel latch is depressed. The barrel assembly shall be capable of forward and rearward movement over its full range of travel. The maximum force required to move the unloaded barrel assembly from the unlocked position to the maximum forward open position and returned to the closed locked position shall not exceed 14 pounds. Under loaded

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conditions using cartridge 40mm, XM387E4 (dummy, inert) the maximum forces shall not exceed 28 pounds. Testing shall be as specified in 4.5.3.2.

3.2.2.2 Barrel stop. Upon opening of barrel assembly to full open position, the barrel stop shall exert sufficient pressure on the barrel to allow retention of the barrel in the full open position as the launcher is held in the vertical position with the muzzle upward. A force of 4.0 pounds maximum shall be required to move the barrel assembly from this position. Testing shall be as specified in 4.5.3.2.

* 3.2.2.3 Barrel latch. The barrel latch shall move through its full range of travel under spring action without binding. the Barrel latch shall pivot under thumb pressure to release the barrel assembly for movement to the open position. The barrel latch shall remain unlocked until the barrel assembly is closed. It shall not be possible to move the barrel out of the locked battery position manually until the barrel latch has been depressed. The force required to manually actuate the barrel latch shall be 1.5 pounds minimum to 8.0 pounds maximum. Testing shall be as specified in 4.5.3.2.

3.2.2.4 Cartridge retainer. The cartridge retainer clips shall be capable of deflection through their full range of travel without binding or permanent deformation. The cartridge retainer shall be capable of holding a fully inserted 40mm cartridge within the barrel chamber, when the launcher is held in the vertical position with the muzzle upward and the barrel opened to the full open position.

3.2.2.5 Cartridge locator. The cartridge locator shall be capable of movement through its full range of travel without binding and shall exhibit a force of 8.0 pounds minimum to 12.0 pounds maximum when deflected flush plus .020 inches with face of the barrel. The cartridge locator spring shall deflect through its full range of travel without binding or permanent deformation. Testing shall be as specified in 4.5.3.2.

3.2.3 Receiver group.

* 3.2.3.1 Extractor. The extractor shall function through its full range of travel under spring action without binding. Upon locking the barrel into the battery position with the chambered cartridge, the extractor shall cam downward upon contact with the cartridge and allow the barrel with cartridge to be locked in the battery position. The extractor hook shall engage the cartridge rim and retain the cartridge within the receiver to allow clearing of the barrel chamber as the barrel assembly is moved to the open forward position.

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3.2.3.2 Cartridge ejector. The cartridge ejector shall be capable of movement through its full range of travel without binding and shall exhibit a force of 2.75 pounds minimum to 6.75 pounds maximum when deflected flush plus .020 inches with the breech face on the receiver. Testing shall be as specified in 4.5.3.2.

* 3.2.3.3 Follower assembly. The follower assembly shall prevent actuation of the firing mechanism when the barrel assembly is moved forward out of battery irrespective of the position of the safety.

3.2.3.4 Trigger sear and secondary sear. With the firing pin cocked, the trigger sear shall return to its original position under spring action after partial trigger pull. When the trigger is held rearward in the "fire" mode during opening of the breech and loading of a cartridge, the firing pin shall be retained by the sear when the breech is closed; the secondary sear shall retain the firing pin until the trigger is allowed to return to its forward position, where the trigger sear shall engage the firing pin notch before the secondary sear releases the firing pin.

* 3.2.3.5 Breech insert. The breech insert shall be securely seated and torqued to 50 inch-pounds \pm 5 inch-pounds so that the breech insert face is flush to .007 inch below the breech face surface of the receiver. After the breech insert has been securely seated and torqued, the sealing compound shall be allowed to cure for not less than 24 hours. The breaking torque of the breech insert from the receiver shall be not less than 130 inch-pounds. Torque readings shall be taken at 1/4, 1/2, 3/4 and full turn. The average of these four(4) readings shall be considered the locking torque, and shall be not less than 70 inch-pounds. The firing pin hole shall be free of residue that would affect firing pin movement or freedom of other moving parts. Testing shall be as specified in 4.5.3.8.

3.2.3.6 Firing pin. The firing pin shall move forward through its firing stroke without interference.

* 3.2.3.7 Firing pin indent. The firing pin indent shall be a depth of .008 inches minimum to .012 inches maximum. The firing pin indent shall not be off center more than one-half the diameter of the firing pin point. Testing shall be as specified in 4.5.3.3.

* 3.2.3.8 Firing pin protrusion. The firing pin protrusion shall be .032 inches minimum to .07 maximum. Testing shall be as specified in 4.5.3.3.

3.2.3.9 Trigger pull. The trigger pull shall be free of creep and shall be greater than 5 pounds but shall not exceed 11 pounds. Creep shall be interpreted to mean any perceptible rough movement between the time the trigger slack is taken up and the firing pin released. After

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partial or completed trigger pull the trigger shall return to its normal forward position under spring action. Testing shall be as specified in 4.5.3.4.

3.2.3.10 Trigger guard. The trigger guard shall pivot freely through its full range of travel.

3.2.3.13 Safety.

* 3.2.3.11.1 Battery position. The barrel when locked in battery position, and the trigger in forward position, the safety shall move between "safe" and "fire" positions, and retained in the set position under spring action of the spring plunger. The safety when positioned in the "fire" position (firing pin cocked) the firing pin shall release as the trigger is pulled. The safety when positioned in the "safe" position, the safety shall prevent firing of the launcher. The firing pin shall remain cocked when the safety is moved from "safe" to "fire" position.

* 3.2.3.11.2 Safety actuation torque. The torque required to move the safety from the "safe" position to the "fire" position, or reverse, shall be 1 inch-pounds minimum to 9 inch-pounds maximum. Testing shall be as specified in 4.5.3.4.

3.2.4 Front sling swivel assembly. The launcher shall be provided with a replacement front sling swivel assembly; consisting of a swivel mount, locking bar and two (2) pins and rivet for assembly to the M16 or M16A1 rifle front sight base.

3.2.5 Leaf sight assembly. The leaf sight assembly shall be adjustable to all range and deflection settings, and shall exhibit the following accuracy of alinement:

<u>Range Setting</u>	<u>Elevation Angle</u>	<u>Deflection Angle</u>
50	4°27' ± 0°41'	0°14' ± 0°55'
100	7°12' ± 0°42'	0°19' ± 1°02'
150	10°37' ± 0°45'	0°24' ± 1°08'
200	14°02' ± 0°48'	0°30' ± 1°14'
250	17°56' ± 0°55'	0°35' ± 1°22'

The spring tension acting on the components of the leaf sight assembly shall maintain alinement of their selected position when the sight blade is in the raised position. Testing shall be as specified in 4.5.3.5.

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3.3 Performance characteristics.

* 3.3.1 Pressure resistance and functioning. Launchers shall withstand the firing of one (1) Government standard 40mm cartridge, M387E4 or equivalent for pressure resistance and functioning. The launcher shall function without malfunction or unserviceable parts. There shall be no evidence of blown primer or primer puncture during firing. Testing shall be as specified in 4.5.3.4.

* 3.3.2 Endurance. Launchers shall withstand the firing of 1,000 rounds using cartridge 40MM, XM387E4 or equivalent without malfunctions or unserviceable parts. Launchers shall be cleaned and oiled with lubricant conforming to MIL-L-46000 after each 250 rounds fired and at the close of day's firing. Testing shall be as specified in 4.5.3.6.

* 3.3.3 Targeting and accuracy. The launcher shall be assembled to an M16 or M16A1 rifle and fired at a 200 meter range distance for targeting and accuracy, using Government standard 40mm, M387E4 cartridges or equivalent. The top edge of the front sight post flange of the rifle shall be set flush with or not more than .030 inches below the bottom surface of the front sight slot, and the leaf sight shall be unfolded to the sighting position. No adjustment of the leaf sight shall be made after it has been set in the leaf sight alignment. Testing shall be as specified in 4.5.3.7.

* 3.3.3.1 Targeting. At a 200 meter range distance, the center of impact of a 20 round group shall be within a targeting rectangle of 36.6 meters (120.08 feet) in range, and 6.38 meters (20.93 feet) in deflection with the 200 meter aiming point as the center.

* 3.3.3.2 Accuracy. The launcher when assembled to an M16 or M16A1 rifle and fired at a 200 meter range distance, a 20 round group shall have one range probable error of less than 4.3 meters (14 feet) and one deflection probable error of less than 0.9 meters (3 feet). The probable error shall be calculated by multiplying the range and deflection standard deviations by 0.674.

* 3.4 Interchangeability. Unless otherwise indicated on the drawings, all parts shall be interchangeable. Testing shall be as specified in 4.5.3.8-

3.5 Reliability. The launchers shall have a minimum acceptable Mean Rounds Between Failure (MRBF) of 1333 ROUNDS demonstrated at a 80% confidence level. Desired MRBF is 4000 rounds. Launchers which meet endurance requirement specified in Para. 3.3.2 shall be considered to have met this reliability requirement. Testing shall be as specified in Para. 4.6.

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3.6 Environmental conditions. Unless otherwise specified in the contract, these performance requirements apply to launchers tested under prevalent ambient conditions.

* 3.7 Marking. Marking of launchers shall be in accordance with MIL-W-13855.

3.8 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 any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

* 4.2 Quality assurance terms and definitions. Quality assurance terms and definitions used herein in accordance with MIL-STD-109 and MIL-STD-721.

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 submitted for inspection in accordance with contract requirements (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 such other inspection deemed necessary to determine that all requirements of the contract have been met.

4.5 Quality conformance inspection.

4.5.1 Inspection lot.

4.5.1.1 Launchers. Unless otherwise specified herein, an inspection lot size shall be 500 launchers or one month's production whichever is smaller. Launchers shall be assembled from lots of component parts that have met all inspection requirements specified herein.

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4.5.1.2 Parts and packaging. The formation, size and presentation of inspection lots and packaging shall be in accordance with MIL-STD-105. Inspection lots shall be as large as practicable, in consideration of quality history, manufacturing conditions and contractor's delivery schedule and within the limitations of MIL-W-13855.

4.5.2 Examination.

4.5.2.1 Component parts and concurrent repair parts. Examination of parts shall be performed as specified herein and in accordance with the criteria specified in the contract (see 6.1). The contractor's examination of parts shall be accomplished prior to their assembly into the end item or submission for acceptance as repair parts.

* 4.5.2.2 Launcher. Visually and manually examine each launcher to determine conformance with the material, construction and design requirements of 3.2 and Table I. Each step in the examination shall include a visual examination for proper cleaning and presence of the specified 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. Reinspections 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. Launchers failing to meet the requirements shall be rejected.

TABLE I

<u>Part of Assembly</u>	<u>Reference Paragraph</u>
Barrel	3.2.1
Cartridge retainer	3.2.2.4
Extractor	3.2.3.1
Follower assembly	3.2.3.3
Trigger Sear and Secondary Sear	3.2.3.4
Firing pin	3.2.3.6
Trigger guard	3.2.3.10
Safety	3.2.3.11
Front sling swivel assembly	3.2.4

* 4.5.2.2.1 Each launcher and handguard assembly shall be examined independently, using mounting fixture F11838000 representing mounting of a launcher and handguard assembly on the M16 or M16A1 rifle.

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4.5.2.2.2 All markings required by final assembly drawings shall be visually examined for clarity and legibility.

4.5.3 Testing.

* 4.5.3.1 Failure data. Unless otherwise specified herein, all tests shall be conducted on a complete launcher. Failure of the launcher to meet the test requirements specified herein shall be cause for rejection of the launcher or the inspection lot of launchers. Acceptance of launchers 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 and correct the applicable production processes and procedures to prevent recurrence of the same defect(s) in future production.
Examine launchers, partially assembled launchers, and components (including components and subassemblies at inprocess of final assembly) to insure that material containing the same defect is purged from the inventory and 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 launcher for retest.

* 4.5.3.2 Pump actuation, barrel stop, barrel latch, cartridge locator and cartridge ejector testing. A sample of 50 launchers shall be randomly selected from each inspection lot and tested for pump actuation (see 3.2.2.1), barrel stop (see 3.2.2.2), barrel latch (see 3.2.2.3), cartridge locator (see 3.2.2.5) and cartridge ejector (see 3.2.3.2) using test methods 4.7.1.1, 4.7.1.2, 4.7.1.3, 4.7.1.4 and 4.7.2.1 respectively. Failure of the launcher to pass any of the tests shall be cause for rejection of the represented lot. Reconditioned launchers or reconditioned lot shall be tested using the procedures and test methods specified above.

* 4.5.3.3 Firing pin indent and firing pin protrusion testing. A sample of 10 launchers shall be randomly selected from each inspection lot and tested for firing pin indent (see 3.2.3.7) and firing pin protrusion (see 3.2.3.8) using the methods specified in 4.7.2.2 and 4.7.2.3. Failure of the launcher to pass any of the tests shall be cause for rejection of the represented lot. A sample of 20 launchers from each retest or reconditioned lot shall be tested using the procedure specified above.

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* 4.5.3.4 Trigger pull, safety actuating torque, pressure resistance and functioning. Each launcher shall be tested for trigger (see 3.2.3.9), safety actuation torque (see 3.2.3.112), pressure resistance and functioning (see 3.3.1) using the test methods specified in 4.7.2.4, 4.7.2.5 and 4.7.4 respectively. Failure of the launcher to pass any of the test shall be cause for rejection.

4.5.3.5 Leaf sight alinement testing. Prior to mounting on the handguard assembly, each leaf sight assembly (see 3.2.5) shall be tested for alinement as specified in 4.7.3.

* 4.5.3.6 Endurance testing. One launcher randomly selected from each inspection lot shall be tested for endurance (see 3.3.2) using the test method specified in 4.7.5. If the endurance requirements are not met, the represented lot shall be rejected. Upon completion of the endurance test looseness of the barrel extension is permissible.

* 4.5.3.7 Targeting and accuracy testing. One launcher randomly selected from each inspection lot shall be fired for targeting and accuracy (see 3.3.3) using test methods specified in 4.7.6. Failure of launcher to meet the targeting and accuracy requirements shall be cause for rejection of the represented lot. A sample of two launchers from each reconditioned lot shall be tested using the procedure specified above.

4.5.3.8 Interchangeability testing.

4.5.3.8.1 In plant.

* 4.5.3.8.1.1 Launchers. Ten launchers randomly selected from each inspection lot shall be tested for interchangeability (see 3.4) using the test methods specified in 4.7.7.1.1. Launchers taken for interchangeability testing shall have been found satisfactory in all other examinations and tests. The 10 launchers shall be tested for and shall comply with the requirements for firing pin indent (see 3.2.3.7) and firing pin protrusion (see 3.2.3.8) after interchange of parts using the test methods specified in 4.7.2.2 and 4.7.2.3 respectively. In addition, the launchers shall be examined for functioning of safety (see 3.2.3.11) and shall be tested for safety actuation torque (see 3.2.3.11.2, functioning (see 3.3.1), and targeting and accuracy (see 3.3.3) requirements after interchange of parts using the test methods specified in 4.7.2.5, 4.7.4 and 4.7.6 respectively. No malfunctions or failures shall be allowed. Failure of any launcher to pass any of the tests or requirements specified above shall be cause for rejection of the represented lot. A sample of 20 launchers from each retest or reconditioned lot shall be tested using the test procedures specified above.

* 4.5.3.8.1.1.1 The ten launchers selected for the interchangeability test shall be subjected to the breech insert removal test using the test method specified in 4.7.7.1.1.1. Failure of the ten launchers to meet the torque requirements of 3.2.3.5 shall be cause for rejection of the represented lot.

* 4.5.3.8.1.2 Concurrent repair parts. A sample of at least five parts from each inspection lot of concurrent repair parts shall be subjected to the interchangeability test specified in 4.7.7.1.2. Failure of any part to pass the interchangeability test shall be cause for rejection of the represented lot of parts. A sample of 10 parts from each retest or reconditioned lot shall be tested using the test procedures specified in 4.7.7.1.2.

* 4.5.3.8.2 Interplant. When launchers are manufactured concurrently by more than one contractor, each contractor shall forward monthly to a testing agency designated by the procuring agency, five launchers for the interplant interchangeability test specified in 4.7.7.2 (see 6.1). The launchers shall be tested for and shall comply with the requirements for firing pin indent (see 3.2.3.7) and firing pin protrusion (see 3.2.3.8) before and after interchange of parts using the test methods specified in 4.7.2.2 and 4.7.2.3, respectively. In addition, the launchers shall be examined for functioning of the safety (see 3.3.3.11) and shall be tested for safety actuation torque (see 3.2.3.11.2), functioning (see 3.3.1), and targeting and accuracy (see 3.3.3) after interchange of parts using the test methods specified in 4.7.2.5, 4.7.4 and 4.7.6 respectively. Parts shall be identified with their manufacturer throughout the test. Before launchers are returned to the contractors, the original parts shall be reassembled to their respective launchers and the launchers given a hand functioning test to assure proper operation.

4.5.3.9 Component part and repair parts testing. Raw material testing, part testing, and certification shall be performed in accordance with the criteria specified in the contract (see 6.1). This will include chemical analysis and physical tests of materials, tests of protective finish, heat treatment, bonding, and function of parts as applicable. The contractor shall accomplish these tests prior to assembly into an end item or submission for acceptance as repair parts.

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

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4.5.5 Certification. Unless otherwise specified, the contractor shall be responsible for testing necessary to accomplish certification. For each inspection lot of launchers, the contractor shall provide the Government representative with Certification of compliance with applicable drawings and specifications.

4.5.6 Inspection equipment. Unless otherwise specified in procurement documents (see 6.1), responsibilities for acquisition maintenance, and disposition of measuring and testing equipment prescribed on the Inspection Equipment List IEL8448300, and for all other inspection equipment required to perform inspection prescribed by applicable specifications, shall be in accordance with MIL-I-45607.

* 4.6 Reliability demonstration. When specified in the contract (see 6.1) six launchers randomly selected shall be tested for the reliability demonstration requirements specified in 3.5 using test plant XXIV of MIL-STD-781. Launchers selected shall be mounted on a rifle, 5.56mm, M16 or M16A1 and subjected to the demonstration methods specified in 4.7.8. If test failure occurs, a retest for reliability in accordance with 4.7.8.1 thru 4.7.8.7 shall be conducted utilizing launchers on which all corrective actions have been accomplished as specified in 4.7.8.5.

4.7 Test methods.

4.7.1 Barrel assembly group.

4.7.1.1 Pump actuation test. Launchers shall be tested for pump actuation using Government approved inspection equipment. With the launcher in vertical position, the firing mechanism in the fired position, the barrel latch shall be depressed and a continuous force applied to the barrel assembly to move it to its forward most position and return it to the locked position using a continuous applied force. This procedure shall be performed with the weapon unloaded, and repeated with the weapon loaded.

4.7.1.2 Barrel stop test. With the barrel assembly opened to the full open position and held in a vertical position with the muzzle upward, a force shall be applied downward on the muzzle end of the barrel assembly to overcome the retention characteristics of the barrel stop. The force required to release the barrel assembly from this position shall be measured and shall conform within the limits specified.

4.7.1.3 Barrel latch test. With the barrel assembly locked in the battery position, a force shall be applied to the barrel latch surface to cause release of the barrel assembly from the battery position. This force shall be measured and shall conform within the limits specified.

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4.7.1.4 Cartridge locator test. With the barrel assembly not assembled to the receiver, a force shall be applied to the rear end of the cartridge locator, parallel to the axis of the barrel. The force required to deflect the cartridge locator to within flush position plus .020 inches of the barrel face shall be measured and shall conform within the limits specified.

4.7.2 Receiver group.

* 4.7.2.1 Cartridge ejector test. With barrel assembly not assembled to the receiver, a force shall be applied to deflect the cartridge ejector pinto within flush plus .020 inch of the breech face shall be measured and shall conform within the limits specified.

4.7.2.2 Firing pin indent test. Launchers shall be tested for firing pin indent using Government approved inspection equipment. The launcher shall be held in a vertical position with muzzle down, the launcher opened, and the copper compression cylinder holding fixture containing the copper compression cylinder, Drawing B8440920, inserted in the barrel chamber. The launchers shall then be closed, the safety set in the fire position, and the trigger pulled to release the firing pin and indent the copper cylinder. The holding fixture shall then be removed from the launcher and the depth of the indent in the copper pressure cylinder computed by measuring the distance from the original surface of the copper cylinder (before indentation) to the bottom of the firing pin impression. If the indent is not within the requirements, three more impressions shall be taken and the average depth of the three indents of each test shall be within the requirements for acceptance. All firing pin indent impressions shall not be off center more than one-half the diameter of the firing pin point.

4.7.2.3 Firing pin protrusion test. Launchers shall be tested for firing pin protrusion using Government approved inspection equipment.

4.7.2.4 Trigger pull test. Launchers shall be tested for trigger pull using Government approved inspection equipment. The launcher shall be cocked, the safety shall be in the "fire" position, and the launcher shall be in the vertical position with the stock assembly down when each load is applied. The load shall be applied gradually to the trigger and exerted in a line parallel to the axis of the barrel bore by a slow steady lift of the launcher. When the minimum load is applied the firing pin shall not release, and when the maximum load is applied the firing pin shall release. The trigger pull shall also be tested for creep by applying pressure manually to the trigger at a unifom rate of increase over a period of not-less than three seconds.

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4.7.2.5 Safety actuation torque test. Each launcher shall be tested for the safety actuation torque with the launcher in a horizontal position and the safety set at the "safe" position. Government approved inspection equipment shall be used. With the torque indicator gage engaging the lower side corner of the safety, the torque shall be applied gradually to the rear of the safety in the test direction of the safety motion until movement to the "fire" position is reached. With the safety set at the "fire" position, a torque shall be identically applied to the front of the safety until it moves to the "safe" position, and the torque measured. The maximum torque measured during the movement of the safety from the "safe" position to the "fire" position and reverse shall determine whether the safety actuation torques are within the specified requirements.

4.7.3 Leaf sight alinement test. Each leaf sight assembly shall be tested for alinement prior to being assembled onto the handguard. A Government approved alinement sighting fixture shall be used for this test. With the elevation and azimuth settings on the central graduation marks and leaf unfolded to the sighting position, the leaf sight assembly shall be securely fastened to the alinement sighting fixture. Each range setting shall be checked for acceptable alinement within the designated images using the pointer element of the alinement sighting fixture. It shall be permitted to adjust the sight for either or both one (1) mark azimuth, one (1) mark elevation in either direction to achieve entrance into an acceptance image. After such adjustments, the leaf sight assembly shall be checked for alinement within all of the sighting fixture images without further adjustment. Each leaf sight assembly that fails to pass this test shall be rejected as an individual assembly, subject to corrective action as specified in 4.5.3.1.

* 4.7.4 Pressure resistance and functioning tests. Each launcher shall be tested for pressure resistance and functioning concurrently by firing of one round using Government approved firing fixture. Each barrel shall be penetrant inspected before application of final protective finish prior to this test. Barrels shall be examined for cracks, deformations and other evidence of damage. Cartridge cases shall be visually examined for bulges, splits, rings and other defects caused by defective barrels. Proof marks shall be applied as specified on the applicable drawing on launchers that have passed this test.

4.7.5 Endurance test.

4.7.5.1 The launcher shall be tested for endurance by assembling the launcher to an M16 or M16A1 rifle or Government approved testing fixture and firing 1000 rounds. The launcher shall be cooled to ambient temperature after each 250 rounds fired.

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4.7.5.2 Launchers shall be cleaned and oiled after each 250 rounds and at the close of each day's firing.

4.7.5.3 A complete record shall be kept for each endurance test showing each malfunction and part replacement including the number of round at which each occurred and corrective action taken. Malfunctions attributable to ammunition shall not be counted against the launcher; however, such malfunctions shall be recorded.

* 4.7.6 Targeting and accuracy test. Testing shall be conducted from a bench rest position for the targeting and accuracy. The launcher, complete with leaf sight assembly, and the sights set as specified in 3.3.3, a 20 round group shall be fired at a range of 200 meters using an Army "A" type target. The range and deflection of each round shall be recorded. The standard deviation (range and deflection), the probable error (range and deflection), and center of impact of the 20 round group shall be determined within the limits specified. All firing shall be conducted with wind conditions not exceeding 10 miles per hour.

4.7.7 Interchangeability test.

4.7.7.1 In plant.

4.7.7.1.1 Launchers. Launchers shall be tested for interchangeability of parts by disassembling and then reassembling parts using the parts and prearranged system prescribed below. Interchange of parts shall be accomplished by dividing the parts of each launcher into 10 groups of nonmating parts, distributing the groups into 10 different trays until each tray contains a complete launcher. Groups of parts from launcher number 1 shall be taken in order and placed in trays 1 through 10; groups of parts from launcher number 2 shall be taken in order and placed in trays 2 through 10 to 1; groups of parts from launcher number 3 shall be taken in order and placed 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 associated part. Any commercial part rendered unserviceable by disassembly shall be replaced without penalty to the interchangeability test. The launchers shall be reassembled using only those parts which are in the same tray.

4.7.7.1.1.1 The launcher receiver, prior to reassembly, shall be securely held, and using a torque wrench shall remove the breech insert. The breaking torque and average locking torque shall be recorded and forwarded as specified in the contract in accordance with contract data requirement (see 6.2).

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GROUPS OF NONMATING PARTS

Group I

Barrel Assembly (8448373)
 Plate, Back (8448314) or (8448776)

Group II

Follower Assembly (8448775)
 Trigger (8448341)

Group III

Pin, Trigger (12002921)
 Spring, Sear (8448305)
 Sear (84483452)
 Pin (MS16562-96)

Group IV

Lever, Cocking (8448332)
 Pin, Spring (8448781)

Group V

Ejector, Cartridge (8448302)
 Spring, Ejector (8448307)
 Retainer, Ejector (8448313)
 Pin, Spring (8448781)

Group VI

Safety (8448773)
 Spring, Safety (8448383)
 Plunger, Safety (8448324)
 Pin, Swing (8448781)

Group VII

Extractor, Cartridge (8448386)
 Spring, Extractor (8448308)
 Pin, spring (MS16562-28)

Group VIII

Stop, Barrel (8448348)
 Spring, Barrel Stop (8448326)
 Pin, Dowel (MS16555-632)

Group IX

Receiver (8448338)
 *Latch, Barrel (8448349)
 *Pin, Barrel Latch (8448350)
 *Spring, Barrel Latch (8448304)
 *Guard, Trigger (8443375)
 *Pin (MS39086-41)
 *Pin, (MS39086-163)

Group X

Pin, Firing (12002970)
 Spring, Firing Pin (8448777)

*Note: Do Not Remove these Parts from the Receiver.

4.7.7.1.2 Concurrent repair parts. Each lot of concurrent repair parts shall be tested for interchangeability by disassembling two launchers previously accepted in 4.7.7.1.1 as required, in groups of nonmating parts and then reassembling them using the concurrent repair parts. No hand refinement of parts will be allowed, and the launchers shall operate and function properly as specified in 4.5.3.8.1.1. This test may be performed independently of the launcher interchangeability test specified in 4.7.7.1.1 and at more frequent intervals using accepted launchers taken from current production.

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4.7.7.2 Interplant. Launchers to be subjected to the interplant interchangeability test shall be given preliminary hand functioning to assure proper operation before parts are disassembled from the launcher. Launchers shall be interchanged in a manner similar to the detailed plan in 4.7.7.1.1 except that the parts shall be divided into five groups and that when disassembling, every other launcher used shall be one produced by a different manufacturer.

4.7.8 Reliability demonstration method.

4.7.8.1 Launchers selected for the reliability demonstration shall be mounted to an M16 or M16A1 rifle and test fired 1000 rounds each for reliability.

4.7.8.2 Firing shall be in 10 complements of 100 rounds each from a shoulder fired free standing position.

4.7.8.3 During rounds 21-30 and 81-90 of each complement, the launchers shall be rapid fired within a two minute period, beginning with the weapon loaded and locked. The time, in seconds, during each 10 rounds rapid firing, shall be recorded. If a failure, as defined in 3.5.1, occurs during the rapid firing for time, the time reading shall be discarded; an additional reading of the time to fire ten rounds will be taken for any reading discarded.

4.7.8.4 Launchers shall be cleaned and oiled using lubricant in accordance with MIL-L-46000 after each 250 rounds and at the close of each day's firing, but no parts shall be altered. Only parts broken or worn to the extent that they are unserviceable shall be replaced.

* 4.7.8.5 Launchers exhibiting a reliability failure shall be cause for the contractor to perform a failure analysis. The Government representative shall verify the results of the failure analysis and assure deficiencies causing failure have been corrected on all weapons and components in process and at the vendor's plant. If a total of two (2) or less failures occur during the entire demonstration (6000 rounds) the reliability requirements has been met. The occurrence of three (3) failures shall be cause for test failure, testing shall be suspended and the contractor shall perform the corrective specified in 4.5.3.1.

4.7.8.6 A complete record shall be maintained for each reliability demonstrated weapon, showing each malfunction and parts replacement including the number of rounds at which each occurred and the cause for the failure. In addition, the round interval and time in seconds for each 10 round rapid firing shall be recorded.

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4.7.8.7 At completion of the reliability demonstration, launchers shall be disposed of as specified in the contract (see 6.1).

5. PREPARATION FOR DELIVERY

5.1 Pilot pack. A pilot pack shall consist of a complete launcher packaged in accordance with Packaging Data Sheets P11838703 for the level of protection specified in the contract (see 6.1), and packed level C, shall be forwarded as specified in 3.1.

5.2 Preservation, packaging, packing and marking. Launchers shall be preserved, packaged, packed, and marked in accordance with the Packaging Data Sheet P11838703 for the level of protection specified (see 6.3.).

5.3 Repair parts. Repair parts shall be preserved, packaged, packed and marked in accordance with the Packaging Data Sheet or other requirements, and for the level of protection specified in the contract (see 6.1).

6. NOTES

* 6.1 Cheering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Lists of drawings and specifications pertinent to the launcher, showing applicable revision dates.
- c. Examination criteria not specified herein (see 4.5.2.1).
- d. Disposition of endurance tested launchers.
- e. Shipping instructions for first article and pilot pack, if different (see 3.1 and 5.1).
- f. Selection of applicable levels of preservation, packaging and packing (see 5.1 and 5.2).
Packaging instructions for repair parts (see 5.3).
- h. Responsibilities for acquisition, maintenance and disposition of acceptance inspection equipment (see 4.5.6).
- i. Shipping instructions for launchers when an interplant interchangeability test is required (see 4.5.3.7.2).
- j. Procedures and methods for demilitarizing and disposing of rejected material.
- k. Disposition of Government furnished property.
- l. Reliability demonstration. when required, and disposition of launchers (see 4.6 and 4.7.11.7).

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

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6.3 Supersession data. This specification include the requirements of U.S. Army Weapons Command Purchase Description USAWECOM PD-14, dated 17 July 1970.

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.

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

6.6 The margin of this specification are marked with an asterisk to indicate where changes (additions, modifications, confections, deletions) from the previous issue 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 issue.

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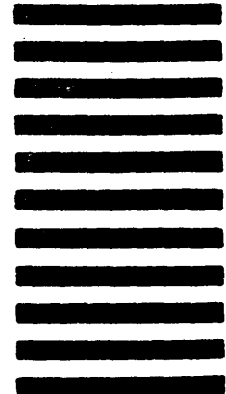
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INCH-POUND

MIL-L-45935A
AMENDMENT 3
29 March 1991
SUPERSEDING
AMENDMENT 2
29 June 1987

MILITARY SPECIFICATION

LAUNCHER, GRENADE, 40MM: DETACHABLE M203

This Amendment forms a part of Military Specification MIL-L-45935A, dated 5 September 1974, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

1.1, Change "the M16 and M16A1, 5.56mm Rifle" to "the M16 and M16A1 or M16A2, 5.56mm Rifle".

* 2.1, Under Standards Add:

"MIL-STD-1189

-Standard Department of Defense
Bar Code Symbology"

PAGE 2

Delete 3.2.2.1 and Substitute:

"3.2.2.1 Pump actuation. The barrel assembly shall be capable of pump actuation when the barrel latch is depressed. The barrel assembly shall be capable of forward and rearward movement over its full range of travel. The maximum force required to move the unloaded barrel assembly from the unlocked position to the maximum forward open position and returned to the close locked position shall not exceed 14 pounds. Under loaded conditions using the 40mm (functional test) plug, P/N 12937951, the maximum forces shall not exceed 28 pounds. Testing shall be as specified in 4.5.3.2."

PAGE 3

* Delete 3.2.2.4 and Substitute:

"3.2.2.4 Cartridge retainer. The cartridge retainer clips shall be capable of deflection through their full range of travel without binding or permanent deformation. The cartridge retainer shall be capable of holding a fully inserted 40mm plug, P/N 12937951, within the barrel chamber, when the launcher is held in the vertical position with the muzzle upward and the barrel opened. to the full open position."

AMSC N/A

1 of 7

FSC 1010

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* Delete 3.2.3.1 and Substitute:

"3.2.3.1 Extractor. The extractor shall function through it's full range of travel under spring action without binding. Upon locking the barrel into the battery position with the chambered 40mm plug, P/N 12937951, the extractor shall cam downward upon contact with the plug and allow the barrel with plug to be locked in the battery position. The extractor hook shall engage the plug's rim and retain the plug within the receiver to allow clearing of the barrel chamber as the barrel assembly is moved to the open forward position."

PAGE 4

3.2.3.2 Change "2.75 pounds minimum to 6.75 pounds maximum" to "0.65 pounds minimum to 1.62 pounds maximum".

3.2.3.4 Add: "testing shall be as specified in 4.5.3.10."

Delete 3.2.3.5 and substitute:

"3.2.3.5 Breech insert. The breech insert shall be securely seated and torqued to 50 pounds-inches \pm 5 pounds-inches so that the breech insert face is flush to 0.007 inch below the breech surface of the receiver. After the breech insert has been securely seated and torqued, the sealing compound shall be allowed to cure for not less than 24 hours. The loosening torque of the breech insert from the receiver shall not be less than 130 pounds-inches -10 pounds-inches. The firing pin hole shall be free of residue that would affect firing pin movement or freedom of other moving parts. Testing shall be as specified in 4.5.3.8."

PAGE 6

* Delete 3.3.1 and Substitute:

"3.3.1 Pressure resistance and functioning. Launchers shall withstand the firing of one (1) government standard 40 mm M781 practice round for pressure resistance and functioning. The launcher shall function without malfunction or unserviceable parts. There shall be no evidence of blown primer or primer puncture during firing. Testing shall be as specified in 4.5.3.4."

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* Delete 3.3.2 and Substitute:

"3.3.2 Endurance. Launchers shall withstand the firing of 1000 rounds using the 40mm, M781 Practice Round or equivalent, without malfunction or unserviceable parts. Launchers shall be cleaned and oiled with lubricant conforming to MIL-L-46000 after each 250 rounds fired and at the close of day's firing. Testing shall be as specified in 4.5.3.6."

3.3.3 Change "an M16 or M16A1 rifle" to "an M16 or M16A1 or M16A2 rifle".

* Delete 3.3.3 and Substitute:

"3.3.3 Targeting and Accuracy. The launcher shall be assembled to an M16, M16A1 or M16A2 rifle and fired at a 200 meter range distance for targeting and accuracy, using government standard 40mm M781 practice rounds or equivalent. The top edge of the front sight post flange of the rifle shall be set flush with or not more than .030 inches below the bottom surface of the front sight slot, and the leaf sight shall be unfolded to the sighting position. No adjustment of the leaf sight shall be made after it has been set in the leaf eight alignment. Testing shall be as specified in 4.5.3.7."

3.3.3.2 Change "an M16 or M16A1 rifle" to "an M16 or M16A1 or M16A2 Rifle".

Add 3.5.1 as shown below:

"3.5.1 Definition of reliability failure.

3.5.1.1 The occurrence of a malfunction which cannot be cleared in 10 seconds. A malfunction is any cessation of any ability of the system or any of its components to perform its intended function. A system is the item or combination of items which are under test.

3.5.1.2 The occurrence of a launcher condition which causes an unwarranted safety hazard to personnel.

3.5.1.3 The occurrence of broken or unserviceable part which renders the launcher inoperable or unsafe if firing is continued.

3.5.1.4 Failures which are attributable to ammunition shall not be charged against the launcher; they will however, be recorded."

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PAGE 7

* 3.7 Add:

"Bar code label shall be affixed to the receiver and IAW MIL-STD-1189".

PAGE 8

4.5.2.2.1 Delete "F1183800" and add "F11838246".

Change "the M16 or M16A1 rifle" to "the M16 or M16A1 or M16A2 Rifle".

PAGE 10

4.5.3.4 Delete in its entirety and substitute:

"4.5.3.4 Trigger pull, safety actuating torque, pressure resistance and functioning and breech insert loosening torque. Each launcher shall be tested for trigger pull (see 3.2.3.9) safety actuation torque (see 3.2.3.11.2), pressure resistance and functioning (see 3.3.1) and breech insert loosening torque (see 3.2.3.5) using the test methods specified in 4.7.2.4, 4.7.2.5, 5.7.4 and 4.7.7.1.1.1 respectively. Failure of the launcher to pass any of these tests shall be cause for rejection."

PAGE 11

4.5.3.8.1.1.1 Delete in its entirety and substitute the following:

"4.5.3.10 Trigger sear and secondary sear testing. A sample of 50 launchers shall be randomly selected from each inspection lot for trigger sear and secondary sear requirements of 3.2.3.4 using the test method specified in 4.7.2.6. Failure of the launcher to pass the above test shall be cause for rejection of the represented lot. Reconditioned launchers or reconditioned lots shall be tested using the procedures and test methods specified above."

PAGE 12

4.6 Change "on a rifle, 5.56mm, M16 or M16A1" to "on an "M16, M16A1 or M16A2 Rifle".

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PAGE 14

Add paragraph 4.7.2.6 as shown below:

"4.7.2.6 Trigger sear and secondary sear test. Launchers shall be tested for trigger sear and secondary sear requirements (see 3.2.3.4) utilizing inspection equipment in accordance with drawing F11836899 and Cartridge, 40MM, XM387B2 (Dummy, Completely Inert). With the launcher mounted to the fixture, the barrel latch shall be depressed and the launcher barrel exercised to cock the launcher with the left hand. Partial trigger pull shall be evenly applied to the trigger by the index finger of the right hand until movement of the trigger occurs without releasing the firing pin. The trigger shall then be released. The trigger shall return to the original position under spring action after partial trigger pull. The trigger will then be pulled to cause the firing pin to fall. The launcher shall then be opened in the manner previously cited and a fired cartridge case inserted into the breech of the barrel. The hook of the fixture will be placed over the trigger and 20 lb. pressure applied to depress the trigger. The barrel will then be moved to the closed position, left hand on the hand guard at a speed to simulate actual loading and firing of 5 to 10 rounds per 2 minutes. When the barrel is closed, the firing pin shall be retained by the secondary sear until the trigger is released and allowed to return to its forward position. When the trigger is pulled with the index finger of the right hand, the firing pin shall fall."

* Delete 4.7.2.6 and Substitute:

"4.7.2.6 Trigger sear and secondary sear test. Launchers shall be tested for trigger sear and secondary sear requirements (see 3.2.3.4) using inspection equipment in accordance with drawing F11835899 and 40mm functional test plug, P/N 12937951. With the launcher mounted to the fixture, the barrel latch shall be depressed and the launcher barrel exercised to cock the launcher with the left hand. Partial trigger pull shall be evenly applied to the trigger by the index finger of the right hand until movement of the trigger occurs without releasing the firing pin. The trigger shall then be released. The trigger shall return to the original position under spring action after partial trigger pull. The trigger pull will then be pulled to cause the firing pin to fall. The launcher shall be opened in a manner previously cited and the 40mm functional test plug inserted into the breech of the barrel. The hook of the fixture will be placed over the trigger and 20 lb. pressure applied to depress the trigger. The barrel will then be moved to the

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closed position, left hand on the hand guard at a speed to simulate actual loading and firing of 5 to 10 rounds per 2 minutes. When the barrel is closed, the firing pin shall be retained by the secondary sear until the trigger is released and allowed to return to its forward position. When the trigger is pulled with the index finger of the right hand, the firing pin shall fall."

4.7.5.1 Change "to and M16 or M16A1 rifle" to "to an M16, M16A1 or M16A2 Rifle".

4.7.7.1.1.1 Delete in its entirety and substitute:

"4.7.7.1.1.1 The launcher receiver, prior to reassemble, shall be securely held, and using a torque wrench, shall withstand a torque of 130-10 pound-inches applied to the breech insert without movement or loosening of the breech insert."

PAGE 16

Table titled: GROUPS OF NONMATING PARTS. Group V Change
"Spring, Ejector (8448307)" to "Spring, Ejector (12006355)".

PAGE 17

4.7.8.1 Change "to an M16 or M16A1 rifle" to "to an M16, M16A1 or M16A2 Rifle".

PAGE 18

* 5.2.1 Add:

"5.2.1 Bar code shall be attached to the receiver IAW the drawing and shall agree with the serial number."

* 6.1 Add:

"m. Bar code marking requirements."

6.1.1 Delete "4.7.11.7" and substitute: "4.7.8.7".

6.2 Change "and interchangeability and breech insert removal, etc.)" to "and interchangeability)".

The margins of this amendment are marked with an asterisk or vertical lines to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment were made. This was done as a convenience only and the

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