

MIL-B-60884C(MU)  
 28 June 1974  
SUPERSEDING  
 MIL-B-60884B(MU)  
 28 September 1973

## MILITARY SPECIFICATION

### BINOCULAR M19

This specification is approved for use by all departments and agencies of the Department of Defense.

#### 1. SCOPE

1.1 This specification covers one model of 7 x 50 binocular with a mil scale reticle. The binocular is of modular design, consisting of pre-collimated fully interchangeable eyepiece, prism housing; and objective modules.

#### 2. APPLICABLE DOCUMENTS

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

#### SPECIFICATIONS

##### Federal

BB-N-411 Nitrogen, Technical

##### Military

MIL-O-13830 Optical Components for Fire Control Instruments; General Specification Governing the Manufacture, Assembly and Inspection of  
 MIL-F-13926 Fire Control Material; General Specification Governing the Manufacture and Inspection of  
 MIL-P-14232 Parts, Equipment and Tools for Army Materiel, Packaging and Packing of  
 MIL-I-45607 Inspection Equipment, Supply and Maintenance of

#### STANDARDS

##### Military

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes  
 MIL-STD-109 Quality Assurance Terms and Definitions  
 MIL-STD-810 Environmental Test Methods

MIL-B-60884C (MU)

DRAWINGS

U.S. Army, Frankford Arsenal

F7680840	Collimator Assembly, Double
F8565556	Pressure Tester, Two Station
F10547050	Binocular M19
F10547434	Collimator, 10 inch

PACKAGING DATA SHEET

10547050	Packaging of Binocular M19
10547052	Packaging of Binocular M19 With Equipment

PUBLICATIONS

NBS Circular 533 Method for Determining the Resolving Power of Photographic Lenses

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

3. REQUIREMENTS

3.1 Fabrication.- The binocular shall be manufactured in accordance with Drawing F10547050 and drawings pertaining thereto. Each module shall meet the form, fit and functional requirements of its applicable drawing.

3.2 General specification.- The contractor shall be responsible for compliance with the following requirements of MIL-F-13926:

- a. Order of precedence
- b. Dimensions and tolerances
- c. Inorganic protective surface finishes
- d. Part identification and marking
- e. Workmanship - In addition, the exterior protective surface finishes shall be free of defects which may affect their protective qualities, or appearance of the binocular

3.3 Temperature conditions.- The binocular shall meet all requirements of this specification at a temperature between 60° to 90° Fahrenheit (°F), (15.6 to 32.2°C) except where otherwise specified.

3.4 Storage temperature.- The binocular shall show no evidence of physical damage after exposure to - 70°F (-56.7°C) and +160°F (71.1°C). Each exposure shall be for a minimum of four hours.

## MIL-B-60884C (MU)

3.5 Extreme operating temperatures.- The binocular shall meet the requirements of 3.18.1 and 3.18.2 while exposed at  $-40^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$ ) for low temperature operation and at  $+125^{\circ}\text{F}$  ( $51.7^{\circ}\text{C}$ ) for high temperature operation. The binocular shall be exposed to each temperature extreme for a minimum of four hours prior to being tested.

3.6 Humidity.- The binocular shall show no evidence of physical damage after being subjected to five (5) continuous temperature - humidity cycles, each cycle to be conducted as follows:

a. Subsequent to the installation of the item in a suitable test chamber, the internal temperature shall be gradually raised to  $160^{\circ}\text{F}$  ( $71^{\circ}\text{C}$ ) and the relative humidity to at least 95 percent over a period of  $2.0 \pm .25$  hours.

b. The conditions of a. above shall be maintained for not less than six (6) hours.

c. While maintaining a relative humidity of at least 85 percent the internal chamber temperature shall be reduced to  $82^{\circ}\text{F}$  ( $28^{\circ}\text{C}$ ) over a period of  $16 \pm 1.0$  hours.

### 3.7 Vibration.

3.7.1 Vibration "A".- The binocular shall show no evidence of physical failure and shall be capable of meeting the requirements of 3.9 to 3.19, inclusive, after vibration in each of three mutually perpendicular directions, one of which shall be along the hinge axis of the binocular. Vibration shall be a simple harmonic motion varied between 5 and 500 Hertz (cycles per second). The double amplitude shall be 0.5 inch (12.7mm) at the lower frequencies until an acceleration value of  $4 \pm 0.5$  "G" is reached with increase of frequency. This "G" value shall be maintained through the higher frequency portions of the cycle. The applied frequency change from 5 to 500 Hertz and return to 5 Hertz shall be at a logarithmic rate over a period of  $15 \pm 1.0$  minutes. Vibration shall be applied for two hours along each of the three mutually perpendicular directions of vibration, six hours total vibration time.

3.7.2 Vibration "B".- The binocular shall show no evidence of physical failure and shall be capable of meeting the requirements of 3.9 to 3.19, inclusive, after vibration in each of three mutually perpendicular directions, one of which shall be along the hinge axis of the binocular. Vibration in each direction shall be at an amplitude of  $1/16$  inch (1.59mm) ( $1/8$  inch (3.17mm) total excursion) and a frequency of 30 cycles per second (Hertz). The vibration shall be applied for 15 minutes in each direction, 45 minutes total.

3.8 Shock.- The binocular shall show no evidence of physical failure and shall be capable of meeting the requirements of 3.9 through 3.19, inclusive, after being subjected to a total of 12 shocks along each of three mutually perpendicular axis, one of which shall be parallel to the hinge axis. In each position the binocular shall be subjected to four shock impulses with two impulses in each direction along the respective axis, for a total of twelve shocks

MIL-B-60884C(MU)

Each impulse shall be 75 "G"  $\pm$  10%, half sine with a time duration of  $11 \pm 1$  milliseconds.

3.9 Sealing.- The assembled telescopes of the binocular shall show no evidence of leakage in excess of 0.10 Psig (.007 kg/cm<sup>2</sup>) over a period of one hour when subjected to an internal pressure of  $5.0 + .25$  Psig ( $.351 + .0176$  kg/cm<sup>2</sup>). Each body assembly of an accepted binocular shall contain dry nitrogen gas having a dew point at least as low as  $-25^{\circ}\text{F}$  ( $-31.7^{\circ}\text{C}$ ).

3.10 Cleanliness.

3.10.1 Dirt.- When viewed through either eyepiece, there shall be no more than three (3) dirt particles appearing within a 50 mil diameter central field of view. There shall be no more than three (3) dirt particles appearing outside the 50 mil field of view. The angular separation between dirt particles shall be at least 15 mils. The size of any particle shall not exceed the apparent width of the reticle line. Dirt particles smaller than  $1/4$  reticle line width shall be ignored regardless of distribution.

3.10.2 Defects.- There shall be no evidence of moisture, grease, fingerprints, condensates, fractures and adhesive separations on any glass component when each telescope of the binocular is viewed through both the eyepiece and objective ends.

3.11 Collimation.- Two infinity target beams, originally parallel when entering the objectives, shall emerge from the eyepieces parallel within fifteen minutes of arc in dipvergence and between zero and forty minutes of arc in divergence when the eyepieces are set at zero diopter. This requirement shall apply for any interpupillary setting. There shall be no convergence of the emergent beams.

3.12 Resolution.- Resolution of each telescope on the optical axis shall be six seconds of arc or less. Resolution consists of detectable line structure and proper line count in all four meridians. The variation in eyepiece focus between any two meridians shall not exceed 0.25 diopters.

3.13 Image tilt.- The image of a plumb line, as formed by the optical system of each telescope of the binocular, shall be vertical within 30 minutes of arc.

3.14 Parallax.- Parallax between an infinity target image and the reticle shall not exceed 0.5 mil on the optical axis at the 2 mil graduation of the vertical reticle line.

3.15 Eyepiece focus.- Eyepiece focus shall be adjustable over a minimum range of plus and minus 4 diopters as read on the eyepiece scale. The zero setting of the diopter scale shall indicate zero diopter within 0.25 diopter.

3.16 Equality of magnification.- The magnification of each telescope

MIL-B-60884C(MU)

of the binocular shall not be less than 6.9 power or greater than 7.1 power.

3.17 Interpupillary adjustment.— The separation between the binocular exit pupils shall be adjustable between 58mm and 72mm. The interpupillary scale shall indicate the correct interpupillary distance within 1mm.

### 3.18 Operability.

3.18.1 Eyeiece torque.— The torque required for movement of each eyepiece focus adjustment between settings of minus four and plus four diopters shall be as indicated below for the temperatures specified:

<u>60° to 125°F (15.6° to 51.7°C)</u>	<u>-40°F (-40°C)</u>
6 to 20 inch-ounces (.432 to 1.44 cm-kg)	6 to 50 inch-ounces (.432 to 3.6 cm-kg)

3.18.2 Interpupillary torque.— The torque required for interpupillary adjustments in either direction through the total range of movement shall be as indicated below for the temperatures specified:

<u>60° to 125°F (15.6° to 51.7°C)</u>	<u>-40°F (-40°C)</u>
6 to 13 inch-pounds (33.6 to 72.9 cm-kg)	6 to 16 inch-pounds (33.6 to 89.7 cm-kg)

3.19 Interchangeability.— Binoculars having met all the requirements of this specification, except that binoculars shall be exposed to only one vibration specification in 3.7, shall be disassembled into their major modules, (objectives, eyepieces and prism housing assemblies). These modules shall be interchanged and assembled into complete binoculars without need for selective assembly or readjustment of components. The binoculars that result shall meet the requirements of 3.9, 3.10, 3.11, 3.12 and 3.14.

3.20 Reliability.— The binocular shall be capable of withstanding cumulative environmental exposures of vibration and humidity, 3.7.1 and 3.6, without degradation of performance.

## 4. QUALITY ASSURANCE PROVISIONS

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

MIL-B-60884C(MU)

4.1.1 General provisions.- The component and subassembly inspection requirements of MIL-F-13926 form a part of the Quality Assurance Provisions of this specification. Definitions of inspection terms shall be as listed in MIL-STD-109.

4.2 First article (initial production) approval.- The requirement for first article approval and the responsibility (Government or contractor) for first article testing shall be as specified in the contract. The sample for first article approval tests shall consist of nine (9) binoculars plus five (5) each of all items covered by SQAP. The nine binoculars shall be tested as specified herein for all the requirements of this specification except 3.7.2. The items covered by SQAP shall be tested, as specified thereon, for all characteristics delineated on the SQAP. The samples shall be manufactured in the same manner, using the same materials, equipment, processes, and procedures as used in regular production. All parts and materials, including packaging and packing, shall be obtained from the same source of supply as used in regular production.

4.2.1 Government testing.- When the Government is responsible for conducting first article approval tests, the contractor, prior to submitting the sample to the Government, shall inspect the sample to insure that it conforms to all the requirements of the contract and submit a record of this inspection with the sample, including certificates of conformance for materials.

4.2.2 Contractor testing.- When the contractor is responsible for conducting first article approval tests, the sample shall be inspected by the contractor for all the requirements of the contract. The sample and a record of this inspection, including certificates of conformance for materials, shall be submitted to the Government for approval. The Government reserves the right to witness the contractor's inspection.

#### 4.3 Inspection provisions.

4.3.1 Submission of product.- Unless otherwise specified by the Contracting Officer, inspection lot size, lot formation and presentation of lots shall be in accordance with "Submission of Product" provisions of MIL-STD-105.

#### 4.3.2 Examination and tests.

4.3.2.1 Components and subassemblies.- All components and subassemblies shall be inspected in accordance with the inspection provisions contained in Supplementary Quality Assurance Provisions (SQAP) listed in the technical data package (TDP). In the absence of SQAP's, the applicable Quality Assurance Provisions of MIL-F-13926 shall apply.

4.3.2.2 Binocular.- Examination and tests related to Section 3 herein shall be performed on a class basis in accordance with MIL-STD-105 and the sampling plans specified in Tables I, II, III, IV and V herein.

MIL-B-60884C (MU)

Examination and tests for packaging, packing, and marking shall be in accordance with MIL-P-14232 and Section 5 herein. The tabulated classification of defects in Tables I, II, III, IV and V shall constitute the minimum inspection to be performed by the supplier after first article approval and prior to Government acceptance or rejection by item or lot.

TABLE I - CLASSIFICATION OF DEFECTS

<u>CLASS</u>		<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
<u>CRITICAL:</u>	<u>NONE</u>		
<u>MAJOR:</u>	<u>AQL 1.0% Defective</u>		
101.	Vibration "B"	3.7.2	4.6.5
102.	Sealing	3.9	4.6.7
103.	Cleanliness	3.10	4.6.8
104.	Collimation	3.11	4.6.9
105.	Resolution	3.12	4.6.10
106.	Image tilt	3.13	4.6.11
107.	Parallax	3.14	4.6.12
108.	Eyepiece focus	3.15	4.6.13
109.	Equality of magnification	3.16	4.6.14
110.	Interpupillary adjustment	3.17	4.6.15
111.	Eyepiece torque	3.18.1	4.6.16
112.	Interpupillary torque	3.18.2	4.6.17

MINOR: NONE

NOTE: The tests in Table I shall be conducted at a temperature between 60° and 90°F (15.6° to 32.2°C).

4.3.3 Acceptance and rejection.- Rejected lots shall be screened for all defective characteristics. Removal or correction of defective units and resubmittance of rejected lots shall be in accordance with "Acceptance and Rejection" as specified in MIL-STD-105.

#### 4.4 Special sampling.

4.4.1 General.- One binocular shall be selected at random as a special sample from each 100 produced or from each month's production, whichever occurs first. The sample shall meet the requirements and tests in Table II.

TABLE II - CLASSIFICATION OF DEFECTS

<u>NO.</u>	<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
301.	Fabrication	3.1	Applicable drawing - visual
302.	General specification	3.2	MIL-F-13926 - visual

NOTE: The tests in Table II shall be conducted at a temperature between +60° and +90°F (15.6° and 32.2°C).

MIL-B-60884C(U)

4.4.2 Environmental.- Five binoculars shall be selected at random as samples from each 50 produced, or from each month's production, whichever occurs first. Each sample shall meet the requirements and tests in Table III, and shall then meet the requirements and tests in Table 1.

TABLE III - CLASSIFICATION OF DEFECTS

<u>NO.</u>	<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
303.	Storage temperature (-70°F and +160°F)	3.4	4.6.1
304.	Eyepiece torque (-40°F and +125°F)	3.5, 3.18.1	4.6.2, 4.6.16
305.	Interpupillary torque (-40°F and +125°F)	3.5, 3.18.2	4.6.2, 4.6.17
306.	Shock (+60°F to +90°F)	3.8	4.6.6

4.4.3 Interchangeability.- Each month, nine binoculars shall be selected at random from the special samples that conform to the requirements and tests specified in 4.4.2. Each of the nine binoculars shall meet the requirements and tests in Table IV.

TABLE IV - CLASSIFICATION OF DEFECTS

<u>NO.</u>	<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
307.	Interchangeability	3.19	4.6.18
308.	Sealing	3.9	4.6.7
309.	Cleanliness	3.10	4.6.8
310.	Collimation	3.11	4.6.9
311.	Resolution	3.12	4.6.10
312.	Parallax	3.14	4.6.12

NOTE: The tests in Table IV shall be conducted at a temperature between +60°F and +90°F (15.6° to 32.2°C). The test for Characteristics 308 through 312 inclusive, shall be conducted subsequent to the interchanging of the assemblies of the nine binoculars.

4.4.4 Reliability.- Three binoculars shall be randomly selected as samples from production lots at the 25 percent, 50 percent and 75 percent completion interval of each production order or contract. Each sample shall meet the requirements and tests in Table V.



MIL-B-60884C (MU)

TABLE V - CLASSIFICATION OF DEFECTS

<u>NO.</u>	<u>CHARACTERISTIC</u>	<u>REQUIREMENT</u>	<u>TEST PROCEDURE</u>
313.	Vibration "A"	3.7.1	4.6.4
314.	Sealing	3.7.1, 3.9	4.6.4, 4.6.7
315.	Cleanliness	3.7.1, 3.10	4.6.4, 4.6.8
316.	Collimation	3.7.1, 3.11	4.6.4, 4.6.9
317.	Resolution	3.7.1, 3.12	4.6.4, 4.6.10
318.	Image tilt	3.7.1, 3.13	4.6.4, 4.6.11
319.	Parallax	3.7.1, 3.14	4.6.4, 4.6.12
320.	Eye-piece focus	3.7.1, 3.15	4.6.4, 4.6.13
321.	Equality of magnification	3.7.1, 3.16	4.6.4, 4.6.14
322.	Interpupillary adjustment	3.7.1, 3.17	4.6.4, 4.6.15
323.	Eye-piece torque	3.7.1, 3.18.1	4.6.4, 4.6.16
324.	Interpupillary torque	3.7.1, 3.18.2	4.6.4, 4.6.17
325.	Humidity	3.6	4.6.3

NOTE: The tests for Characteristics 313 through 324 inclusive, shall be conducted at a temperature between +60° and +90°F (15.6° and 32.2°C).

4.4.4 Failure of sample.- Should any one item of a special sampling fail to meet the specified test requirements, acceptance of the represented inspection lot will be suspended by the Government until necessary corrections have been made by the contractor and resubmitted items have been approved (see 4.3.3).

4.5 Inspection equipment.- Except as otherwise provided for by the contract, the contractor shall supply and maintain inspection equipment in accordance with the applicable requirements of MIL-I-45607.

4.5.1 Government furnished inspection equipment.- Where the contract provides for Government furnished test equipment, supply and maintenance of test equipment shall be in accordance with the applicable requirements specified in MIL-I-45607.

4.5.2 Contractor furnished inspection equipment.

4.5.2.1 Government design.- All inspection equipment specified by drawing number in specification or SQAP forming a part of the contract shall be supplied by the contractor in accordance with technical data included in the technical data package list.

4.5.2.2 Contractor design.- The contractor shall design and supply inspection equipment compatible with 4.5.2.3, the "Test Methods and Procedures" specified in 4.6 of this specification and with the component inspection procedures specified in "Examination" and "Test Facilities" requirements of MIL-F-13926. Since tolerance of test equipment is normally considered to be within 10% of the product tolerance for which it is intended, this inherent error in the test equipment design must be considered as part of

MIL-B-60084C (MU)

the prescribed product tolerance limit. Thus, concept, construction, materials, dimensions and tolerances used in the design of test equipment shall be so selected and controlled as to insure that the test equipment will reliably indicate acceptability of a product which does not exceed 90% of the prescribed tolerance limit, and permit positive rejection when non-conforming. Construction shall be such as to facilitate routine calibration of test equipment.

4.5.2.3 Inspection equipment design requirements.

4.5.2.3.1 Temperature test.- The volume of the test chamber shall conform to the test facilities requirements of MIL-F-13926. The air temperature at the control sensor shall be in accordance with the specified requirements within plus or minus 1.4°C (2.5°F). The temperature gradient across the cross-sectional area occupied by the test items shall not exceed 0.3°C (0.5°F) per foot in any direction. The heat source of the test chamber shall be so located that radiant heat, if used, will not fall directly on the test item. Thermocouples or equivalent temperature sensors utilized to determine or control the specified chamber temperature shall be centrally located within the test chamber, or in the return air stream and shall be baffled or otherwise protected against direct impingement of supply air and against radiation effects.

4.5.2.3.2 Humidity test.- The humidity testing apparatus shall conform to the requirements of MIL-STD-810.

4.5.2.3.3 Vibration test.- The vibration tester shall be capable of providing the specified amplitude within plus or minus 5 percent, the frequency within plus or minus 2 percent, and where applicable, the acceleration within plus or minus 10 percent. The adapter for the vibration test shall be contoured to the outside configuration of the binocular bodies. The binocular shall be opened to an interpupillary setting between 66mm and 72mm when positioned in the adapter. The clamping pressure for securing the binoculars in the adapter shall be distributed evenly over the binocular bodies. A suggested method of construction of the adapter is depicted in Figure 1. Construction of the adapter shall also permit the binocular to be positioned for vibration in each of three mutually perpendicular directions, one of which shall be with the axis of hinge pin maintained in the vertical plane.

4.5.2.3.4 Shock test.- The shock testing apparatus shall conform to the requirements of MIL-STD-810 for half sine wave shock impulse testing.

4.5.2.3.5 Sealing test.- The pressure testing apparatus to test sealing of the binocular shall be capable of applying the internal pressure to the binocular as detailed on Sheets 1 and 2 of Drawing F8565556. The sensitivity of the device utilized to monitor the applied pressure in the binocular shall be at least 0.025 psi. The adapters for the pressure testing apparatus and dew point tester shall adapt to the threaded purging holes occupied by the 2 Screws MS 3212-21, located in each housing assembly.

## MIL-B-60884C(MU)

4.5.2.3.6 Performance.- Special testing equipment to test the binocular assembly shall conform to Figures 2 and 3 and the following requirements:

a. Target collimator.- A 10 inch collimator, conforming to Drawing F10547434, shall be utilized to project a horizontal and vertical crossline reticle pattern in parallel light. The axis of the collimator shall be established horizontal within 45 seconds of arc. The vertical reticle line of the target collimator shall be plumb during all tests.

b. Binocular holding device.- With the binocular set to an interpupillary index setting of 65mm, the binocular holding device shall position the line defined by the geometric centers of the binocular exit pupils in a horizontal plane that is coincident with the horizontal plane containing the geometric axis of the target collimator, within 0.5 inch. The binocular holding device shall be capable of maintaining the centers of the binocular exit pupils in that horizontal plane during all changes to the interpupillary index settings. The holding device shall also position the long axis through the Hinge Sleeve 10547102 horizontal during all changes to the interpupillary settings

c. Adjustable table.- The binocular holding device shall be affixed to the adjustable table that will permit a fine alignment of the right, or left, telescope of the binocular to obtain zero divergence and zero convergence as read on the reticle of the appropriate collimator reticle of the double collimators (see 4.5.2.3.6d) that are positioned in line with the binocular eyepieces. Construction of the adjustable table shall be such that, with the holding device affixed, the incident surfaces of the binocular objectives will be positioned within 12 inches (304.8mm) of the target collimator objective.

d. Double collimator assembly.- A double collimator assembly conforming to Drawing F7680840, except Reticle C7680844, shall be utilized to test collimation, image tilt and magnification of the binocular. In place of Reticle C7680844, each collimator of the assembly shall be equipped with a reticle that contains the pattern depicted in Figure 2. The double collimator assembly shall be rigidly mounted on a stand that aligns the optical axis of the collimators to the geometric centers of the binocular exit pupils within 0.125 inch (3.175mm). The incident surface of the viewing collimator objectives shall be positioned within 0.250 inch (6.35mm) of the binocular exit pupils. The vertical reticle lines passing through the geometric centers of each collimator reticle shall be adjusted plumb.

4.5.2.3.6.1 Resolution.- The wall target utilized for the resolution test shall be the National Bureau of Standards (NBS) High Resolution Test Chart 1952 that forms a part of NBS Circular 533. Two charts shall be used side by side. One chart shall be used erect (lines horizontal and vertical), the second chart shall be rotated 45 degrees clockwise from the first chart.

4.5.2.3.6.2 Image tilt - Utilized the projected vertical line

MIL-B-60884C (MU)

image of a target collimator and reticle pattern of double collimator for image tilt tests. Gates (marked "2" in Figure 2) are provided to test image tilt.

4.5.2.3.6.3 Magnification.- Collimator F10547434 and Collimator Assembly, Double F7680840 are utilized for magnification tests as shown in test set-up Figure 3. The five mil reticle markings of the 10" collimator provide dimensionally known horizontal and vertical line targets subtending ten mils in the horizontal and the vertical directions. Gates (marked 3 in Figure 2) are provided on the reticle pattern to test magnification.

4.5.2.3.6.4 Interpupillary adjustment.- The test equipment utilized to test interpupillary adjustment shall consist of a binocular holding device, translucent light source, a transparent or translucent millimeter scale, and a holding device for the scale. The binocular holding device shall maintain the axis through the binocular hinge sleeve horizontal within five degrees. The translucent light, of between 30 and 60 watts, shall be positioned incident to the binocular objectives. The holding device for the millimeter scale shall be capable of securely holding the scale in the plane containing image of the exit pupils of the binocular.

4.5.2.3.6.5 Torque requirements.- The torque wrench type tester for testing eyepiece torque shall have a range of zero to eighty (0-80) inch-ounces, the accuracy of which shall be five percent throughout the entire zone of excursion. The force measuring gage for testing interpupillary adjustment torque shall have a range of zero to twenty-five (0-25) inch-pounds, the accuracy of which shall be five percent throughout the entire zone of excursion.

4.5.2.3.5.6 Fabrication, set-up and calibration.- Design and fabrication of test equipment shall be such that it incorporates the features of rigidity, stability and ease of maintenance. Set-up and calibration equipment necessary for certification of the testing equipment shall be furnished and will become a part of the testing equipment.

#### 4.6 Test methods and procedures.

4.6.1 Storage temperature.- Testing equipment utilized in this test shall conform to the requirements of 4.5.2.3.1. The binocular shall be placed in the test chamber and the temperature of the chamber reduced, over a period of 4 hours plus or minus 15 minutes, from room ambient temperature to -70°F (-56.7°C). The binocular shall be maintained at this extreme temperature for a minimum of 4 hours. Upon completion of the 4 hour exposure the temperature of the chamber shall be raised, over a period of 8 hours plus or minus 15 minutes, to +160°F (71.1°C). The binocular shall remain at this temperature for a minimum of 4 hours. Upon completion of the 4 hour exposure the temperature of the chamber shall be reduced, over a period of 4 hours plus or minus 15 minutes, to

MIL-B-60884C (MU)

room ambient temperature. The binocular shall then be removed from the test chamber and subjected to the visual, tactile and audible examination of 4.6.4.1. The binocular shall conform to the requirements of 3.4. Caution shall be exercised throughout this test to avoid subjecting the binocular to thermal shock.

NOTE: Room temperature is defined as any degree of temperature between +60° and +90°F (15.6° and 32.2°C).

4.6.2 Extreme operating temperature.- Testing equipment utilized in this test shall conform to the requirements of 4.5.2.3.1. The binocular shall be placed in the test chamber and the temperature of the chamber reduced, over a period of 4 hours plus or minus 15 minutes, from room temperature to -40°F (-40°C). The binocular shall be maintained at this extreme temperature for a minimum of 4 hours. At completion of the 4 hour exposure, and while at -40°F, the binocular shall be subjected to the tests in 4.6.16 and 4.6.17. Upon completion of the low temperature operability tests the temperature of the chamber shall be raised, over a period of 8 hours plus or minus 15 minutes, to +125°F (51.7°C). The binocular shall be maintained at this extreme temperature for a minimum of 4 hours. At the completion of the 4 hour exposure, and while at +125°F the binocular shall be subjected to the tests in 4.6.16 and 4.6.17. Upon completion of the high temperature operability tests the temperature of the chamber shall be reduced, over a period of 4 hours plus or minus 15 minutes, to room ambient temperature. The binocular shall then be removed from the test chamber. The binocular shall conform to the requirements of 3.5 at each temperature extreme. Caution shall be exercised during these tests to avoid subjecting the binocular to thermal shock.

4.6.3 Humidity.- Testing equipment utilized in this test shall conform to the requirements of 4.5.2.3.2. Position the binocular in the test chamber and perform this test in accordance with Test Method 507, Procedure 1 of MIL-STD-810, except that the number of cycles shall be reduced to five. The binocular shall show no evidence of physical damage, such as corrosion, moisture penetration or damage to optical-mechanical parts and protective coatings.

4.6.4 Vibration "A".- Testing equipment utilized in this test shall conform to the requirements of 4.5.2.3.3. The binocular shall be clamped in the vibration holding adapter. The adapter, with binocular, shall then be secured to the table of the vibration machine. The binocular shall be vibrated in accordance with Test Method 514.1, Procedure VIII, Equipment Category F, Curve W of MIL-STD-810, except that a resonance search and dwell are not required, and the sinusoidal cycling time in Schedule A shall be as specified in 3.7.1. Upon completion of the vibration cycling the binocular shall be removed from the vibration table and adapter and subjected to the examinations in 4.6.4.1.

CAUTION: The clamping torque applied to the vibration holding adapter containing the binocular shall be such that a uniform pressure is applied to all contacted surfaces of the binocular.

MIL-B-60884C(MU)

4.6.4.1 Examination.- Subsequent to vibration, the binocular shall be thoroughly examined for physical defects prior to being subjected to the remaining tests specified herein. A visual examination shall be made for missing or damaged parts. A tactile examination shall also be conducted to determine looseness or improper functioning of moving parts such as diopter movements and hinge movements, etc. An examination shall be made for loose internal parts or broken optical components such as (lenses, prisms, etc.). Any one of the possible defects defined above shall be cause to consider a binocular defective. Binoculars that have passed the above examinations shall be subjected to the tests specified in 4.6.7 thru 4.6.17 inclusive, to determine overall conformance to 3.7.1.

4.6.5 Vibration "B".- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.3. The binocular shall be secured and positioned on the vibration machine as specified in 4.6.4. The binocular shall be vibrated in accordance with Procedure 1, Condition E of MIL-F-13926, except that the frequency shall be maintained at 30 cycles per second. Upon completion of the vibration cycling the binocular shall be removed from the vibration table and adapter and subjected to the examinations in 4.6.4.1. Binoculars that have passed the examinations specified in 4.6.4.1 shall then be subjected to the tests specified in 4.6.7 through 4.6.17 inclusive, to determine overall conformance to 3.7.2.

4.6.6 Shock.- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.4. The adapter for holding the binocular during this test shall conform to the requirements specified in 4.5.2.3.3. The binocular shall be clamped in the shock test holding adapter. The adapter, with binocular, shall then be secured to the shock test machine. The binocular shall be shock tested in accordance with Test Method 516.1, Procedure III with a half sine wave shock pulse of MIL-STD-810. Upon completion of the 12 shock impulses the binocular shall be removed from the shock test machine and adapter and subjected to the examinations in 4.6.4.1. Binoculars that have passed the examinations specified in 4.6.4.1 shall then be subjected to the tests specified in 4.6.7 through 4.6.17 inclusive, to determine overall conformance to 3.8.

4.6.7 Sealing.- The nitrogen gas used for this test shall conform to Federal Specification BB-N-411, Type 1, Grade B Class 1. Prior to performing the sealing test the internal atmosphere of each telescope assembly of the binocular shall be tested utilizing the internal pressure testing apparatus of 4.5.2.3.5, together with a dew point tester. Attach the internal pressure testing apparatus to one purging port of the telescope assembly, and the dew point tester to the other purging port of the same telescope assembly. Apply an internal pressure of 1.0 to 2.0 psig (.07 to .14 kg/cm<sup>2</sup>) of nitrogen gas to the telescope assembly while simultaneously capturing the initial exhaust of gas from the same telescope assembly. The dew point of the initial amount of the exhausted gas from the telescope assembly shall conform to the

## MIL-B-60884C (MU)

requirements of 3.9, as measured with the dew point tester. Subsequent to this test the sealing test of the binocular shall be performed. The internal pressurizing of each telescope assembly to test the sealing of the binocular shall be performed using the special testing equipment conforming to 4.5.2.3.5. Each telescope assembly shall be pressurized to the requirements of 3.9 in accordance with the internal pressure test procedure delineated on Sheets 1 and 2 of Drawing F8565556. The pressure shall be retained in each telescope assembly for the time period specified. Any evidence of leakage in either telescope at the end of the one hour time period shall not exceed the tolerance specified in 3.9, as measured on the monitoring pressure gauges of the testing equipment. Should leakage in any one telescope assembly of the binocular assembly exceed the tolerance specified in 3.9 the binocular assembly shall be considered defective, and shall be rejected.

**CAUTION:** The sensitivity of the interior atmosphere of the binocular to temperature change may require restricted handling of the binocular during the performance of the sealing test.

**4.6.8 Cleanliness.**- Subsequent to the post vibration examination of 4.6.4.1 the binocular shall be visually examined for cleanliness through each eyelens of the binocular with the unaided eye. Inspection for condensates and grease shall be made by the technique of shadowing. Inspection for fingerprints, fractures and dirt, or foreign particles, shall be made by viewing a uniformly illuminated field having a brightness of approximately 300 apparent foot candles. Cleanliness of each telescope assembly of the binocular shall conform to the cleanliness requirements of 3.10. Inspection for fractures shall also be made by visual examination through each objective lens, with the unaided eye.

**4.6.9 Collimation.**- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6a through 4.5.2.3.6d inclusive. Utilize the test equipment depicted in Figure 3. With the binocular removed from the testing equipment align the double collimator assembly with the pre-plumbed target collimator. Adjust the double collimator to superimpose the horizontal and vertical reticle line patterns on the projected image of the target collimator's horizontal and vertical reticle lines within one minute. Lock the double collimator in this established position. Position the binocular in the binocular holding device that is affixed to the adjustable table, located between the target collimator and double viewing collimator. Adjust the binocular diopter scales to indicate zero diopter, and adjust the interpupillary distance (IPD) to "65mm" as read on the IPD scale. Observe through the right eyepiece of the double collimator assembly. Adjust the table, containing the binocular holding device, in azimuth and elevation to establish coincidence of the horizontal and vertical reticle lines of the right double collimator with respect to the intersecting point of the horizontal and vertical target line image. Observe through the left eyepiece of the double collimator assembly. The image of the target collimator crossline center shall fall within the left half of the rectangular grid pattern of the viewing collimator's special reticle (Figure 2). The image of the vertical target line shall appear on the side of the vertical reticle line in the viewing collimator

MIL-B-60884C(MU)

which represents divergence of the emergent beam (see NOTE). The infinity target beams emerging from the eyepiece of the binocular shall be parallel within the tolerance specified in 3.11 for dipvergence and divergence. Repeat the above test procedures with the interpupillary distance adjusted to "58mm" then "72mm" as read on the IPD scale. The binocular shall again meet the requirements of 3.11 at each interpupillary setting. Any evidence of convergence of the emergent beams shall be cause for rejection of the binocular.

NOTE: When the double viewing collimators, as specified, used in the divergence test have no erecting lens system between the objective and eyepiece, the image of the vertical target line shall appear to the left of the viewing collimator vertical reticle line.

4.6.10 Resolution.- The resolution target used in this test shall conform to the requirements of 4.5.2.3.6.1. Illumination of the resolving power chart shall be by diffuse white light of the highest practical intensity. The binocular shall be positioned on a holding medium that maintains the axis through the hinge sleeve perpendicular within one degree to the resolution target. An auxiliary telescope of at least three power (3X) shall be used at the binocular eyepiece to obtain sufficient magnification of the target image. Perform the test for resolution in accordance with the procedure outlined in MIL-O-13830. Resolution of each telescope of the binocular shall conform to the requirements of 3.12.

4.6.11 Image tilt.- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6a, 4.5.2.3.6b, 4.5.2.3.6c, 4.5.2.3.6d and 4.5.2.3.6.2. Perform this test with the equipment set-up as shown in Figure 3. Adjust the interpupillary distance of binocular to 65mm. Observe through the right eyepiece of the double collimator assembly and adjust the binocular table, if necessary, to superimpose the left, or right, edge of the vertical target line image on the cross marked "1" on the reticle of the right collimator. The same edge of vertical target line image shall fall within the gated line marked "2" on the reticle in the right collimator. Observe through the left eyepiece of the double collimator assembly and repeat the above test procedure. The selected edge of the vertical target image line shall again fall within the gated line marked "2" on the reticle in the left collimator.

4.6.12 Parallax.- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6a, 4.5.2.3.6b and 4.5.2.3.6c. Adjust the interpupillary distance of the binocular to 65mm. Adjust the diopter movement of the left binocular eyepiece for best focus of the binocular reticle. Observe the target image through the left eyepiece of the binocular. Parallax is recognized as any apparent movement of vertical reticle line, at the intersection of the "2" horizontal line, with respect to the intersecting point of the target image lines when the observers head is moved side to side or up and down. Parallax in the left telescope optical system shall conform to the requirements of 3.14.

NOTE: For purposes of this test the binocular reticle line width in the field of view represents 0.2 mil.



## MIL-B-60884C(MU)

4.6.13 Eyeiece focus.- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6a, 4.5.2.3.6b and 4.5.2.3.6c. Adjust the interpupillary distance of the binocular to 65mm. Rotate the diopter movement of the left and right binocular eyepieces to zero diopter, as read on each diopter scale. A calibrated dioptometer shall be utilized for measuring the accuracy of the zero diopter setting of the eyepiece focus adjustment. Adjust the dioptometer eyepiece for best focus of the dioptometer reticle. Position the dioptometer at the left eyepiece of the binocular. Obtain best focus of the target image, at the center of the field, by adjustment of the dioptometer objective. The target image shall be in best focus within the tolerance specified in 3.15, as measured on the dioptometer objective scale. Position the dioptometer at the right eyepiece of the binocular and repeat the above test procedure. The target image shall be in best focus within the tolerance specified in 3.15 as measured on the dioptometer objective scale. Remove the calibrated dioptometer from the line of sight. Rotate the diopter movement of the left and right binocular eyepieces to their clockwise stop and note the setting on the eyepiece diopter scale, then rotate the left and right diopter movements to their counterclockwise stop and again note the setting each eyepiece diopter scale. Each eyepiece focus adjustment range shall conform to the requirements of 3.15, as measured on the binocular eyepiece diopter scale.

4.6.14 Equality of magnification.- The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6a, 4.5.2.3.6b, 4.5.2.3.6c, 4.5.2.3.6d and 4.5.2.3.6.3. With the test equipment set-up as shown in Figure 3, observe through the right eyepiece of double collimator. Adjust the binocular table, if necessary, and obtain coincidence of the intersecting point of the collimator's vertical and horizontal reticle lines with the intersecting point of the target image lines. The image of the 5 mil target lines shall fall within the gates marked "3" on the reticle in the right collimator. Observe through the left eyepiece of the double collimator assembly and repeat the above test procedure. The image of the 5 mil target lines shall fall within the gates marked "3" on the reticle in the left collimator.

4.6.15 Interpupillary adjustment.- The testing equipment utilized in this test shall conform to the requirements of 4.5.2.3.6.4. Position the binocular on its holding device. Energize the light source incident to the objective lenses of the binocular. Position the millimeter scale in the plane of the exit pupils so that their best image is imaged on the scale. Adjust the interpupillary distance of the binocular to 58mm, then 65mm, then 72mm as read on the binocular IPD scale. At each IPD setting the interpupillary scale shall conform to the requirements of 3.17 as read on the millimeter scale.

4.6.16 Eyeiece torque.- A suitable adapter that accommodates the binocular eyepiece shall be utilized with the torque wrench tester specified in 4.5.2.3.6.5. Each eyepiece focus adjustment shall be rotated from its counterclockwise stop to its clockwise stop, then back to its counterclockwise stop by means of the torque wrench tester. The running torque required for this rotation shall not exceed the values specified in 3.18.1 at the temperature indicated.

MIL-B-60884C (MU)

4.6.17 Interpupillary torque. - The test equipment utilized in this test shall conform to the requirements of 4.5.2.3.6.5. Secure the left, or right, binocular body assembly in a horizontal plane. With the foot of the force gage in contact with the top of the unsecured body assembly, at a known distance from the axis of the hinge sleeve and the forward edge of the objective assembly, rotate the body through one full excursion to its stop. While the body assembly is at this excursion stop, reposition the force gage to the bottom side of the body, at the location which is exactly opposite to the location utilized for the first excursion. Again rotate the body back through a full excursion to its stop. The running interpupillary torque required for these rotations shall not exceed the values specified in 3.18.2, at the temperature indicated.

4.6.18 Interchangeability. - The nine binoculars selected in accordance with 4.4.3 shall be laid adjacent to each other on a horizontal work surface. The assemblies of the first binocular shall be labeled in the following manner: the left objective, housing (body), and eyepiece assemblies individually labeled "1A"; the right objective, housing (body), and eyepiece assemblies individually labeled "1B". The assemblies of the second binocular shall be labeled in the following manner: the left objective, housing (body), and eyepiece assemblies individually labeled "2A", the right objective, housing (body), and eyepiece assemblies individually labeled "2B". By use of this identification procedure the assemblies of the remaining binoculars, numbers three through nine shall be appropriately labeled "3A" - "3B" through "9A" - "9B". After labeling the nine binoculars, all objectives shall be disassembled from the housings (bodies), all eyepieces shall be disassembled from the housings (bodies) and the left housing disconnected from the right housing. The housings, objectives and eyepieces shall be interchanged and assembled as follows:

a. Housings (bodies).

Assemble Housing 1A to Housing 2B
" " 2A to Housing 3B
" " 3A to Housing 4B
" " 4A to Housing 5B
" " 5A to Housing 6B
" " 6A to Housing 7B
" " 7A to Housing 8B
" " 8A to Housing 9B
" " 9A to Housing 1B

b. Objectives.

Assemble Objective 1A to Body 2A	Assemble Objective 1B to Body 4B
" " 2A to Body 3A	" " 2B to Body 5B
" " 3A to Body 4A	" " 3B to Body 6B
" " 4A to Body 5A	" " 4B to Body 7B
" " 5A to Body 6A	" " 5B to Body 8B
" " 6A to Body 7A	" " 6B to Body 9B
" " 7A to Body 8A	" " 7B to Body 1B
" " 8A to Body 9A	" " 8B to Body 2B
" " 9A to Body 1A	" " 9B to Body 3B

## MIL-B-60884C (MU)

c. Eyeieces.

Assemble Eyepiece	1A to Body 4A	Assemble Eyepiece	1B to Body 6B
"	2A to Body 5A	"	2B to Body 7B
"	3A to Body 6A	"	3B to Body 8B
"	4A to Body 7A	"	4B to Body 9B
"	5A to Body 8A	"	5B to Body 1B
"	6A to Body 9A	"	6B to Body 2B
"	7A to Body 1A	"	7B to Body 3B
"	8A to Body 2A	"	8B to Body 4B
"	9A to Body 3A	"	9B to Body 5B

d. Hinge assembly.- All hinge components shall be considered to be part of the left body housing for the interchangeability test.

e. Reconstructed binoculars.- Reconstructed binoculars shall be composed of the following assemblies:

Binocular	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
Objective	8A-7B	9A-8B	1A-9B	2A-1B	3A-2B	4A-3B	5A-4B	6A-5B	7A-6B
Housing	9A-1B	1A-2B	2A-3B	3A-4B	4A-5B	5A-6B	6A-7B	7A-8B	8A-9B
Eyepiece	6A-5B	7A-6B	8A-7B	9A-8B	1A-9B	2A-1B	3A-2B	4A-3B	5A-4B

4.6.18.1 Interchangeability tests.- Binoculars that have been reconstructed in accordance with the procedure specified in 4.6.18a, 4.6.18b and 4.6.18c shall be subjected to the tests in 4.6.7, 4.6.8, 4.6.9, 4.6.10 and 4.6.12. The reconstructed binoculars shall meet all the requirements of 3.19.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking.- Packaging, packing and marking shall be in accordance with the applicable packaging data sheet listed in Section 2. The level of protection shall be as specified in the procurement document.

## 6. NOTES

6.1 Intended use.- Binocular M19 is a hand held observation instrument. The left ocular of Binocular M19 contains a reticle which is graduated in angular mils for use in range estimation.

6.2 Ordering data.- Procurement documents should specify the following:

- Title, number and date of this specification.
- Applicable stock number.
- Applicable packaging data sheet (see 5.1).
- Selection of applicable levels of preservation, packaging and packing.
- Provisions for first article testing.

6.3 Tolerance studies (worst case produceability analysis).

- A computer study has been performed to evaluate the effects

MIL-B-60884C(MU)

on divergence and convergence of out-of tolerance conditions of the Binocular M19. Certain of the more critical tolerances incorporated into the Technical Data Package for the Binocular M19, have been established or influenced as a result of this study. The report, RA-74-06-01, is available upon request from Frankford Arsenal, ATTN: SARFA-QAF-R, Philadelphia, Pa. 19137.

b. The results of a worst case tolerance analysis of this binocular will yield collimation error values in excess of those permitted by this specification. The worst case condition is not however, considered to be representative of the Binocular M19 in production. The probability that an eyepiece assembly, objective assembly and body assembly are all at the upper limits of acceptance and have their errors in the same direction is on the order of  $2.7 \times 10^{-7}$ . Since the other half of the binocular would also have to be at maximum tolerance, but in the opposite direction, the probability that any one complete instrument would represent the worst case condition is approximately  $7 \times 10^{-14}$ .

c. The Monte Carlo study shows that collimation requirements are easily satisfied if all subassemblies are manufactured to the mean dimension and controlled within the 3 (sigma) values represented by the tolerance.

d. One Monte Carlo run, randomly selecting modules from lots considered to be .65% defective, simulated the manufacture of 16,000 binoculars. All but eight binoculars proved to be collimated within specification requirements.

Custodian:

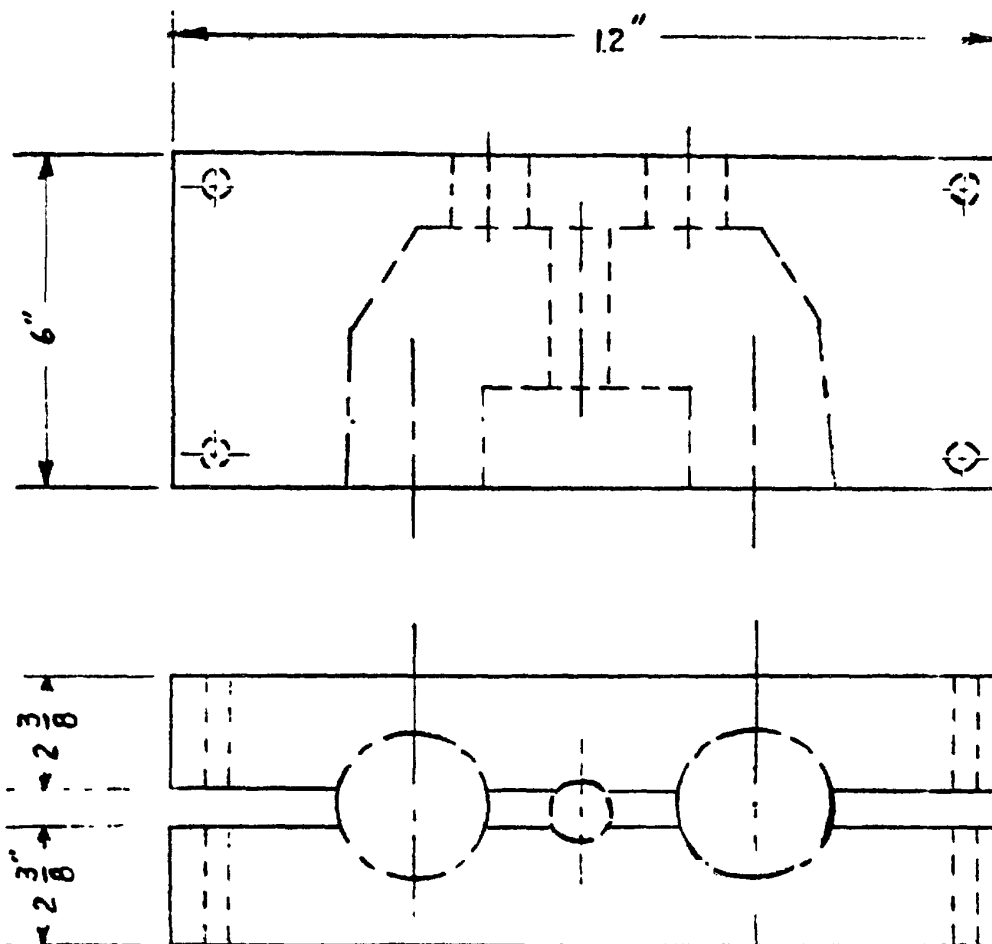
Army - MU

Preparing activity:

Army - MU

Project No. 6650-A084

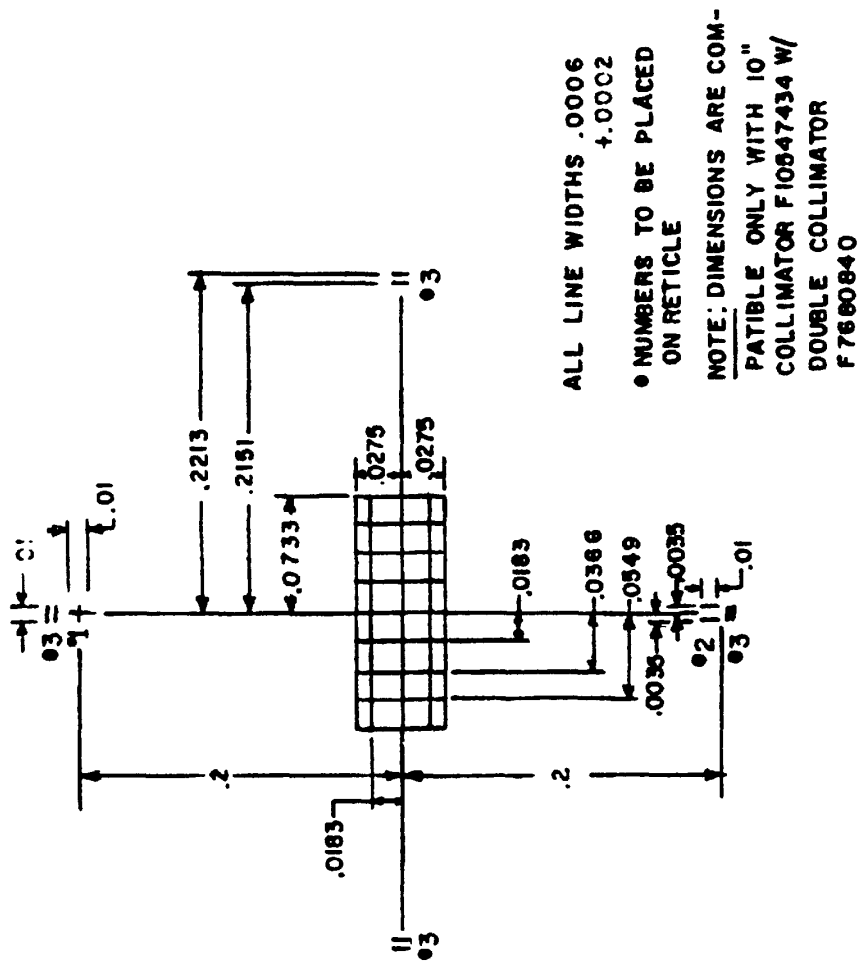
MIL-B-60884C(MU)



MATERIAL - OAK OR EQUAL

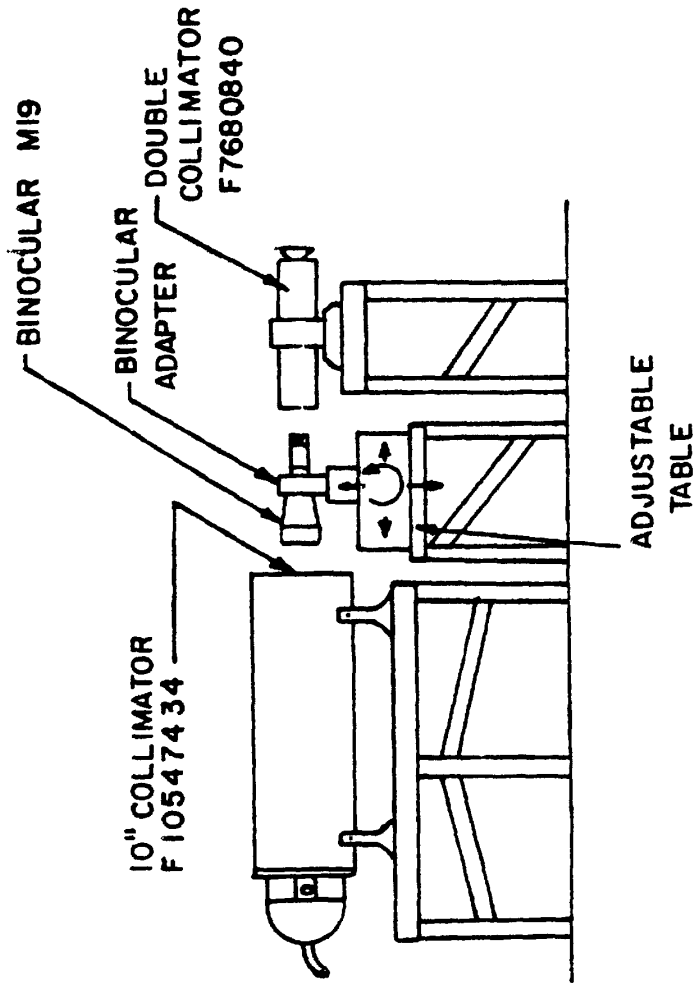
FIGURE 1

MIL-B-60884C (MU)



SPECIAL RETICLE  
FIG 2

MIL-B-60884C (MU)



EQUIPMENT TEST SET-UP

FIG. 3

**TRU MIS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in making comments and suggestions for improvements. All users of military standardization documents are invited to provide feedback. This form may be detached, folded along the lines indicated, taped along the loose edge (**DO NOT STAPLE**), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problem. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of classification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE ARMY

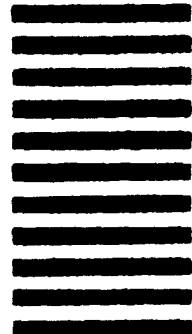


NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE \$300

**BUSINESS REPLY MAIL**  
FIRST CLASS PERMIT NO 12062 WASHINGTON D C  
POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE ARMY

Commander  
US Army Armament Research and Development Command  
ATTN: DRDAR-TST-S  
Dover, NJ 07801





**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL**  
(See Instructions - Reverse Side)

1. DOCUMENT NUMBER		2. DOCUMENT TITLE	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER (Specify) _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording			
b. Recommended Wording			
c. Reason/Rationale for Recommendation			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	

(TO DETACH THIS FORM, CUT ALONG THIS LINE)