INCH-POUND

MIL-DTL-48550A
16 August 2012
SUPERSEDING
MIL-C-48550(AR)
15 August 1978

DETAIL SPECIFICATION

COLLIMATOR, INFINITY AIMING REFERENCE - M1A2

Reactivated after 16 August 2012 and may be used for new and existing designs and acquisitions

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

1. SCOPE

1.1 Scope. This specification covers the Collimator, Infinity Aiming Reference: M1A2, which consists of a collimator with integral tripod and cover. This equipment is referenced throughout this specification as "Collimator."

2. APPLICABLE DOCUMENTS

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

Comments, suggestions, or questions on this document should be addressed to: Commander, US Army ARDEC, ATTN: RDAR-QES-E, Picatinny Arsenal, New Jersey 07806-5000 or emailed to picaardecstdznbranch@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 https://assist.dla.mil.

AMSC N/A FSC 1240

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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-13830	-	Optical Components for Fire Control Instruments; General Specification Governing the Manufacture, Assembly and Inspection of
MIL-F-13926	-	Fire Control Materiel, Manufacture, and Inspection, General Specification for

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1916	-	DOD Preferred Methods for Acceptance of Product

(Copies of federal and military specifications, standards, and handbooks are available online at https://assist.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 specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

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

12984644	-	Collimator Infinity Aiming Reference M1A2

(Copies of these drawings may be requested online at pica.drawing.request@conus.army.mil or from U.S. Army ARDEC, ATTN: RDAR-EIS-PE, Picatinny Arsenal, NJ 07806-5000)

2.3 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 shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Conformance. A sample shall be subject to conformance inspection in accordance with 4.3.

3.3 Collimator. The item shall conform to drawing 12984644.

3.4 Environmental.

3.4.1 Storage temperature. With fresh batteries installed, the collimator shall be thermally stabilized at temperatures of -60 ± 5°F and +160 ± 5°F for a period of not less than 4 hours at each temperature. While thermally stabilized at these temperatures, the collimator shall be subjected to a visual and tactile inspection and shall not exhibit any signs of physical failure or damage. Upon return to and stabilization at standard ambient temperature, +60°F to +90°F, the collimator shall meet the requirements of 3.4.2 through 3.7.12 inclusive.

3.4.2 Operating temperature. With fresh batteries installed, the collimator shall meet the requirements of 3.7.4 through 3.7.8 inclusive while exposed to and thermally stabilized at temperatures of +145 ± 5°F and -50 ± 5°F for a period of not less than 4 hours at each temperature. Upon return to and stabilization at standard ambient temperature, +60°F to +90°F, the collimator shall meet the requirements of 3.4.3 through 3.7.12 inclusive.

3.4.3 Vibration. The collimator unit shall be vibrated at a constant frequency of 30 cycles per second with an amplitude of 1/16 inch (1/8 inch maximum excursion) for a period of 5 minutes ± 15 seconds to simulate transportation in a vehicle. Subsequent to vibration, the collimator shall not exhibit any signs of physical failure or damage and meet the requirements of 3.4.4 through 3.7.12 inclusive.

3.4.4 Rain. The collimator unit with the cover secured in place and the legs folded to the carrying position shall be exposed to a simulated rainfall of 4 + 1 inches per hour as measured at the surface of the equipment for a period of not less than 2 hours. Immediately following the rain test, neither the interior of the cover nor the collimator shall show evidence of water penetration.

3.5 Sealing. The collimator unit (telescope) shall be capable of holding dry nitrogen at a minimum internal pressure of 5 psig for a period of not less than 2 without the loss of pressure in excess of 0.2 psig for that 2 hour period. The internal pressure of the telescope shall then be reduced to 0 psig. The telescope shall then be sealed with an internal pressure of between 0.25 and 0.50 psig of dry nitrogen.

3.6 Optical.

3.6.1 Reticle lean. With the zero vertical reticle line parallel to the image of a plumb line, the bubble of the level vial shall be within the central graduation marks on the vial.

3.6.2 Reticle accuracy. The angle subtended by the two 50 mil graduation lines on the horizontal axis of the reticle pattern shall be 100 mils ± 0.25 mil.

3.6.3 Parallax. The parallax between the center cross of the reticle pattern and the image of an infinity target shall not exceed 0.1 mil.

3.6.4 Cleanliness. The optical system shall meet the cleanliness requirements of MIL-PRF-13830 and there shall be no more than 3 particles of dirt visible on the reticle and the area of such particle shall not be in excess of the area equivalent to a size 10 dig. There shall be no dirt within the optical system which interferes with observation or adversely affects image quality.

3.6.5 Reticle illumination. All reticle graduations and numbers shall be clearly defined when observed through a four power telescope in ambient darkness from 15 to 48 feet inclusive.

3.6.6 Collimated light output. With fresh batteries installed, the brightness of the collimated light output measured in complete darkness at approximately one quarter inch from end of collimator shall be a minimum of 275 microlamberts.

3.7 Mechanical.

3.7.1 Elevation travel. The elevation travel of the line of sight shall cover the minimum excursion from - 800 mils to + 800 mils when the tripod legs are fully extended.

3.7.2 Azimuth travel. The instrument shall provide a full and unrestricted 6400 mils of azimuth rotation.

3.7.3 Open sight. The light of sight of the open sight shall be parallel to the optical axis within one degree.

3.7.4 Operability. As assembled, there shall be no looseness, rattling, restriction or binding of any part of the equipment when the collimator is placed from the carrying position to operational position. The hinge of the tripod legs shall have sufficient torque to support the fully extended legs in a horizontal position.

3.7.5 Knob travel. Each knob shall provide a range of adjustment from full locking to free movement of the instrument component.

3.7.6 Knob locks. The knob locks shall meet the requirements of Table 1 at the standard ambient temperature of +60°F to +90°F. The corresponding part shall not move

when the test value is applied. At the extreme operating temperatures of 3.4.2, the knob locks shall be able to be locked and unlocked by hand.

TABLE I. Knob locks.

Lock control	Torque to secure (inch pounds)	Test value
Rotate collimator on tripod	25	50 inch pounds of torque
Cross level the collimator	25	50 inch pounds of torque
Elevate the collimator	25	10 foot pounds of torque
Telescope of tripod legs	25	40 pounds of force

3.7.7 Telescope alignment. With the lock released the minimum torque required to rotate the scope to center the level vial shall not be less than 3 inch pounds and the maximum torque required shall not exceed 22 inch pounds when checked at standard ambient temperature of +60°F to +90°F. The maximum torque shall not exceed 35 inch pounds when checked at the extreme operating temperatures of 3.4.2.

3.7.8 Azimuth fine adjustment knob.

3.7.8.1 Azimuth fine adjustment knob torque. The torque required to operate the azimuth fine adjustment knob shall not exceed 5 inch pounds when checked at standard ambient temperature of +60°F to +90°F and shall not exceed 10 inch pounds when exposed to and checked at the extreme operating temperatures of 3.4.2.

3.7.8.2 Azimuth fine adjustment knob durability. With the azimuth fine adjustment knob at its extreme travel position (both in and out), the adjustment assembly shall withstand a torque load of 25 to 30 inch pounds, without stripping the threads within the adjustment assembly when checked at standard ambient temperature of +60°F to +90°F.

3.7.9 Fastening devices. Catches and similar fastening devices used to secure the cover shall function without interference and shall securely fasten the cover to the base when secured.

3.7.10 Carrying handle. The carrying handle shall be securely attached and show no evidence of looseness of assembly.

3.7.11 Strap security. The strap shall be subjected to a direct pull of 25 pounds at 90 degrees to the securing surface, the strap shall remain secure, the rivets firm, and the cover shall subsequently meet the requirements of 3.4.4.

3.7.12 Gasket. The rubber gasket at the base of the cover assembly shall be securely attached and show no gap where ends meet.

3.8 Workmanship. Workmanship of the collimator shall be in accordance with the requirements of MIL-F-13926.

4. VERIFICATION

TABLE II. Requirement/verification cross reference matrix.

Method of Verification 1 - Analysis 2 - Demonstration 3 - Examination 4 - Test						Class of Verification A - First Article B - Conformance		
Section 3 Requirements	Description	Verification Method				Verification Class		Section 4 Verification
		1	2	3	4	A	B	
3.1	First article			X	X	X		4.2
3.2	Conformance			X	X		X	4.3
3.3	Collimator			X		X	X	4.3.2.1
3.4.1	Storage temperature				X	X	X	4.4.1
3.4.2	Operating temperature				X	X	X	4.4.2
3.4.3	Vibration				X	X	X	4.4.3
3.4.4	Rain				X	X	X	4.4.4
3.5	Sealing				X	X	X	4.5
3.6.1	Reticle lean				X	X	X	4.6.1
3.6.2	Reticle accuracy				X	X	X	4.6.2
3.6.3	Parallax				X	X	X	4.6.3
3.6.4	Cleanliness			X		X	X	4.6.4
3.6.5	Reticle illumination				X	X	X	4.6.5
3.6.6	Collimated light output				X	X	X	4.6.6
3.7.1	Elevation travel				X	X	X	4.7.1
3.7.2	Azimuth travel				X	X	X	4.7.2
3.7.3	Open sight				X	X	X	4.7.3
3.7.4	Operability				X	X	X	4.7.4
3.7.5	Knob travel				X	X	X	4.7.5
3.7.6	Knob locks				X	X	X	4.7.6
3.7.7	Telescope alignment				X	X	X	4.7.7
3.7.8.1	Azimuth fine adjustment knob torque				X	X	X	4.7.8.1
3.7.8.2	Azimuth fine adjustment knob durability				X	X	X	4.7.8.2
3.7.9	Fastening devices				X	X	X	4.7.9
3.7.10	Carrying handle				X	X	X	4.7.10
3.7.11	Strap security				X	X	X	4.7.11
3.7.12	Gasket			X		X	X	4.7.12
3.8	Workmanship			X		X	X	4.8

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

a. First article inspection (see 4.2)

b. Conformance inspection (see 4.3)

4.2 First article. When specified, a sample shall be subjected to first article verification in accordance with Table III.

TABLE III. First article inspection criteria.

Examination or Test	Requirement Paragraph	Verification Paragraph
Collimator	3.3	4.3.2.1
Storage temperature	3.4.1	4.4.1
Operating temperature	3.4.2	4.4.2
Vibration	3.4.3	4.4.3
Rain	3.4.4	4.4.4
Sealing	3.5	4.5
Reticle lean	3.6.1	4.6.1
Reticle accuracy	3.6.2	4.6.2
Parallax	3.6.3	4.6.3
Cleanliness	3.6.4	4.6.4
Reticle illumination	3.6.5	4.6.5
Collimated light output	3.6.6	4.6.6
Elevation travel	3.7.1	4.7.1
Azimuth travel	3.7.2	4.7.2
Open sight	3.7.3	4.7.3
Operability	3.7.4	4.7.4
Knob travel	3.7.5	4.7.5
Knob locks	3.7.6	4.7.6
Telescope alignment	3.7.7	4.7.7
Azimuth fine adjustment	3.7.8	4.7.8
Fastening devices	3.7.9	4.7.9
Carrying handle	3.7.10	4.7.10
Strap security	3.7.11	4.7.11
Gasket	3.7.12	4.7.12
Workmanship	3.8	4.8

4.2.1 First article quantity. First article inspections shall be performed on three (3) complete units.

4.2.2 First article inspection to be performed. The first article inspection shall be performed in accordance with Table III.

4.2.3 First article rejection. If any item of the sample fails to comply with any of the first article requirements, the first article shall be rejected.

4.3 Conformance inspection.

4.3.1 Lot formation. Lot formation shall be in accordance with the lot formation requirements of MIL-STD-1916, paragraph "Formation and identification of lots and batches."

4.3.2 Conformance inspection quantity. Conformance inspection quantities shall be in accordance with 4.3.2.1 and MIL-STD-1916, paragraph "Sampling of lots or batches." Conformance criteria shall be in accordance with 4.3.2.1 and MIL-STD-1916, paragraph "Verification level (VL)."

4.3.2.1	Collimator.			Drawing number 12984644
Classification	Examination or test	Conformance criteria	Requirement paragraph	Next higher assembly None Inspection method reference
Critical	None defined			
Major				
101	Storage temperature	3 units per lot 1/	3.4.1	4.4.1
102	Operating temperature	3 units per lot 1/	3.4.2	4.4.2
103	Vibration	3 units per lot 1/	3.4.3	4.4.3
104	Rain	3 units per lot 1/	3.4.4	4.4.4
105	Sealing	100%	3.5	4.5
106	Reticle lean	100%	3.6.1	4.6.1
107	Reticle accuracy	100%	3.6.2	4.6.2
108	Parallax	100%	3.6.3	4.6.3
109	Cleanliness	100%	3.6.4	4.6.4
110	Reticle illumination	100%	3.6.5	4.6.5
111	Collimated light output	100%	3.6.6	4.6.6
112	Elevation travel	VL-II	3.7.1	4.7.1
113	Azimuth travel	100%	3.7.2	4.7.2
114	Open sight	100%	3.7.3	4.7.3
115	Operability	100%	3.7.4	4.7.4
116	Knob travel	100%	3.7.5	4.7.5
117	Knob locks	100%	3.7.6	4.7.6
118	Telescope alignment	100%	3.7.7	4.7.7
119	Azimuth fine adjustment	100%	3.7.8	4.7.8
120	Fastening devices	100%	3.7.9	4.7.9
121	Carrying handle	VL-II	3.7.10	4.7.10
122	Strap security	100%	3.7.11	4.7.11
123	Gasket	100%	3.7.12	4.7.12
Minor				
201	Workmanship	VL-II	3.8	4.8

NOTES:
1/ Lot shall be accepted if there are 0 failures, and rejected if there are 1 or more failures.

4.3.3 Conformance inspection to be performed. The conformance inspection shall be performed in accordance with 4.3.2.1.

4.3.4 Conformance rejection. If any item fails to comply with the applicable conformance inspection requirements, the lot shall be rejected.

4.4 Environmental.

4.4.1 Storage temperature. The collimator shall be placed in the test chamber and the temperature of the chamber reduced gradually to -60 ± 5°F and shall remain at this

temperature for a minimum of 4 hours. At the completion of this 4 hour period, the temperature shall then be gradually raised to +160 ± 5 °F and the collimator shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period the temperature of the test chamber shall be gradually reduced to room ambient temperature (+60°F to +90°F) at which time the collimator shall be removed from the test chamber. The collimator shall then meet the requirements of 3.4.2 through 3.8 inclusive. See 6.6, Thermal shock. As an option, the collimator may be removed from the environmental chamber and be inspected at the high and/or low temperature to observe the collimator's condition if a failure is suspected.

4.4.2 Operating temperature. The collimator shall be placed in the environmental chamber and the temperature of the chamber reduced gradually to -50 ± 5°F. The collimator shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period, and while at -50 ± 5°F, the collimator shall meet requirements of 3.7.4 through 3.7.8 inclusive. Upon completion of this portion of the test, the collimator shall then be placed back in the environmental chamber and the temperature shall be raised gradually to +145 ± 5°F. The collimator shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period, and while at +145 ± 5°F the collimator shall again meet requirements of 3.7.4 through 3.7.8 inclusive. Upon completion of this test, the collimator shall be returned to the environmental chamber and the temperature shall be gradually reduced to room ambient temperature (+60°F to +90°F) at which time the collimator shall be removed from the test chamber and then be subjected to vibration testing per 4.4.3. See 6.6, Thermal shock.

4.4.3 Vibration. The collimator unit, enclosed in its cover with the tripod legs secured in place, shall be vibrated while in a horizontal position at a constant frequency of 30 cycles per second with an amplitude of 1/16 inch (1/8 inch maximum excursion) for a period of 5 minutes ± 15 seconds. Upon completion of the vibration test, the collimator shall be subjected to a visual and tactile examination for physical failure or damage and must meet the requirements of 3.4.4 through 3.8 inclusive.

4.4.4 Rain. The strap security test of 4.7.11 must be completed prior to this test. The rain test chamber shall be maintained between 65°F and 90°F throughout the test period. The collimator unit with the cover secured in place and the legs folded to the carrying position shall be placed in the chamber and exposed to a simulated rainfall of 4 + 1 inches per hour as measured at the surface of the equipment with a U.S. Weather Bureau type gage. The rain shall be produced by means of a water spray nozzle of such design that the water is emitted in the form of small droplets rather than a fine mist. The temperature of the water shall be maintained between 50°F and 70°F. The rainfall shall be dispersed uniformly over the collimator and the collimator shall be periodically rotated to allow the simulated rainfall to contact all surfaces which are normally subjected to rain during actual use. See 6.7 Rain test. Total duration of the rain test shall be a minimum of 2 hours. Immediately following the rain test, the cover shall be removed and the collimator and equipment shall be examined for evidence of water penetration or damage in accordance with requirements specified in 3.4.4.

4.5 Sealing. Internal pressurizing of the collimator to test for sealing shall be performed using nitrogen gas having a dew point of -25°F or lower, and commercial type pressure testing equipment capable of pressurizing the collimator to the pressure specified in 3.5. The test equipment shall be equipped with a pressure shut-off valve, filter, and a calibrated pressure gage to read required pressure value specified in 3.5 to an accuracy of ±.02 psi. Maintain the pressure within the collimator for the period specified. Any drop in pressure as indicated on the pressure gage of the test equipment shall not exceed the requirement specified in 3.5. The pressure shall then be reduced to zero psig (normal atmospheric pressure). The collimator shall then be flushed with dry nitrogen until the interior atmosphere has a dew point at least as low as -25°F. When this atmosphere is attained within the collimator, the unit shall be sealed with an internal pressure of nitrogen at a pressure of between 0.25 and 0.50 psig at room temperature, +60°F to +90°F.

4.6 Optical.

4.6.1 Reticle lean. Reticle lean test shall be performed with aid of a collimating telescope, hereafter referred to as auxiliary telescope; with a reticle plumbed and adjusted to infinity focus. Position the collimator in front of the auxiliary telescope so the optical axes are coincident. Align the zero vertical line image of the collimator parallel with the vertical line image of the auxiliary telescope. With the zero vertical line image of the collimator plumbed, the bubble of the level vial shall be within the central graduation marks of the vial in accordance with the requirements of 3.6.1.

4.6.2 Reticle accuracy. This test shall be accomplished with the aid of an auxiliary telescope and calibrated reticle pattern. The calibrated reticle pattern shall have a horizontal line 100 mils in length with vertical marks at the center and each end. A mil block at either end of the horizontal line will enable the observer to detect error. With the auxiliary telescope focused on the collimator reticle image, both 50 mil marks of the reticle image shall coincide within the allowable tolerance in accordance with the requirements of 3.6.2.

4.6.3 Parallax. This test shall be performed with the auxiliary telescope positioned as specified in 4.6.1. Parallax shall be removed from the auxiliary telescope by means of an auto collimator. The test shall be made by sighting through the auxiliary telescope to the collimator center cross image. Parallax will be recognized as any apparent displacement of the collimator center cross image in relation to the auxiliary telescope reticle when the observer's head is moved from side to side, or up and down. Any movement of the observer's head shall not cause displacement of the collimator center cross image to exceed the requirement specified in 3.6.3.

4.6.4 Cleanliness. The optical system of the collimator unit shall be inspected for cleanliness in accordance with MIL-PRF-13830 and 3.6.4 and shall meet the requirements specified therein. Dirt particles which interfere with the legibility or accuracy of the reticle pattern shall be cause for rejection. The mean diameter of a size 10 dig is equal to 0.10 millimeter.

4.6.5 Reticle illumination. Perform test under daylight conditions with the rear cover of the collimator in an open position. Position a four power telescope at a distance of 15 feet + 6 inches and then at 48 feet – 6 inches from the objective lens of the collimator. At both positions, view the collimator reticle through the telescope for compliance with the requirements of 3.6.5. Repeat the above test in a completely darkened area with the rear cover closed, fresh batteries installed, and the light switched on.

4.6.6 Collimated light output. Perform this test by using a focusing photometer capable of producing readings in the microlamberts (10^{-3} footlamberts) range. The photometer shall have an accuracy of ±4% and be capable of repeating to better than ±0.5%. The light output shall be performed by directing the photometer toward the supported item and separated at the specified working distance. The item under test shall be supported by an appropriate medium having a black background. Align and focus the receiving aperture of the photometer so that it covers no more than one half of the smallest dimension on the radiating surface of the item under test and is centered on the surface. The radiating surface must also be perpendicular to the line of sight of the photometer. The measurement in microlamberts shall be equal to or exceed the minimum value specified. Perform this test in a dark room.

4.7 Mechanical.

4.7.1 Elevation travel. The elevation travel test shall be made by means of a wall chart located a suitable distance from the collimator. The chart shall have a plumbed line with a mark for the line of sight of the collimator and marks located 800 mils above and below the collimator line of sight mark. With legs fully extended in a horizontal position and the elevation clamping mechanism released, the collimator shall be elevated and depressed through the entire excursion indicated. Sighting of the collimator shall be accomplished by means of the open sight located on the collimator and shall meet the minimum requirements specified in 3.7.1.

4.7.2 Azimuth travel. This test shall be made with the wall chart specified in 4.7.1. Sighting of the collimator shall be accomplished by means of the open sight located on the collimator. With open sight aligned with the plumbed line and the azimuth clamping mechanism released, the collimator shall be rotated 6400 mils and shall meet the requirements of 3.7.2.

4.7.3 Open sight. This test shall be accomplished with the aid of an auxiliary telescope and a calibrated target. The center of the calibrated target shall be coincident with the optical line of sight of the auxiliary telescope and shall contain a 1 degree radius circle, the center of which shall represent the center of the open sight of the collimator. With the collimator positioned in front of the auxiliary telescope as specified in 4.6.1 and the calibrated target located to the rear of the auxiliary telescope, the open sight shall read within the limits of the circle in compliance with the requirements of 3.7.3.

4.7.4 Operability. The collimator assembly shall be manually set up in the operational position from the carrying position. This shall be a visual and tactile examination of the collimator for conformance to the requirements specified in 3.7.4.

4.7.5 Knob travel. There shall be a tactile examination for movement of the knobs to provide full locking and free movement of each specific component as specified in 3.7.5.

4.7.6 Knob locks. At +60°F to +90°F, the eight knobs of the collimator shall be locked by application of "Torque to secure" values in Table I. There shall be no movement of locked items when the specified "Test values" are applied in conformance with the requirements of 3.7.6 and Table I. Torque and force values shall be applied with standard measuring equipment. At the extreme operating temperatures of 3.4.2, the knob locks shall be locked and unlocked by hand, without the use of any tools except gloves, to verify compliance.

4.7.7 Telescope alignment. The torque required to rotate the scope to center the level shall be measured with standard measuring equipment. The measured values shall not exceed the valued specified in 3.7.7 for the temperatures indicated.

4.7.8 Azimuth fine adjustment knob.

4.7.8.1 Azimuth fine adjustment knob torque. The torque required to operate the azimuth fine adjustment shall be measured with standard measuring equipment attached to the fine adjustment knob. The measured torque values shall not exceed 5 inch pounds at standard ambient temperature and shall not exceed 10 inch pounds when exposed to the extreme temperatures, in accordance with the requirements of 3.7.8.1.

4.7.8.2 Azimuth fine adjustment knob durability. The durability test of the azimuth fine adjustment at each travel stop position (in and out), shall be measured with standard measuring equipment attached to the knob. At standard ambient temperature (60°F to 90°F), rotate the azimuth fine adjustment to the travel stop position, and then apply the specified 25 to 30 inch pounds torque load to the knob. During this torque application there shall be no evidence of knob rotation. Repeat at the opposite travel stop. Subsequent to torque applications, the azimuth fine adjustment knob shall be manually rotated in and out to each stop. During these rotations there shall be no tactile evidence of damage to the threads as specified in 3.7.8.2

4.7.9 Fastening devices. All fastening devices used to secure the cover shall be subjected to a visual and tactile examination to ensure conformance with the requirements of 3.7.9.

4.7.10 Carrying handle. The carrying handle shall be inspected by a visual and tactile examination initially to determine compliance with 3.7.10. The collimator assembly shall then be subjected to being lifted by the carrying handle to a height of three feet from the ground and returned, at least 50 full cycles. Subsequent to the lifting test, the handle

shall again be examined to determine any detrimental effects or indication of poor workmanship in accordance with the requirements of 3.7.10.

4.7.11 Strap security. The test shall be accomplished with a standard pull weight scale attached to the strap and subjected to a direct pull as indicated in 3.7.11. After completion of the test, the strap shall be visually examined for any slippage, or looseness of rivets to determine compliance with the requirements of 3.7.11.

4.7.12 Gasket. The gasket shall have a visual and tactile examination to assure that there is proper adhesion to the cover as specified in 3.7.12.

4.8 Workmanship. Workmanship of the collimator shall be confirmed in accordance with the verifications of MIL-F-13926.

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 activities within the Military Service or 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 Collimator Infinity Aiming Reference, M1A2 is an optical instrument on a tripod with a protective cover, intended to be used for laying field artillery weapons for indirect fire by establishing an optical reference from which weapon deflection angles can be measured. It has an illuminated mil scale reticle which functions as an optical projection system that simulates a grid board type of infinity target reference.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.

b. Selection of an applicable level of preservation, packaging, and packing in accordance with MIL-STD-2073-1, Department of Defense Standard Practice for Military Packaging.

c. Packaging Data Sheet, SPI12984644, as applicable (See 6.5).

d. Applicable stock number.

e. Provisions for first article testing.

6.3 Inspection equipment design.

6.3.1 Submission of designs for approval. Contractor designs for final acceptance inspection must be approved by the Government prior to fabrication or procuring the equipment. The contractor is referred to MIL-HDBK-204 for guidance. Submission of design concept on inspection equipment is permissible for tentative approval. The completion date for design review will be based on the date of the final submission of designs and the required delivery schedule as stipulated in the contract. Submit designs as required to: Commander, U.S. Army Armament Research, Development and Engineering Center, ATTN: RDAR-QEW-A, Picatinny Arsenal, NJ 07806-5000. This address will be specified on the Contract Data Requirements List DD Form 1433 in the contract. When the contractor submits inspection equipment designs to the Government for approval, he must give the following information in his letter of transmittal:

a. The contract number.

b. The contract item (name, model number, etc).

c. The designs remaining to be submitted and the expected date of submittal.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading U.S. Army Armament, Research Development and Engineering Center (ARDEC) Drawings may also include drawings prepared by, and identified as Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal, or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under the cognizance of ARDEC.

6.5 Packaging data sheet drawings. The following packaging data sheet drawings should be obtained from U.S. Army ARDEC, ATTN: RDAR-EIL-P B455, Picatinny Arsenal, NJ 07806-5000.

SPI 12984644 - Special Packaging Instructions for Collimator Infinity Aiming Reference M1A2

6.6 Thermal shock. Caution should be exercised during environmental testing to avoid subjecting the collimator to thermal shock. A rate of change of 5°F per minute has been shown not to thermally shock the units; however a different rate of temperature change may be used at the tester's discretion.

6.7 Rain test. The collimator should be rotated every 20-30 minutes to ensure that all exterior surfaces get exposed to the simulated rainfall.

6.8 Subject term (key word) listing.

Fire Control
Howitzer
M109
M119
M198
M777
Self Propelled Artillery
Towed Artillery

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

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

Preparing activity:
Army-AR
(1240-2012-003)

Review activities:
Army-AV, MI
Navy-MC
Air Force-99
DLA-CC

Civil agency:
GSA-FAS

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 https://assist.dla.mil.