INCH-POUND

MIL-PRF-32327 (AR)
20 March 2009

PERFORMANCE SPECIFICATION

RIFLE, CALIBER .50: SNIPER W/DAY OPTIC SIGHT AND CARRYING CASES - M107

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

1 SCOPE

1.1 Scope. This specification prescribes the performance requirements and identifies the verification procedures for the RIFLE: caliber .50, sniper w/day optic sight and carrying cases, M107. This specification contains components as defined in section 6.6, hereafter referred to simply as M107.

1.2 Type-designator. The Army type-designator M107 referenced in this specification is of Army origin and does not reflect a particular design. (See 6.3).

1.3 Requirement levels. This specification lists two values for certain performance parameters. The threshold value (T) is the minimum acceptable value, and the objective value (O) is the desired value for which the performance of the M107 results in operationally significant increase in capabilities. All requirements not noted are threshold requirements.

1.4 Component designation. This specification contains four component requirement designations: System requirements, Rifle requirements, Optic sight requirements, and System case requirements. Unless otherwise specified, the system requirements apply to the rifle, the day optic sight, and the carrying case. Unless otherwise specified the rifle requirements apply to the rifle only, the optic sight requirements apply to the sight only, and the system case requirements apply to the system cases only.

Comments, suggestions, or questions on this document should be addressed to Commander ARDEC, ATTN: RDAR-QES-E, Picatinny, NJ 07806-5000) or emailed to (ardecstdzn@conus.army.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

AMSC N/A FSC 1005

2 APPLICABLE DOCUMENTS

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

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

TT-C-490	Chemical Conversion Coatings and Pretreatments for Ferrous Surfaces (Base for Organic Coatings)

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-3150	Lubricating Oil, Preservative, Medium
MIL-PRF-14107	Lubricating Oil, Weapons, Low Temperature
MIL-DTL-16232	Phosphate Coating, Heavy, Manganese or Zinc Base
MIL-C-60162	Cartridge, Caliber .50, Test, High Pressure, M1
MIL-PRF-63460	Lubricant, Cleaner and Preservative for Weapons and Weapon Systems

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-810E	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1474	Noise Limits
MIL-STD-1913	Dimensioning of Accessory Mounting Rail for Small Arms Weapons
MIL-STD-1916	DOD Preferred Methods for Acceptance of Product

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

US ARMY DEVELOPMENTAL TEST COMMAND

TOP 3-2-045	Automatic Weapons, Machine Guns, and Hand and Shoulder Weapons
TOP 3-2-504	Safety Evaluation of Hand and Shoulder Weapons
TOP 3-2-609	Chemical Compatibility of Nonmetallic Materials Used In Small Arms Systems

(Copies of these documents may be ordered from the US Army Developmental Test Command, ATTN: Publications, 314 Longs Corner Road, Aberdeen Proving Ground, MD 21005-5005, or online at http://www.dtc.army.mil/publications/topsindex.aspx.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

ASTM E1417	Standard Practice for Liquid Penetrant Testing
ASTM E1444	Standard Practice for Magnetic Particle Testing

(Copies of ASTM standards are available online from http://www.astm.org/ or from the American Society for Testing and Materials, 100 Barr Harbor Drive, Conshohocken, PA 19428-2959.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS

3.1 Design verification. When specified (see 6.2), a sample of M107 and components shall be subjected to design verification in accordance with Table I and 4.2.

3.2 First article inspection. When specified (see 6.2), a sample of M107 and components shall be subjected to first article inspection in accordance with Table I and 4.3.

3.3 Conformance inspection. When specified (see 6.2), a sample of M107 and components shall be subjected to quality conformance inspection in accordance with Table I and 4.4.

3.4 Operating requirements.

3.4.1 System requirements.

3.4.1.1 Accuracy (personnel- sized targets). The rifle with Day Optic Sight attached and zeroed, shall be capable of acquiring and engaging personnel-sized targets, 4.869 x 1.489

feet (1.484 x 0.454 meters), at 1,968.5 feet (600 meters) (T), and 4,921.2 feet (1,500 meters) (O). At either distance, one shot out of six (T), five shots out of six (O) shall hit the target.

3.4.1.2 Accuracy (vehicle sized targets). The rifle with Day Optic Sight attached shall be capable of acquiring and engaging vehicle sized targets, 7.55 x 15.09 x 7.55 feet (2.3 x 4.6 x 2.3 meters), at 3,280.83 feet (1,000 meters) (T), and 6561.66 feet (2,000 meters) (O). At either distance, one shot out of ten shall hit the target.

3.4.1.3 Dispersion. When using the rifle, with Day Optic Sight attached, the distance between the centers of the best five (5) rounds (after firing a six (6) round shot group at a target located 328.083 feet (100 meters) from the rifle) shall be less than 2.5 inches when fired with Cartridge, Caliber .50, Ball, M33 ammunition or equivalent.

3.4.2 Rifle requirements.

3.4.2.1 Functioning. The rifle shall fire 10 rounds, using magazine supplied with the system, without stoppages, malfunctions, unserviceable parts, or pierced primers, when firing M33 ammunition or equivalent.

3.4.2.2 High pressure resistance. After the proof firing of one Cartridge, Caliber .50: Test, High Pressure, M1 round as specified in MIL-C-60162, or approved equivalent, the barrel, bolt and barrel extension shall be free of cracks.

3.4.2.3 Firing rate. The rifle shall fire not less than 10 rounds per minute, under steady-state firing, including magazine changes.

3.4.2.4 Rifle action. The rifle action shall be semi-automatic, (see 6.4).

3.4.2.5 Safety. The rifle shall have a safety device with the following characteristics:

a. It can be placed in either the “safe” or "fire" position.
b. It prevents the weapon from being fired when the trigger is depressed with the safety in the “SAFE” position.
c. It is movable between the safe and fire positions by the operator without moving his hands from the shooting position (prone, standing, kneeling, and sitting).
d. It remains in the position the operator sets it until it is manually changed.
e. It performs all operations at all temperatures in the operating range (-50° F through 145°F).
f. It is operable by a person (5^{th} to 95^{th} percentile) dressed in cold weather environmental clothing (except for the outer arctic mitten) and NBC (MOPP IV) hand gear.
g. It is capable of being checked by both sight and touch.
h. The design of the rifle shall preclude firing while the bolt is not in the closed and locked position, or when the bolt is being closed.

3.4.2.6 Recoil. The recoil of the rifle shall not be greater than 60 ft-lbs, when firing the Cartridge, Caliber.50: Armor-Piercing-Incendiary, MK211 API or Cartridge, Caliber.50: ball, M33.

3.4.3 Day Optic sight requirements.

3.4.3.1 Elevation and windage adjustment. Elevation and windage adjustments on the Day Optic Sight shall be provided with the following characteristics:

a. Clearly marked graduations that provide tactile feedback during movement.
b. Increments of 0.25 minutes of angle (MOA).
c. The zero position of the reticle shall move not more than 0.5 MOA from the optical axis when cycled from zero to the extreme adjustments and returned.

3.4.3.2 Elevation and windage range. There shall be sufficient elevation adjustment to engage targets out to 6561.66 feet (2000 meters).

3.4.3.3 Magnification. The Day Optic Sight shall have a variable range of magnification. The low power setting shall be no less than 3x and no greater than 4.5x and the high power setting shall be no less than 14x and no greater than 16x.

3.4.3.3.1 Power zero retention. The Day Optic Sight shall have variable/adjustable power and shall retain zero throughout all power settings. With the sight zeroed at the high power setting the line of sight shall retain its zero setting within 0.5 MOA throughout the entire range of magnification.

3.4.3.4 Field of view. The Day Optic Sight shall have a field of view (FOV) that is not less than 1 degree at the highest magnification setting, and not less than 3 degrees at the lowest magnification setting.

3.4.3.5 Objective opening. The objective end of the day optical sight shall have an internally threaded interface for accepting a laser filter unit (LFU) Tactical Rifle Scopes, 50mm (NSN 1240-01-502-1295).

3.5 Interface and interoperability requirements.

3.5.1 System requirements.

3.5.1.1 Weight. The rifle with bipod, mounted Day Optic Sight, and an unloaded magazine shall weigh no more than 35 pounds (T), 25 pounds (O).

3.5.1.2 Exterior surfaces. All exposed exterior surfaces of the M107 shall be dull/non-reflective. The external color of the entire weapon shall be a tan, black, or gray, to accommodate various camouflage combinations.

3.5.1.3 Ambidextrous use. The system shall be capable of use by either a right or left handed firer.

3.5.2 Rifle requirements.

3.5.2.1 Blank firing. The rifle shall be capable of firing blank ammunition when chambered manually (T), and shall be fully capable (semi-automatic) with Blank Firing Adapter (BFA) (see 6.4) (O).

3.5.2.2 Headspace. The headspace shall be not less than 3.134 inches and not greater than 3.144 inches.

3.5.2.3 Firing pin protrusion. The firing pin protrusion shall be not less than 0.057 inches and not greater than 0.063inches.

3.5.2.4 Trigger pull. The trigger pull of the rifle shall be not less than 7 pounds, and not greater than 9 pounds. The trigger shall return to its normal forward position upon release after partial or complete trigger pull.

3.5.2.5 Noise. The rifle, when firing either the MK211 Armor Piercing Incendiary or M33 ball cartridge, shall have impulse noise levels that are not greater than the decibel limits for double hearing protection in accordance with Impulse noise daily exposure limits (Table 4-I) and Peak sound pressure levels and B-duration limits for impulse noise (Figure 4-1) of MIL-STD-1474.

3.5.2.6 Ammunition compatibility. The rifle shall safely fire the following rounds of Caliber .50 ammunition.

Cartridge, Caliber.50, Armor-Piercing-Incendiary, MK211
Cartridge, Caliber .50, Ball, M33
Cartridge, Caliber .50, Tracer, M17
Cartridge, Caliber .50, Armor-Piercing-Incendiary, M8
Cartridge, Caliber .50 Armor-Piercing-Incendiary-Tracer, M20
Cartridge, Caliber .50, Test, High Pressure, M1
Cartridge, Blank, Caliber .50, M1A1 (excluding extraction, unless a Blank Firing Adaptor is available)

3.5.2.7 Magazine. Five detachable magazines, each with a capacity of ten rounds, shall be provided with each weapon. The magazines shall be capable of being removed from the rifle using only one hand; bare handed and with NBC (MOPP IV) hand gear.

3.5.2.8 Mounting interface. The rifle shall be provided with two MIL-STD-1913 Picatinny Rails. One rail shall be on the top of the receiver, at a 27 minute angle to the bore, oriented high in back and low towards muzzle, and shall accommodate the mounting of the Day Optic Sight. The second mounting rail shall be parallel to the bore, but not on the top of the receiver to accommodate mounting accessory equipment.

3.5.2.9 Disassembly. The rifle shall be capable of being easily disassembled into its major components without the use of special tools.

3.5.2.9.1 Disassembled length. The maximum overall length of any individual component after disassembly shall not be greater than 49 inches (T), 36 inches (O).

3.5.2.10 Bipod. The rifle shall have a bipod with the following characteristics:

a. It shall be detachable.
b. It shall have legs, which are independently adjustable in length.
c. It shall have legs that provide rigid support when firing from the prone position.
d. It shall have legs that fold, allowing the weapon to be stored, in its case, without removing the bipod.
e. It shall have a height, from the ground to the attachment point, of not greater than 11 inches and not less than 7 inches.
f. It shall attach to the rifle without the use of special tools.

3.5.2.11 Iron sights. The rifle shall be equipped with a Back-Up Iron Sight (BUIS) for emergency use.

3.5.2.11.1 Targeting. The iron sights shall allow for acquiring and hitting a personnel-sized target, 4.869 x 1.489 feet (1.484 x 0.454 meters), out to 1,968.5 feet (600 meters). One shot out of six shall hit the target.

3.5.2.11.2 Detachability. The iron sights, if detachable, shall be capable of being detached and reattached by the operator without the use of special tools (T), by hand (O). When removed and then reattached the iron sights shall repeat zero within 0.5 MOA.

3.5.2.11.3 Adjustability. The iron sights shall be adjustable for both elevation and azimuth in increments no greater than 0.5 MOA increments. The adjustments shall be audible, tactile clicks and capable of adjustment at all temperatures in the operating range (-50°F through 145°F) by a person dressed in cold weather environmental clothing (less the outer arctic mitten), and by a person dressed in NBC (MOPP IV) hand gear.

3.5.2.12 Coatings. The rifle shall incorporate self-lubricating coatings and materials that do not require the application of grease or lubricants for the operating components (O).

3.5.3 Day Optic sight requirements.

3.5.3.1 Eye relief. The eye relief of the Day Optic Sight shall be not less than 5 inches at the low power setting and not less than 3.7 inches at the high power setting.

3.5.3.2 Mounting interface. The Day Optic Sight shall be equipped with a mounting system (e.g. rings and/or base interface) compatible with the MIL-STD-1913 Rail.

3.5.3.3 Reattachment. The Day Optic Sight shall be capable of being removed from the rifle and reattached by the operator by hand and/or with tools common to the snipers deployment kit, with a maximum change in the zero of the weapon of 0.5 MOA.

3.6 Environmental requirements.

3.6.1 System requirements.

3.6.1.1 Corrosion resistance. The rifle and all components shall be protected with durable corrosion resistant coatings (T), or shall be constructed of corrosion resistant materials (O), which are abrasion, impact and battlefield chemical resistant equal to or greater than phosphated steel. The M107 Steel parts that are phosphate coated or electro-plated shall have appropriate thermal treatment to prevent hydrogen embrittlement as specified in MIL-DTL-16232 and TT-C-490.

3.6.1.2 Salt fog. The exposed rifle, complete with Day Optic Sight (lenses covered) and two fully loaded magazines, system carrying case and all metallic components shall be functional and the rifle shall be capable of firing two magazines without stoppages after 48 hours (T), 96 hours (O) exposure to salt fog environment.

3.6.1.3 Sand and dust. The rifle with Day Optic Sight attached and with lenses covered, shall be capable of firing 50 rounds with no greater than five (5) Class I malfunctions (see 6.4) after exposure to sand and dust environment (O).

3.6.1.4 Rain. The rifle with Day Optic Sight attached and with lenses covered, shall be capable of firing 50 rounds with no greater than 5 Class I malfunctions (see 6.4) after exposure to rain (O).

3.6.1.5 Icing. The rifle with Day Optic Sight attached and with lenses covered, shall be capable of firing 50 rounds with no greater than 5 Class I malfunctions (see 6.4) after being covered with ice (O).

3.6.1.6 Mud. The rifle with Day Optic Sight attached and with lenses covered, shall be capable of firing 50 rounds with no greater than 5 Class I malfunctions (see 6.4) after being covered with mud (O).

3.6.1.7 Operating temperature. The rifle with Day Optic Sight attached shall be capable of firing 100 rounds per hour for a total of 1,000 rounds, with no more than three stoppages, at temperatures ranging from not less than -50°F through not greater than 145°F.

3.6.1.8 Chemical resistance. Components of the rifle and Day Optic Sight shall not be adversely affected by exposure to petroleum, oil and lubricant products, insect repellents and other common battlefield compounds, listed in TOP 3-2-609.

3.6.1.9 Fungus. There shall be no detrimental effects, as specified in MIL-STD-810E, Method 508.4 “FUNGUS”, on components of the M107 due to fungal growth.

3.6.2 Rifle requirements.

3.6.2.1 Drop test. The rifle shall withstand a five-foot drop onto concrete with an empty, primed Caliber .50 cartridge in the chamber and a mounted simulated sight. With the safety in either the "safe" or "fire" position, the primed cartridge shall not discharge and there shall be no functional damage to the rifle.

3.6.3 Day Optic sight requirements.

3.6.3.1 Watertightness. The Day Optic Sight, without lens cover, shall show no moisture or fogging when submerged in 3.28 feet (1 meter) of water for a 2 hour period.

3.6.3.2 Lens cover. The Day Optic Sight shall be equipped with covers, which protect the lenses from sunlight, debris and dust. These covers shall be securely fastened to the sight, shall be capable of being opened while remaining attached to the sight and shall remain open during use.

3.6.4 System case requirements.

3.6.4.1 Drop test. The system carrying case fully loaded shall withstand a 30-inch drop onto concrete throughout all temperatures in the operating range (-50°F through 145°F). The component carrying case shall not open on impact. There shall be no structural damage to the component carrying case which may result in damage to the contents during subsequent shipping, handling or storage. There shall be no functional or physical damage to its contents.

3.6.4.2 Transportation vibration. The system carrying case shall protect its full contents from transportation vibration. There shall be no functional or physical damage to the system carrying case or its contents.

3.7 Support and ownership.

3.7.1 System requirements.

3.7.1.1 Reliability. The rifle with Day Optical Sight shall demonstrate compliance with the following Mean Round Between Essential Function Failure (MFBEFF) requirements, with 80% confidence, using M33 Ball Cartridges, or equivalent, over the service life of 5,000 rounds.

3.7.1.1.1 MRBEFF (Class I & II). The rifle with Day Optical Sight shall demonstrate a MRBEFF, for Class I & II failures (see 6.4) combined, of not less than 475 rounds over 5,000 rounds of firing.

3.7.1.1.2 MRBEFF (Class III). The rifle with Day Optical Sight shall demonstrate a MRBEFF, for Class III failures (see 6.4), of not less than 1424 rounds over 5,000 rounds of firing.

3.7.1.2 Maintainability. The M107 shall allow the operator to perform all necessary maintenance using lubricant for small arms weapons, in accordance with MIL-PRF-63460, without the use of any tools other than the equipment in the cleaning kit and deployment kit. Parts shall be designed to prevent improper assembly when removed or disassembled under field conditions.

3.7.1.3 Workmanship. The parts shall be clean and free of burrs, sharp edges, unblended radii, surface defects, cracks, chips, dirt grease, oil (except where specifically required), rust, foreign matter that could render the system unsuitable for its intended purpose. The fabrication shall be processed in such a manner as to be uniform in quality and shall be free from defects that affect serviceability and appearance.

3.7.2 Rifle requirements.

3.7.2.1 Barrel life. The barrel life of the rifle shall be not less than 1000 rounds (T), 3,000 rounds (O). A barrel shall be considered unserviceable when the dispersion measured is greater than 3.75 inches at 328.08 feet (100 meters).

3.7.2.2 Parts interchangeability. All operator/intermediate support replaceable parts shall be interchangeable without hand or machine fitting. The performance of the weapon shall not be degraded after interchange of parts.

3.7.2.3 Special clothing. The rifle shall be operable by a person dressed in NBC (MOPP IV) clothing and by a person dressed in cold weather clothing (except for the outer arctic mitten).

3.7.2.4 Marking. Each rifle shall have unique identification (UID) markings in accordance with MIL-STD-130, along with the designation “U.S. M107” and an individual serial number, applied to the lower receiver. After completion of the high pressure resistance test, rifle barrels or barrel extensions shall be marked to show completion of proof testing (P), and magnetic particle inspection (MP). Rifle barrels shall be marked to show caliber.

3.7.3 Day Optic sight requirements.

3.7.3.1 Cleanliness and optical quality. There shall be no evidence of glass fracture, cement separation, grease or fingerprints on any optical component when viewing through the objective or eyepiece end of the sight unit. There shall not be more than 3 particles of foreign matter visible on the reticle surface and no particle shall exceed the apparent width of a reticle line. There shall be no foreign matter obvious to the unaided eye which would impair optical performance when looking into the eyepiece against a background having a brightness of the sky in average daylight.

3.7.4 System case requirements.

3.7.4.1 System carrying cases. No more than two hard cases for rifle storage and transport storage shall be provided. If two cases are provided they shall each be no greater than

16 inches by 54 inches by 6 inches. . If only one case is provided it shall be no greater than 16 inches by 54 inches by 18.5 inches. The system carrying case(s) shall have provisions to securely contain and protect the following: rifle with and without the Day Optic Sight mounted; the un-mounted Day Optic Sight; and components and ancillary equipment specified herein.

3.7.5 Ancillary equipment.

3.7.5.1 Deployment kit. The deployment kit shall consist of required operator replacement parts and any tools required for maintenance of all operator level functions as defined in paragraph 6.7. Parts shall have quality equivalent to those in the small arms repair man tool kit (NSN 5180-01-462-4254).

3.7.5.2 Drag bag. A soft carrying case shall be included with the system. The case shall be constructed of durable materials to withstand repeated man-pack infiltrations. This case shall provide the capability to store the disassembled rifle; the Day Optic Sight; magazines sufficient to carry 50 rounds of ammunition; cleaning/deployment kits.

3.7.5.3 Magazine pouch. Each magazine pouch shall allow for the carry of a single, fully loaded magazine and provide for secure attachment compatibility with Army standard load bearing equipment (LBE), tactical vests, assault packs, field packs and drag bag.

3.7.5.4 Sling. Each rifle shall be provided with a detachable, adjustable, carry sling capable of being attached to the weapon and supporting the weight of the weapon.

4 VERIFICATION

TABLE I. Requirement/verification cross-reference matrix

	Section 3 Requirements	Inspection sample size and criteria			Verification Methods	Section 4 Verification Procedures
		Design Verification	First Article	Conformance Inspection (One lot)		
Design verification	3.1	X				4.2
First article inspection	3.2		X			4.3
Conformance inspection	3.3			X		4.4
Accuracy (personnel sized targets)	3.4.1.1	3-0-1[1]	5-0-1		Test	4.5.1.1
Accuracy (vehicle sized targets)	3.4.1.2	3-0-1	5-0-1		Test	4.5.1.2
Dispersion	3.4.1.3	See 4.5.1.3	See 4.5.1.3	See 4.5.1.3	Test	4.5.1.3
Functioning	3.4.2.1	5-0-1	5-0-1	VL I	Test	4.5.2.1
High pressure resistance	3.4.2.2	3-0-1	100%	100%	Test & Examination	4.5.2.2
Firing rate	3.4.2.3	5-0-1			Test	4.5.2.3
Rifle action	3.4.2.4	5-0-1			Test	4.5.2.4
Safety	3.4.2.5	100%	100%	100%	Demonstration & Examination	4.5.2.5
Recoil	3.4.2.6	1-0-1			Test	4.5.2.6
Elevation and windage adjustment	3.4.3.1	5-0-1	5-0-1		Demonstration	4.5.3.1
Elevation and windage range	3.4.3.2	5-0-1	5-0-1		Demonstration	4.5.3.2
Magnification	3.4.3.3	5-0-1	5-0-1		Examination	4.5.3.3
Power zero retention	3.4.3.3.1	5-0-1	5-0-1		Examination	4.5.3.3.1
Field of view	3.4.3.4	5-0-1	5-0-1		Examination	4.5.3.4
Objective opening	3.4.3.5	5-0-1	5-0-1		Examination	4.5.3.5
Weight	3.5.1.1	100%	100%		Examination	4.6.1.1
Exterior surfaces	3.5.1.2	5-0-1	5-0-1	100%	Examination	4.6.1.2
Ambidextrous use	3.5.1.3	5-0-1			Examination	4.6.1.3
Blank firing	3.5.2.1	5-0-1			Demonstration	4.6.2.1
Headspace	3.5.2.2	100%	100%	100%	Examination	4.6.2.2
Firing pin protrusion	3.5.2.3	100%	100%	100%	Examination	4.6.2.3
Trigger pull	3.5.2.4	100%	100%	100%	Test	4.6.2.4
Noise	3.5.2.5	1-0-1			Test	4.6.2.5
Ammunition compatibility	3.5.2.6	3-0-1	3-0-1		Test	4.6.2.6
Magazine	3.5.2.7	3-0-1			Demonstration	4.6.2.7

[1] Test three (3) - Accept with zero (0) failures - Reject with one (1) failure

TABLE I. Requirement/verification cross-reference matrix – Continued

	Section 3 Requirements	Inspection sample size and criteria			Verification Methods	Section 4 Verification Procedures
		Design Verification	First Article	Conformance Inspection (One lot)		
Mounting interface (rifle)	3.5.2.8	1-0-1	1-0-1		Examination& Demonstration	4.6.2.8
Disassembly	3.5.2.9	5-0-1	5-0-1		Demonstration	4.6.2.9
Disassembled length	3.5.2.9.1	5-0-1	5-0-1		Examination	4.6.2.9.1
Bipod	3.5.2.10	5-0-1	5-0-1	VL II	Demonstration	4.6.2.10
Iron sights	3.5.2.11	5-0-1			Examination	4.6.2.11
Targeting	3.5.2.11.1				Test	4.6.2.11.1
Detachability	3.5.2.11.2	5-0-1			Demonstration & Test	4.6.2.11.2
Adjustability	3.5.2.11.3	5-0-1			Demonstration	4.6.2.11.3
Coatings	3.5.2.12	See 4.6.2.12	See 4.6.2.12	See 4.6.2.12	Examination	4.6.2.12
Eye relief	3.5.3.1	5-0-1	5-0-1		Examination	4.6.3.1
Mounting interface (sight)	3.5.3.2	5-0-1	5-0-1	VL II	Demonstration	4.6.3.2
Reattachment	3.5.3.3	1-0-1			Demonstration	4.6.3.3
Corrosion resistance	3.6.1.1	See 4.7.1.1	See 4.7.1.1	See 4.7.1.1	Examination	4.7.1.1
Salt fog	3.6.1.2	1[2]	1		Test	4.7.1.2
Sand and dust	3.6.1.3	3			Test	4.7.1.3
Rain	3.6.1.4	3			Test	4.7.1.4
Icing	3.6.1.5	3			Test	4.7.1.5
Mud	3.6.1.6	3			Test	4.7.1.6
Operating temperature	3.6.1.7	3			Test	4.7.1.7
Chemical resistance	3.6.1.8	1-0-1			Test	4.7.1.8
Fungus	3.6.1.9	1-0-1			Test	4.7.1.9
Drop test (rifle)	3.6.2.1	1-0-1	1-0-1		Test	4.7.2.1
Watertightness	3.6.3.1	3-0-1			Test	4.7.3.1
Lens cover	3.6.3.2	5-0-1	5-0-1	100%	Examination	4.7.3.2
Drop test (case)	3.6.4.1	1-0-1			Test	4.7.4.1
Transportation vibration	3.6.4.2	3-0-1			Test	4.7.4.2
Reliability	3.7.1.1	See 4.8.1.1	See 4.8.1.1.8	See 4.8.1.1.9	Test	4.8.1.1
MRBEFF- Class I & II	3.7.1.1.1	See 4.8.1.1	See 4.8.1.1.8	See 4.8.1.1.9	Test	4.8.1.1
MRBEFF- Class III	3.7.1.1.2	See 4.8.1.1	See 4.8.1.1.8	See 4.8.1.1.9	Test	4.8.1.1
Maintainability	3.7.1.2	See 4.8.1.2			Examination	4.8.1.2
Workmanship	3.7.1.3	100%	5-0-1	VL II	Examination	4.8.1.3
Barrel life	3.7.2.1	3-0-1	3-0-1		Test	4.8.2.1
Parts interchangeability	3.7.2.2	5-0-1	5-0-1	VL I	Demonstration	4.8.2.2

[2] Number of units to be tested--accept/reject criteria can be found in verification procedure specified

TABLE I. Requirement/verification cross-reference matrix – Continued

	Section 3 Requirements	Inspection sample size and criteria			Verification Methods	Section 4 Verification Procedures
		Design Verification	First Article	Conformance Inspection (One lot)		
Special clothing	3.7.2.3	1-0-1			Demonstration	4.8.2.3
Marking	3.72.4	100%	5-0-1	100%	Examination	4.8.2.4
Cleanliness and optical quality	3.7.3.1	100%	5-0-1	VL II	Examination	4.8.3.1
System carrying cases	3.7.4.1	100%	5-0-1	VL I	Examination	4.8.4.1
Deployment kit	3.7.5.1	100%	5-0-1		Examination	4.8.5.1
Drag bag	3.7.5.2	5-0-1	5-0-1		Examination	4.8.5.2
Magazine pouch	3.7.5.3	5-0-1	5-0-1		Demonstration	4.8.5.3
Sling	3.7.5.4	5-0-1	5-0-1		Demonstration	4.8.5.4

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

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

4.2 Design verification. When specified, a sample of M107 shall be subjected to design verification in accordance with Table I, Requirement/verification cross-reference matrix.

4.2.1 Design verification test rejection. If any test samples fails to comply with the design verification requirements, the samples shall be rejected.

4.3 First article inspection. When specified, a sample of M107 shall be subjected to first article inspection in accordance with Table I, Requirement/verification cross-reference matrix.

4.3.1 First article rejection. If any M107 fails to comply with any of the applicable requirements, the first article sample shall be rejected.

4.4 Conformance inspection. When specified, a sample of M107 shall be subjected to conformance inspection in accordance with Table I, Requirement/verification cross-reference matrix. Verification Levels (VL) shall be in accordance with MIL-STD-1916.

4.4.1 Inspection lot formation. Unless otherwise specified, lot formation shall be in accordance with MIL-STD-1916.

4.4.2 Lot size. The maximum lot size shall be one month’s production.

4.4.3 Lot identification. Each inspection lot shall be identified with a lot number. The reason for rejection of any inspection lot shall be recorded. When a rejected inspection lot is resubmitted after reconditioning, it shall be identified as such.

4.4.4 Conformance inspection rejection. Failure to meet any of the requirements shall be cause for rejection of the M107. (See 6.2.1)

4.5 Operating requirements.

4.5.1 System requirements.

4.5.1.1 Accuracy (personnel- sized targets). The rifle utilizing the Day Optic Sight shall be tested from a bench rested, shoulder fired position. Testing shall be conducted at 1,968.5 feet (600 meters) using MK211 Armor-Piercing-Incendiary ammunition or equivalent. Before firing for record, up to ten shots may be fired to foul the bore, settle the rifle action and sight the weapon. Six rounds shall then be fired at a target 4.869 x 1.489 feet (1.484 x 0.454 meters).

4.5.1.2 Accuracy (vehicle sized targets). The rifle utilizing the Day Optic Sight shall be tested from a bench rested, shoulder fired position. Testing shall be conducted at 3,280.83 feet (1,000 meters) using MK211 Armor-Piercing-Incendiary ammunition or equivalent. Before firing for record, up to ten shots may be fired to foul the bore, settle the rifle action and sight the weapon. Ten rounds shall then be fired at a target 7.55 x 15.09 x 7.55 feet (2.3 x 4.6 x 2.3 meters).

4.5.1.3 Dispersion. The rifle shall be tested from a bench rested, shoulder fired position or equivalent mount, at 328.083 feet (100 meters) using M33 ammunition or equivalent. Before firing for record, up to ten shots may be fired to foul the bore, settle the rifle action and sight the weapon. A six (6) round shot group shall then be fired for record using the same point of aim for all rounds. The distance between the centers of the best five (5) rounds shall be measured to determine conformance to the requirement. In the event that the system does not meet the requirement, a second attempt shall be made. Failure of the second attempt shall result in the rejection of the weapon.

4.5.2 Rifle requirements.

4.5.2.1 Functioning. Functioning shall be checked by firing 10 rounds, using system magazine, through each weapon to determine conformance to the requirement.

4.5.2.2 High pressure resistance. Each rifle shall fire one (1) M1 round or approved equivalent. After firing, the barrel, bolt and barrel extension shall be examined for cracks, and other evidence of damage using magnetic particle inspection in accordance with ASTM E1444 shall be used for ferrous components.

4.5.2.3 Firing rate. Standard measuring and test equipment (SMTE) shall be used to determine the time it takes to fire 10 rounds from the rifle.

4.5.2.4 Rifle action. The rifle shall fire ten rounds to demonstrate rifle action.

4.5.2.5 Safety. With the safety in the safe position, three attempts shall be made to fire the rifle. The safety shall be placed in the safe position by an operator in prone position and shall show no evidence of movement until manually changed. This examination shall be sufficient to ensure the safety will prevent discharge of a live cartridge in the chamber to determine conformance to the requirement. Any evidence of the weapon firing wile in the safe mode during any testing will be cause for failure.

4.5.2.5.1 Design verification only. An empty, primed Caliber .50 cartridge shall be inserted into the chamber. The safety shall be placed in the safe position. Three attempts shall be made to fire the rifle. The rifle shall not fire. This shall be repeated:

a. By a person dressed in NBC (MOPP IV) hand gear, after which the safety shall be moved to the fire position.
b. After the rifle has been conditioned, in accordance with 4.7.1.8.1, for a minimum of four hours in a hot temperature chamber at 145°F ± 5°.
c. After the rifle has been conditioned, in accordance with 4.7.1.8.2, for a minimum of four hours in a cold temperature chamber at -50°F ± 5°F by a person dressed in cold weather environmental clothing with the outer arctic mitten removed.

4.5.2.6 Recoil. The rifle recoil shall be tested in accordance with TOP 3-2-504, “Human Factors Evaluation”.

4.5.3 Day Optic sight requirements.

4.5.3.1 Elevation and windage adjustment. The Day Optic Sight shall be rigidly mounted to a test fixture and the reticle movement measured using an optical collimator. The elevation and windage knobs shall be cycled from zero (0) to the extreme adjustments and returned, for 10 cycles. The zero position of the day optical sight, as defined by the intersection of the vertical and horizontal reticle lines, shall not have moved more than specified in the requirement.

4.5.3.2 Elevation and windage range. The elevation and windage knobs shall be cycled from zero (0) to the extreme adjustments and returned, for 10 cycles. It shall be verified that the elevation and windage knobs allow for ranging out to 6561.66 feet (2000 meters).

4.5.3.3 Magnification. The magnification of the Day Optic Sight shall be measured using standard optical measuring equipment.

4.5.3.3.1 Power zero retention. The magnification of the Day Optic Sight shall be adjusted. At each power setting the zero of the sight shall be checked.

4.5.3.4 Field of view (FOV). The FOV of the Day Optic Sight shall be measured using standard optical measuring equipment.

4.5.3.5 Objective opening. The objective opening shall be visually/manually examined.

4.6 Interface and interoperability requirements.

4.6.1 System requirements.

4.6.1.1 Weight. The weight of the rifle with bipod, mounted Day Optic Sight, and an empty magazine shall be measured using SMTE.

4.6.1.2 Exterior surfaces. Exterior surfaces of the M107 shall be visually examined.

4.6.1.3 Ambidextrous use. The M107 shall be examined and function fired, by both left and right handed shooters, to determine ambidextrous capability.

4.6.2 Rifle requirements.

4.6.2.1 Blank firing. Five rounds of blank ammunition shall be manually chambered and fired, without stoppages. If a BFA is included it shall be demonstrated that five rounds of blank ammunition can be fired with the BFA attached to the weapon.

4.6.2.2 Headspace. Headspace shall be measured using SMTE.

4.6.2.3 Firing pin protrusion. The firing pin shall be assembled in the bolt carrier, the bolt latch shall be released and pressure shall be applied to the bolt toward the bolt carrier. The exposed firing pin shall be measured from the bolt face to the tip of the firing pin, using SMTE.

4.6.2.4 Trigger pull. The rifle shall be charged to cock the firing mechanism, and the safety placed in the fire position. Force shall be gradually applied to the center of the trigger, parallel to the axis of the barrel bore until the firing mechanism is released. This shall be repeated five times.

4.6.2.4.1 Design verification and first article only. Ten trigger pull readings shall be taken as described above to establish an average trigger pull setting. Five trigger pull reading will be taken every 500 rounds during the endurance test. No trigger pull adjustments will be performed during the endurance test. All readings shall be within ± 8 ounces of the average setting.

4.6.2.5 Noise. A noise test shall be conducted using one rifle. Five rounds of Mk211 Mod 0 (Grade A) Multipurpose Ammunition and five rounds of M33 ammunition shall be fired. The peak sound pressure levels will be measured at the following locations, at a height of 4.921 feet (1.5 meters).

Shooter's left ear.
16.4 feet (5 meters) to the rear of the muzzle of the weapon.
16.4 feet (5 meters) to the left of the muzzle of the weapon.
16.4 feet (5 meters) to the left rear of the muzzle of the weapon, at 45°.

4.6.2.6 Ammunition compatibility. Ten (10) rounds of each type of ammunition listed in the requirement shall be fired in each of three rifles, for a total of thirty (30) rounds of each type of ammunition. There shall be no stoppages or any indication of a potentially unsafe condition attributable to the weapon or weapon-ammunition interface.

4.6.2.7 Magazine. A person shall load five rounds into the magazine and attach it to the rifle. All five rounds shall then be fired. A person shall load ten rounds into the magazine and attach it to the rifle. All ten rounds shall then be fired. After each test the person shall then, using one hand, remove the magazine. To verify that the magazine can be operated with NBC (MOPP IV) hand gear the rifle shall be subject to 4.8.2.3.

4.6.2.8 Mounting interface. Objective evidence that the rail meets all of the requirements of MIL-STD-1913 shall be examined, and the angle of the rail in relation to the bore shall be measured.

4.6.2.9 Disassembly. A person shall disassemble the rifle into its major components without using any special tools.

4.6.2.9.1 Disassembled length. The length of each major component shall be measured.

4.6.2.10 Bipod. A person shall detach and reattach the bipod to the rifle without using any special tools. A person shall adjust each leg of the bipod individually and then fold the legs back. The height of the bipod, from the ground to the attachment point, shall be measured using SMTE. It shall be demonstrated that the bipod provides rigid support when firing from the prone position. The rifle with bipod attached, in folded position, shall then be placed in the carrying case.

4.6.2.11 Iron sights. The rifle shall be visually examined for the presence of a BUIS.

4.6.2.11.1 Targeting. It shall be demonstrated that the iron sights can hit personnel size targets by firing six rounds at 1,968.5 feet (600 meters).

4.6.2.11.2 Detachability. The iron sights shall be installed and zeroed to the weapon. Three, five round shot groups shall be fired at 984.25 feet (300 meters) to establish a baseline center of impact. The iron sights shall be removed and then reinstalled on the weapon. Three more five round shot groups shall be fired using the same aim point as before. The return to zero shall be no greater than 0.5 MOA, and no special tools shall be required for attachment/detachment.

4.6.2.11.3 Adjustability. The azimuth and elevation adjustments shall be adjusted to each extreme position two times. The full range of adjustment shall be checked for audible, tactile clicks.

4.6.2.11.3.1 Design verification only. The azimuth and elevation adjustments shall be adjusted to each extreme position two times. The full range of adjustment shall be checked for audible, tactile clicks. This shall be repeated:

a. By a person dressed in NBC (MOPP IV) hand gear.

b. After the sights have been conditioned, in accordance with 4.7.1.8.1, for a minimum of four hours in a hot temperature chamber at 145°F ± 5°F the above procedure shall be repeated.

c. After the sights have been conditioned, in accordance with 4.7.1.8.2, for a minimum of four hours in a cold temperature chamber at -50°F ± 5°F a person dressed in cold weather environmental clothing with the outer arctic mitten removed, shall perform the adjustment.

4.6.2.12 Coatings. Objective evidence shall be examined to verify coatings.

4.6.3 Day Optic sight requirements.

4.6.3.1 Eye relief. The eye relief of the Day Optic Sight shall be measured using standard optical measuring equipment.

4.6.3.2 Mounting interface. Examine the Day Optic Sight mounting system to verify that it can be attached to the MIL-STD-1913 rail on the rifle.

4.6.3.3 Reattachment. The Day Optic Sight shall be removed and reattached to the rifle for a total of 50 cycles. It will be demonstrated that the sight can be removed and reattached by hand or with the tools common to the snipers deployment kit. Throughout this test the sight rings shall be aligned with the same slot of the base mount/receiver from which it was removed. An auto-collimator which is accurate to 0.50 seconds of arc, a muzzled reference mirror rigidly attached to the muzzle of the rifle, and a light source which will project light through the sight to the collimator shall be used to measure the change in zero. The distance between the auto-collimator reticle as reflected from the muzzle mirror and the projected Day Optic Sight reticle is the change in zero. During each cycle the change in zero shall be measured.

4.7 Environmental requirements.

4.7.1 System requirements.

4.7.1.1 Corrosion resistance. Objective evidence showing that all parts are made with corrosion resistant material or coated with corrosion resistant material, and that all parts that are phosphate coated or electro-plated have the required thermal treatment in accordance with MIL-DTL-16232 or TT-C-490, shall be examined.

4.7.1.2 Salt fog. A rifle, complete with Day Optic Sight and two fully loaded magazines, system carrying case and all metallic components shall be conditioned in accordance with MIL-STD-810E, Method 509.3 “Salt Fog”. The complete rifle, Day Optic Sight and both magazines shall be exposed to the salt fog environment during the entire test. One magazine shall be locked in the weapon. At the completion of exposure, the rifle with Day Optic Sight shall function fire both magazines without stoppages, the Day Optic Sight shall retain functionality and the hinges of the system carrying case shall function without binding.

4.7.1.3 Sand and dust. The rifle with Day Optic Sight attached shall be tested in accordance with TOP 3-2-045, “Sand and Dust Tests”. There shall be no greater than 5 Class I

malfunctions (see 6.4) when firing five magazines from the rifle post exposure, and the Day Optic Sight shall maintain elevation and windage adjustment functionality.

4.7.1.4 Rain. The rifle with Day Optic Sight attached shall be tested in accordance with MIL-STD-810E, Method 506.3 "Rain". There shall be no greater than 5 Class I malfunctions (see 6.4) when firing five magazines from the rifle post exposure and the Day Optic Sight shall maintain elevation and windage adjustment functionality.

4.7.1.5 Icing. A total of three rifles with Day Optic Sights attached shall be used for this test. The magazine shall be loaded to its capacity with M33 ammunition. The rifles with Day Optic Sights and loaded magazines shall be conditioned in a temperature chamber at 0°F ± 3°F for 8 hours. The temperature of the chamber shall then be raised to 20°F ± 3°F. A light spray of water shall be applied to the rifles and Day Optic Sights until 0.126 to 0.252 inches (3.2 to 6.4 millimeters) of ice has accumulated. The rifle shall then be fired. There shall be no greater than 5 Class I malfunctions (see 6.4) when firing five magazines and the Day Optic Sight shall maintain elevation and windage adjustment functionality.

4.7.1.6 Mud. The rifle with Day Optic Sight attached shall be tested in accordance with TOP 3-2-045, "Mud Test", to determine conformance to the requirement. There shall be no greater than 5 Class I malfunctions (see 6.4) when firing five magazines from the rifle post exposure and the Day Optic Sight shall maintain elevation and windage adjustment functionality.

4.7.1.7 Operating temperature. There shall be no more than three stoppages per weapon during either of the following two tests.

4.7.1.7.1 Hot temperature. The rifle with mounted Day Optic Sight shall be used for this test. The rifle shall be lubricated using DoD standard lubricant for small arms weapons as specified in MIL-PRF-63460, then conditioned in hot temperature chamber at 145° ± 5°F for a minimum of six hours. A total of 100 rounds will be fired from each rifle in 50 rounds cycles with a 1 hour reconditioning period between cycles. The maximum firing rate shall be 100 rounds per hour.

4.7.1.7.2 Cold temperature. The rifle with mounted Day Optic Sight shall be used for this test. The rifle shall be lubricated using DoD standard cold weather lubricant for small arms weapons as specified in MIL-PRF-14107, then conditioned in a cold temperature chamber at -50° ± 5°F for a minimum of four hours. A total of 100 rounds will be fired from each rifle in 25 rounds cycles with a 2 hour reconditioning period between cycles. The maximum firing rate shall be 100 rounds per hour.

4.7.1.8 Chemical resistance. All non-metallic components of the M107 shall be tested in accordance with TOP 3-2-609.

4.7.1.9 Fungus test. Components of the M107 fabricated from natural materials shall be tested in accordance with MIL-STD-810E, Method 508.4 "Fungus", to determine conformance to the requirement. The test cycle shall be 28 days.

4.7.2 Rifle requirements.

4.7.2.1 Drop test. The safety shall be placed in the safe position, an empty, primed Caliber .50 cartridge inserted in the chamber and the bolt closed. One rifle shall be dropped in each of the following orientations onto a concrete surface: barrel down, butt end down, right side down, left side down, 45 degree angle with vertical plane - butt end down**,** and top side down. The rifle shall be allowed to free fall a minimum distance of five feet onto a concrete surface. None of the primed cartridges shall discharge. This test shall then be repeated with the safety in the fire position**.** Upon completion of this test, each rifle shall be visually inspected for damage and subjected to the functioning test 4,5,2,1 to determine conformance to the requirement.

4.7.3 Day Optic sight requirements.

4.7.3.1 Watertightness. The Day Optic Sight shall be submerged in a container of water at a depth of 3.28 feet (1 meter), at ambient temperature for two hours. There shall be no evidence of moisture or fogging.

4.7.3.2 Lens cover. The lens covers are to be inspected by hand to determine that they can be opened and closed without the use of tools and remain out of the line of sight of the shooter.

4.7.4 System case requirements.

4.7.4.1 Drop test. One component carrying case with its full contents shall be conditioned in a cold temperature chamber (-40°F ± 5°F) for a minimum of 24 hours. Another system carrying case with its full contents shall be conditioned in a hot temperature chamber (145°F ± 5°F) for a minimum of 24 hours. The system carrying cases with their full contents shall be subjected to the drop specified below, either while still inside the chamber or immediately after removal from the chamber. If the drop test is performed outside the chamber, the test shall be completed within ten minutes of removal from the chamber.

4.7.4.1.1 Orientations. Each system carrying case shall be attached to a test fixture in each of the following orientations: top, bottom, two adjacent sides and two diagonally opposed corners. The system carrying case shall be released from each of these orientations and allowed to fall a minimum distance of 30 inches onto a concrete surface. Upon completion of this test, the system carrying case shall be visually examined for any structural or functional damage. All of the contents shall be examined for any physical damage and functionality shall be tested.

4.7.4.2 Transportation vibration. One system carrying case, containing the rifle and Day Optic Sight, shall be subjected to transportation vibration testing in accordance with MIL-STD-810E, Method 514.4 “Vibration”. Upon completion of the test, the system carrying case shall be examined for structural damage and the rifle and Day Optic Sight shall be examined for physical damage. The rifle mounted with the Day Optic Sight shall then be subjected to the aim point retention test.

4.8 Support and ownership.

4.8.1 System requirements.

4.8.1.1 Reliability.

4.8.1.1.1 Firing schedule. The reliability test shall be performed by firing each of three rifles, a total of 5,000 rounds. All firing, except for dispersion, shall be done from a firing fixture. The ammunition used for this test shall be standard M33 Ball Cartridges, or equivalent. All rounds fired will be counted towards the 5,000 round total. Firing shall be at the rate of no more then 100 shots per hour.

4.8.1.1.2 Maintenance schedule. The barrel/firing mechanism shall be cleaned every 100 rounds and lubricated every 250 rounds. The entire weapon shall be disassembled, cleaned and lubricated at approximately 500 round intervals using the equipment supplied in the deployment/cleaning kits.

4.8.1.1.3 Component inspection. The receiver and bolt shall be inspected for cracks or other discontinuities at 2,500 and 5,000 rounds. Magnetic particle inspection in accordance with ASTM E1444 shall be used for ferrous components. Liquid penetrate inspection in accordance with ASTM E1417 shall be used for non-ferrous components.

4.8.1.1.4 Failure definition. Essential Function Failures, equipment failures/malfunctions causing the inability to perform one or more of the Essential Functions, will be scored against M107 reliability. The Essential Functions for the M107 are defined as follows:

Rifle:

a. Feed and chamber each individual round.
b. Fire rounds. Properly strike the primer of each individual cartridge with sufficient impact to initiate firing.
c. Extract and eject rounds.
d. Provide back-up sighting capability. The back-up sight shall zero (see 6.4) to the appropriate reference point and retains zero during airborne and tactical field operations. It is essential that the back-up sight permit the operator to make windage and elevation adjustments during tactical operations.
e. Safety mechanism shall properly engage/disengage when initiated/activated by the operator.

Optic Sight:

a. Securely mount to the weapon.
b. Zero to the appropriate reference point in accordance with the prescribed procedures and permit the operator to make windage and elevation adjustments during tactical operations.
c. Retain zero and repeat zero during airborne and tactical field operations. Provide optical imagery that is of sufficient clarity/resolution to permit the gunner to detect, recognize and engage targets in the operational environment.

d. Dismount from weapon (when initiated by the operator).

4.8.1.1.5 Acceptance criteria. To demonstrate the MRBEFF requirements with 80% confidence the following acceptance criteria shall be applied to each test weapon individually.

Class I & II	Accept - 7 failures or less	Reject - 8 failures or more
Class III	Accept - 1 failures or less	Reject - 2 failures or more

4.8.1.1.6 Replacement of parts. Barrels shall not be replaced until they become unserviceable. Barrels exceeding the barrel life requirement of 1,000 rounds shall not be scored as a failure. Aim point retention shall be verified each time a barrel is replaced. No parts shall be altered during the test. Broken parts that affect function and those parts that are worn to the extent they are unserviceable shall be replaced and charged as a Class III failure. Replacement parts sufficient to complete the test shall be provided as part of Test Support Package.

4.8.1.1.7 Aim point retention. At the start of the reliability test, the Day Optic Sight shall be zeroed to the weapon according to the manufacturers' established instructions. Five, five round shot groups shall then be fired using the Day Optic Sight for aiming, at a range of 984.25 (300 meters), to establish a baseline center of impact relative to the point of aim. After 100 rounds have been fired the above procedure shall be repeated. The radial distance between the original center of impact and the center of impact for any individual group shall be 1.7 inches (4.4 centimeters) or less.

4.8.1.1.8 First article only. One rifle shall be fired for 3,300 rounds. To be acceptable there shall be zero (0) Class III failures and no more than three (3) Class I & II failures. Maintenance schedule, component inspection, and failure definition shall be as specified above.

4.8.1.1.9 Conformance inspection only. One rifle from every **third** lot shall be fired for 3,300 rounds. To be acceptable there shall be zero (0) Class III failures and no more than three (3) Class I & II failures. Maintenance schedule, component inspection, and failure definition shall be as specified above.

4.8.1.2 Maintainability. A demonstration of all necessary maintenance of the M107, using trained operators, government manuals, and tools provided with the system, shall be conducted.

4.8.1.3 Workmanship. The M107 shall be visually examined to verify workmanship.

4.8.2 Rifle requirements.

4.8.2.1 Barrel life. The dispersion procedure shall be performed after every 500 rounds fired during the reliability test, to assess barrel life.

4.8.2.2 Parts interchangeability. The rifle shall be tested for the interchange of all operator/intermediate support replaceable parts by disassembling and then reassembling using the parts and pre-arranged system specified. Interchange of parts shall be accomplished by

dividing the parts of each rifle into 5 groups of non-mating parts. The 5 groups of non-mating parts shall be based on the supplied parts list. The parts shall be distributed in groups into 5 different trays until each tray contains parts of a complete rifle. Groups of parts from the first rifle shall be taken in order and placed in trays 1 through 5; groups of parts from the second rifle shall be taken in order and placed in trays 2 through 5 to 1; groups of parts from the third rifle shall be taken in order and placed in trays 3 through 5 to 2, etc. Commercial parts such as screws, spring pins, etc., 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 rifle shall be reassembled using only those parts which are in the same tray to determine conformance to the requirement. The rifle shall be subjected to and pass all of the following tests before and after interchange: headspace test, firing pin indent test**,** functioning test and dispersion test.

4.8.2.3 Special clothing. A person dressed in NBC (MOPP IV) hand gear shall load the magazine, insert magazines in the rifle and fire 20 rounds. All shots shall fire without any stoppages attributable to the clothing.

4.8.2.4 Marking. Each rifle shall be visually examined to verify marking.

4.8.3 Optic sight requirements.

4.8.3.1 Cleanliness and optical quality. Following all testing the Day Optic Sight shall be visually inspected to verify cleanliness and optical quality.

4.8.4 System case requirements.

4.8.4.1 System carrying cases. It shall be demonstrated that the system carrying case securely contains and protects the items listed in the requirement

4.8.5 Ancillary equipment.

4.8.5.1 Deployment kit. Both examination and analysis shall be performed on the deployment kit.

4.8.5.2 Drag bag. The drag bag shall be packed and unpacked ten (10) times, and objective evidence shall be examined to determine that the material strength is acceptable.

4.8.5.3 Magazine pouch. A magazine shall be placed in the magazine pouch. It shall then be demonstrated that the magazine pouch securely attaches to Army standard load bearing equipment (LBE), tactical vests, assault packs, field packs and drag bag.

4.8.5.4 Sling. The sling shall be, measured using SMTE and subject to a demonstration to verify adjustability, ability to attach/detach to the weapon, maximum and minimum length, and ability to support the weapon..

5 PACKAGING

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

6 NOTES

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

6.1 Intended use. The rifle, with attached optics, supports all weather tactical dominance via rapid fire, direct fire engagements with the family of Caliber .50 ammunition. The M107 provides a man-portable, materiel destruction capability to the Sniper Team and/or supported force.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification and of all referenced documents cited in Section 2, and identified in Section 6 for information. Note that the specific revision level of MIL-STD-810E is specified in Sections 3 and 4. There are material differences in the test methods specified in Revision "E" and subsequent revisions that are required for this item and must be so stipulated in the contract.
b. Requirements for Design verification (See 4.2).
c. Requirements for First article (See 4.3).
d. Requirements for Quality conformance inspection (See 4.4).
e. Government Furnished Material or equipment.
f. Packaging requirements.
g. Applicable national stock number.
h. Serialization requirements, if applicable.
i. Requirements for manufacturer's operator and maintenance manuals that clearly and fully explain the operation, field stripping and maintenance required.

6.2.1 Failure data. If the requirements cited herein are not met, acceptance of the M107 will be deferred and, as appropriate, the following actions should be accomplished:

a. Conduct a failure analysis study of the components which are suspected to have caused the failure or malfunction.
b. Evaluate and correct the applicable production processes and procedures to prevent recurrence of the same defect(s) in future production.
c. Examine all completed and in-process product, including components and

subassemblies, to ensure that material containing the same defect is purged from the inventory and not presented for acceptance.

d. Submit the results of the failure analysis and the corrective actions taken for approval prior to submitting any reconditioned material for retest.

6.3 Army-type designator. The appearance of type designators in contracts, invitation to bid, specifications, drawings, etc. does not in itself constitute official type designation assignment. Only those type designators approved and issued in full accordance with 4.2.4.3 of MIL-STD-1464 are considered officially assigned. Government direction for appropriate nomenclature will be provided following Design Verification.

6.4 Definitions.

a. Analysis. An element of verification that uses established technical or mathematical models or simulations, algorithms, charts, graphs, circuit diagrams, or other scientific principles and procedures to provide evidence that stated requirements were met.

b. Blank Firing Adapter (BFA). A device placed on the muzzle end of the weapon to create enough pressure inside the bore to cycle the weapon while firing a blank round.

c. Class I malfunctions. Malfunctions that are operator clearable within 10 seconds.

d. Class II malfunctions. Malfunctions that require more than 10 seconds but less than 10 minutes to clear but can be corrected by the operator with available equipment.

e. Class III malfunctions. Malfunctions that are (1) operator correctable but require more than 10 minutes to clear, (2) non-operator correctable malfunctions which cause the loss of essential functionality.

f. Demonstration. An element of verification that involves the actual operation of an item to provide evidence that the required functions were accomplished under specific scenarios. The items may be instrumented and performance monitored.

g. Examination. An element of verification that is generally nondestructive and typically includes the use of sight, hearing, smell, touch, and taste; simple physical manipulation; and mechanical and electrical gauging and measurement.

h. Semi-automatic- Rifle automatically reloads, but will only fire *one* round per trigger pull.

i. Special tools. Tools that are not common to the armorer's tool kit or the Deployment kit specified herein.

j. Test. An element of verification in which scientific principles and procedures are applied to determine the properties or functional capabilities of items.

6.5 Failure definition. Zero - related problems due to equipment design deficiencies such as excessive manufacturing tolerances (where no malfunction has occurred) will be scored as performance limitations (not reliability failures) subject to evaluation against the established standard(s) for the affected area(s) of performance.

6.6 Configuration. The M107 includes the following components:

Item	Quantity
Rifle	1

Bipod	1
Magazine	6
Magazine Pouch	6
Carrying Case Assembly	1
Auxiliary Case	1
Optic Sight	1
Optic Mount System	1
Sight Cover	1
Sling	1
Drag Bag	1
Deployment Kit	1
Blank Firing adapter (BFA) (if included)	1
Laser Filter Unit (LFU) (GFM) NSN 1240-01-502-1295	1
M107 Technical Manual (GFM)	1
M107 Operator's Manual (GFM)	1
M107 Operator's Manual CD (GFM)	1

6.7 Deployment Kit Contents.

Nomenclature/Description	Quantity
M107 Deployment KIT (Consisting of the Following Six items)	1
-Deployment Kit Bag	1
-Deployment Weapons Cleaning (W/Following Components)	1
Bag	1
T-Handle/Obstruction Remover	1
Bronze Bore Brush	2
Cleaning Eye Patch	1
Cleaning Brush	1
Cleaning Cable	1
Swab, Small Arms Cleaning NSN 1005-00-288-3565	10
Extension Rod	1
1.1 Ounce Bottle CLP	1
Chamber Brush (GFM) NSN 1005-00-766-0915	1
-Five Piece Cleaning Rod (50 Cal.) (GFM) NSN 1005-00-653-5441	1
-Deployment Optical Cleaning (W/Following Components)	
Swabs NSN 6515-00-303-8250	50
Lens Paper NSN 6640-00-663-0832 (or Microfiber Lens Cloth)	1pk

Bottle NSN 8125-00-824-9058	2
Brush NSN 8020-00-224-8010 or 105-01-445-6798	1
Case NSN 8465-01-157-4834	1
-Deployment Tools (W/Following Components)	
T30 L-Shaped Torx Wrench	1
½ Short Handle Combo Wrench NSN 5120-00-228-9506	1
$^{1}/_{16}$" Roll Pin Punch	1
T10 L-Shaped Torx Wrench	1
T15 L-Shaped Torx Wrench	1
050 L-Shaped Allen Wrench	1
SOCKET ⅜ INCH DR. ½ INCH SOCKET NSN 5120-00-227-6702	1
65 LBS/IN Torque Wrench (⅜ Drive) NSN 1005-01-260-2645	1
-Deployment Parts	
Extractor	1
Spring, Extractor	1
Plunger, Extractor	1
Rear Lock Pin	1
Midlock Pin	1
Sight Ring Cap Screw	2
Bolt Keeper	1
Nut, Bolt	1
Sight Ring Washer	2
Parts Kit Inventory Card	1
Objective Lens cover	1
Eye Piece Lens Cover	1
Adjustment Turret Cap	1
Bolt Spring	1
Sight Ring Bolt	1

6.8 Anti-Reflection Device. The only approved Anti-Reflection Device (ARD) for the M107 is supplied by Tenebraex Corp., 326 A Street, Boston, MA 02210. Telephone 617-547-9900. Web address is http://www.camouflage.com.

6.9 Protective Finishes. The following finishes are recommended for metallic components:

Carbon Steel - Manganese or Zinc Phosphate (reference MIL-STD-171)
Aluminum - Hard Coat Anodic Coating (reference MIL-STD-171)
Corrosion Resistant Steel - Black Oxide (reference MIL-STD-171)

6.10 Batteries. The list of preferred batteries is available from:

Commander, CECOM
AMC Battery Management Office
ATTN: AMSEL-LC-P-AMC
Fort Monmouth, NJ 07703-5011

6.11 Standards. To obtain Optical Surface Quality Standards if required, contact the following office: US ARMY RDECOM-ARDEC, RDAR-QEP-B, Picatinny Arsenal, NJ 07806-5000 (email address: QESA-QEP@pica.army.mil).

6.12 Key word listing.

Magazine
Picatinny Rail
Semi-automatic

Custodian:
Army- AR

Preparing Activity:
Army- AR
(Project: 1005-2009-006)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.