

INCH-POUND
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MIL-DTL-48557B  
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SUPERSEDING  
MIL-M-48557A(AR)  
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## DETAIL SPECIFICATION

### MOUNT, TELESCOPE AND QUADRANT - M171A1

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 Mount, Telescope and Quadrant: M171A1 which supports the Telescope, Panoramic: M137A2 and Quadrant, Fire Control: M17A1 for use on the M777 and M198 series of howitzers. The mount provides adjustments in pitch and compensates for angles of cant when laying the guns for indirect fire.

#### 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 <a href="mailto:picaardecsdzbranch@conus.army.mil">picaardecsdzbranch@conus.army.mil</a> . Since contact information can change, you may want to verify the currency of this address information using the ASSIST online database at <a href="https://assist.dla.mil">https://assist.dla.mil</a> .
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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-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

8658940	-	Inspection Aid
10549200	-	Sighting Device
10553898	-	Inspection Aide Support Assembly
10555619	-	Test Fixture for Mount, Telescope M134
10558253-11	-	Adapter, Leveling
11747196	-	Adapter, Vibrating and/or Shock for Mount, Telescope & Quadrant XM171
11747840	-	Gage, Interchangeability, Max
11747844	-	Gage, Interchangeability, Max
11747889	-	Gage, Interchangeability, Max
11747949	-	Adapter, Torque
11747950	-	Fixture, Holding
12984713	-	Telescope, Panoramic: M137A2
13005101	-	M17A1 Quadrant
13005103	-	Mount, Telescope and Quadrant: M171A1
13010956	-	Plate, Identification
13042935	-	Adapter, Fixture, for M171 Series Mounts

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(Copies of these drawings may be requested online at [pica.drawing.request@conus.army.mil](mailto: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 takes 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 Mount. The mount shall conform to drawing 13005103.

3.4 Environmental.

3.4.1 Storage temperature. While thermally stabilized at temperatures of  $+160 \pm 5$  °F and  $-60 \pm 5$  °F, the mount 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 mount shall meet the requirements of 3.7 through 3.11 inclusive.

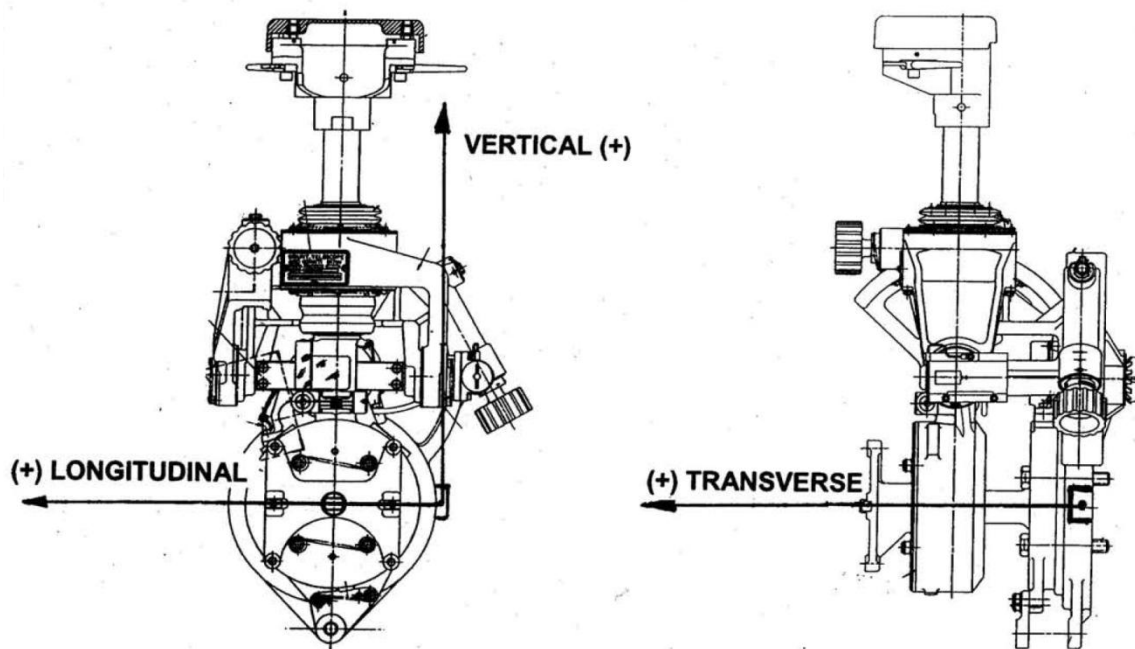
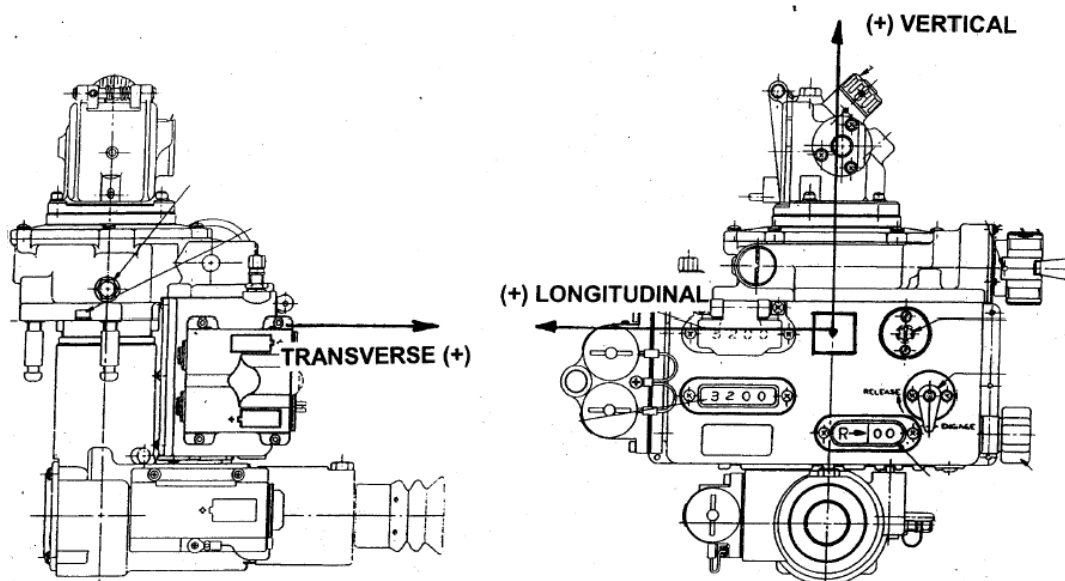
3.4.2 Operating temperature. The mount shall meet the requirements of 3.9 while exposed to and thermally stabilized at temperatures of  $+145 \pm 5$  °F and  $-50 \pm 5$  °F. Upon return to and stabilization at standard ambient temperature,  $+60$  °F to  $+90$  °F, the mount shall meet the requirements of 3.5 through 3.11 inclusive.

3.4.3 Shock. With a M137A2 panoramic telescope, 12984713, and M17A1 quadrant, 13005101, attached in the appropriate locations, the mount shall withstand a total of 75 shock impulses along the 3 mutually perpendicular axes as defined in Figure 1 and Figure 2. Each shock impulse shall be a half sine wave with a time duration of  $0.010 \pm 0.001$  seconds and peak amplitude for each shock impulse as shown in Table I when measured at the face of the counterbox of the M137A2 telescope (see Figure 2). Subsequent to shock, the mount shall show no evidence of damage or physical failure and shall meet the requirements of 3.5 through 3.11 inclusive.

TABLE I. Shock orientation and impulse at M137A2 counterbox.

Orientation	Shock impulse and direction	Number of impulses
Longitudinal	-50 g's, +50 g's	15 each direction
Vertical	100 g's	15 total
Transverse	-100 g's, +100 g's	15 each direction

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FIGURE 1. Orientation of shock loads on M171A1 mount.FIGURE 2. Orientation of shock loads on M137A2 Panoramic Telescope.

3.4.4 Vibration "A". The mount shall withstand a total of  $270 \pm 5$  minutes of sweep-cycle vibration. The vibration shall be applied for  $90 \pm 2$  minutes along each of the three mutually perpendicular major axes shown in Figure 1. A complete sweep-cycle shall consist of vibration from origin (5 Hz at 1 inch double amplitude) to mid-point ( $5 \pm 0.5$  g's at 500 Hz) to origin, and shall have a duration of  $15 \pm 1$  minutes. Double amplitude shall be constant at 1 inch between 5 Hz and 10 Hz, and varied with frequency to maintain a constant  $5 \pm 0.5$  g's acceleration between 10 Hz and 500 Hz. Upon completion of

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vibration, the mount shall exhibit no evidence of damage or physical failure and shall meet the requirements of 3.5 through 3.11 inclusive.

3.4.5 Vibration "B". The mount shall be vibrated in the vertical plane shown in Figure 1 for a total of  $15 \pm 1$  minutes of sweep cycle vibration. A complete sweep-cycle shall consist of vibration from origin (5 Hz at 1 inch double amplitude) to mid-point ( $5 \pm 0.5$  g's at 500 Hz) to origin, and shall have a duration of  $15 \pm 1$  minutes. Double amplitude shall be constant at 1 inch between 5 Hz and 10 Hz and varied with frequency to maintain a constant  $5 \pm 0.5$  g's acceleration between 10 Hz and 500 Hz. Upon completion of vibration, the mount shall exhibit no evidence of damage or physical failure and shall meet the requirements of 3.5 through 3.11 inclusive.

3.5 Locating keys for M137A2 telescope. The locating keys for the M137A2 telescope shall be parallel to the recessed mounting surface of the mount within 1.0 mil.

3.6 Mounting surfaces of M17A1 quadrant. The mounting surfaces for the M17A1 quadrant shall be parallel to the recessed mounting surface of the mount within 1.0 mil.

3.7 Performance.

3.7.1 Locating keys for M17A1 quadrant. The locating keys for the M17A1 quadrant shall be parallel to the locating keyway of the recessed mounting surface within 0.5 mils.

3.7.2 Elevation level vial. When the mounting surface for the M137A2 telescope is level, the elevation level vial bubble shall be centered within the width of a level vial graduation line.

3.7.3 Elevation adjustment range. From a level starting position, the locating keyway of the vertical mounting surface shall rotate through an excursion of not less than 1333 mils in elevation and not less than 270 mils in depression.

3.7.4 Elevation plumb travel. The line of sight shall not deviate horizontally from a plumbed line by more than 0.25 mils when rotated through an excursion of 270 mils depression to 800 mils elevation. From 801 to 1333 mils elevation, the total lateral spread from the leftmost line of sight observed to the rightmost line of sight observed during the excursion shall not be greater than 0.5 mils.

3.7.5 Pitch adjustment range. From a level starting position and using only the pitch adjustment, the mount shall travel through an excursion of not less than 178 mils in depression and not less than 178 mils in elevation.

3.7.6 Pitch plumb travel. The line of sight shall not deviate horizontally from a plumbed line by more than 0.5 mils total lateral spread while it is being subjected to the pitch travel excursion specified in 3.7.5.

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3.7.7 Pitch adjustment backlash. Backlash of the pitch travel mechanism shall not be greater than 1.5 mils at zero elevation.

3.7.8 Cant adjustment range. From a level starting position and using only the cant adjustment, the mount shall travel through an excursion of not less than 178 mils to the left and not less than 178 mils to the right.

3.7.9 Cant adjustment backlash. Backlash of the cant travel mechanism shall not be greater than 1.5 mils at zero elevation and zero cant.

3.7.10 Mount rigidity. With an established line of sight starting from a position of zero elevation and zero cant, the line of sight shall not exceed the total lateral movement specified in Table II at the corresponding elevations when a 20 pound horizontal load is applied to the telescope support perpendicular to the keyway and subsequently released. This shall be done from both the left side and the right side of the mount at all the elevations specified in Table II.

TABLE II. Mount rigidity.

Elevation (mils)	Cant angle (mils)	Total lateral movement (mils)
0	0	0.25
800	0	0.75
1100	0	1.75
1333	0	3.50

3.7.11 Azimuth correction. The mount shall make left and right azimuth corrections in accordance with the requirements and tolerances of Table III.

TABLE III. Azimuth correction.

Elevation (mils)	Cant angle (mils)	Azimuth correction (mils)	Allowable tolerance (mils)
300	88.9	27.0	$\pm 0.3$
600	88.9	59.6	$\pm 0.7$
900	88.9	108.8	$\pm 1.5$
1200	88.9	216.8	$\pm 1.8$
300	177.8	54.5	$\pm 0.6$
600	177.8	120.3	$\pm 1.0$
1100	177.8	342.4	$\pm 2.0$

3.8 Level vial illumination. The level vial bubbles and graduation lines shall be clearly distinguishable when observed in ambient light conditions ranging from dusk to darkness.

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3.9 Knob torque. The running torque required to operate the knobs shall conform to the values in Table IV at the corresponding temperatures.

TABLE IV. Knob torque.

Knob	Torque at +60 °F to +90 °F	Torque at +145 ± 5 °F and -50 ± 5 °F
Cross level	4 to 12 inch pounds	27 inch pounds maximum
Pitch level	4 to 12 inch pounds	27 inch pounds maximum

3.10 Interchangeability.

3.10.1 Interchangeability of mounting surface of M171A1 mount. The mounting surfaces of the M171A1 mount shall be able to be mounted on the corresponding mounting surfaces of the howitzer.

3.10.2 Interchangeability of mounting surface for M17A1 quadrant. The mounting surface on the M171A1 mount for the M17A1 quadrant shall be able to accept a M17A1 quadrant with its mounting surfaces at maximum material condition.

3.10.3 Interchangeability of mounting surface for M137A2 telescope. The mounting surface on the M171A1 mount for the M137A2 telescope shall be able to accept a M137A2 telescope with its mounting surfaces at maximum material condition.

3.11 Workmanship. Workmanship of the M171A1 mount shall be in accordance with the requirements of MIL-F-13926.

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## 4. VERIFICATION

TABLE V. 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	Mount			X	X	X	X	4.3.2.4
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	Shock				X	X	X	4.4.3
3.4.4	Vibration “A”				X	X		4.4.4
3.4.5	Vibration “B”				X		X	4.4.5
3.5	Locating keys for M137A2 telescope				X	X	X	4.5
3.6	Mounting surfaces of M17A1 quadrant				X	X	X	4.6
3.7.1	Locating keys for M17A1 quadrant				X	X	X	4.7.1
3.7.2	Elevation level vial				X	X	X	4.7.2
3.7.3	Elevation adjustment range				X	X	X	4.7.3
3.7.4	Elevation plumb travel				X	X	X	4.7.4
3.7.5	Pitch adjustment range				X	X	X	4.7.5
3.7.6	Pitch plumb travel				X	X	X	4.7.6
3.7.7	Pitch adjustment backlash				X	X	X	4.7.7
3.7.8	Cant adjustment range				X	X	X	4.7.8
3.7.9	Cant adjustment backlash				X	X	X	4.7.9
3.7.10	Mount rigidity				X	X	X	4.7.10
3.7.11	Azimuth correction				X	X	X	4.7.11
3.8	Level vial illumination				X	X	X	4.8
3.9	Knob torque				X	X	X	4.9
3.10.1	Interchangeability of mounting surface of M171A1 mount				X	X	X	4.10.1
3.10.2	Interchangeability of mounting surface for M17A1 quadrant				X	X	X	4.10.2
3.10.3	Interchangeability of mounting surface for M137A2 telescope				X	X	X	4.10.3
3.11	Workmanship			X		X	X	4.11



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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 VI.

TABLE VI. First article inspection.

Examination or Test	Section 3 Requirement	Section 4 Verification
Storage temperature	3.4.1	4.4.1
Operating temperature	3.4.2	4.4.2
Shock	3.4.3	4.4.3
Vibration "A"	3.4.4	4.4.4
Locating keys for M137A2 telescope	3.5	4.5
Mounting surfaces of M17A1 quadrant	3.6	4.6
Locating keys for M17A1 quadrant	3.7.1	4.7.1
Elevation level vial	3.7.2	4.7.2
Elevation adjustment range	3.7.3	4.7.3
Elevation plumb travel	3.7.4	4.7.4
Pitch adjustment range	3.7.5	4.7.5
Pitch plumb travel	3.7.6	4.7.6
Pitch adjustment backlash	3.7.7	4.7.7
Cant adjustment range	3.7.8	4.7.8
Cant adjustment backlash	3.7.9	4.7.9
Mount rigidity	3.7.10	4.7.10
Azimuth correction	3.7.11	4.7.11
Level vial illumination	3.8	4.8
Knob torque	3.9	4.9
Interchangeability of mounting surface of M171A1 mount	3.10.1	4.10.1
Interchangeability of mounting surface for M17A1 quadrant	3.10.2	4.10.2
Interchangeability of mounting surface for M137A2 telescope	3.10.3	4.10.3
Workmanship	3.11	4.11

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 VI.

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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 Classification of characteristics.

4.3.2.1 Conformance inspection quantity. Conformance inspection quantities shall be in accordance with 4.3.2.4 and MIL-STD-1916, paragraph “Sampling of lots or batches.” Conformance criteria shall be in accordance with MIL-STD-1916, paragraph “Verification level (VL).”

4.3.2.2 Conformance inspection to be performed. The conformance inspection shall be performed in accordance with 4.3.2.4.

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

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4.3.2.4	<u>Mount.</u>			Drawing number 13005103
Classification	Examination or test	Conformance criteria	Requirement paragraph	Next higher assembly None
				Inspection method reference
<u>Major</u>				
101	Presence of Plate, Identification, 13010956	100%	3.3	Visual
102	Storage temperature	VL-IV	3.4.1	4.4.1
103	Operating temperature	100%	3.4.2	4.4.2
104	Shock	100%	3.4.3	4.4.3
105	Vibration "B"	100%	3.4.5	4.4.5
106	Locating keys for M137A2 telescope	100%	3.5	4.5
107	Mounting surfaces of M17A1 quadrant	100%	3.6	4.6
108	Locating keys for M17A1 quadrant	100%	3.7.1	4.7.1
109	Elevation level vial	100%	3.7.2	4.7.2
110	Elevation adjustment range	100%	3.7.3	4.7.3
111	Elevation plumb travel	100%	3.7.4	4.7.4
112	Pitch adjustment range	100%	3.7.5	4.7.5
113	Pitch plumb travel	100%	3.7.6	4.7.6
114	Pitch adjustment backlash	100%	3.7.7	4.7.7
115	Cant adjustment range	100%	3.7.8	4.7.8
116	Cant adjustment backlash	100%	3.7.9	4.7.9
117	Mount rigidity	100%	3.7.10	4.7.10
118	Azimuth correction	100%	3.7.11	4.7.11
119	Level vial illumination	VL-IV	3.8	4.8
120	Knob torque	100%	3.9	4.9
121	Interchangeability of mounting surface of M171A1 mount	100%	3.10.1	4.10.1
122	Interchangeability of mounting surface for M17A1 quadrant	100%	3.10.2	4.10.2
123	Interchangeability of mounting surface for M137A2 telescope	100%	3.10.3	4.10.3
<u>Minor</u>				
201	Workmanship	VL-II	3.11	4.11

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 of the sample fails to comply with any of the conformance requirements, the lot shall be rejected.

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#### 4.4 Environmental.

4.4.1 Storage temperature. The mount shall be placed in the test chamber and the temperature of the chamber reduced gradually to  $-60 \pm 5^{\circ}\text{F}$  and shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period, the mount shall be removed from the environmental chamber and inspected for signs of physical failure or damage. The mount shall be placed back in the environmental chamber and the temperature shall then be gradually raised to  $+160 \pm 5^{\circ}\text{F}$  and the mount shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period, the mount shall be removed from the environmental chamber and inspected for signs of physical failure or damage. The mount shall be placed back in the environmental chamber and the temperature of the test chamber shall be gradually reduced to room ambient temperature ( $+60^{\circ}\text{F}$  to  $+90^{\circ}\text{F}$ ) at which time the mount shall be removed from the test chamber. The mount shall then meet the requirements of 3.5 through 3.11 inclusive. (See 6.6)

4.4.2 Operating temperature. The mount shall be placed in the environmental chamber and the temperature of the chamber reduced gradually to  $-50 \pm 5^{\circ}\text{F}$ . The mount shall remain at this temperature for a minimum of 4 hours. At the completion of this 4 hour period, and while at  $-50 \pm 5^{\circ}\text{F}$ , the mount shall meet low temperature requirement listed in 3.9. Upon completion of this portion of the test, the mount shall then be placed back in the environmental chamber and the temperature shall be raised gradually to  $+145 \pm 5^{\circ}\text{F}$ . The mount shall remain at this temperature for a period of 4 hours. At the completion of this 4 hour period, and while at  $+145 \pm 5^{\circ}\text{F}$  the mount shall meet the high temperature requirement listed in 3.9. Upon completion of this test, the mount shall be returned to the environmental chamber and the temperature shall be gradually reduced to room ambient temperature ( $+60^{\circ}\text{F}$  to  $+90^{\circ}\text{F}$ ) at which time the mount shall be removed from the test chamber and shall meet the requirements as specified in 3.5 through 3.11 inclusive. (See 6.6)

4.4.3 Shock. The M171A1 mount shall be mounted to the test equipment utilizing the keyway and four mounting bolts torqued to 85-90 foot-pounds, a M17A1 quadrant, 13005101, and a M137A2 telescope, 12984713, or equivalent weight and center of gravity simulators shall be mounted to it in the designated locations, and then it shall be subjected to the shock requirements in accordance with 3.4.3. Fixture 11747196 may be used to adapt the mount to the shock test equipment. Upon completion of the shock test, the mount shall be examined and inspected to meet the requirements of 3.5 through 3.11 inclusive.

4.4.4 Vibration "A". The mount shall be mounted utilizing the keyway and four mounting bolts torqued to 85-90 foot-pounds and then subjected to the vibration requirements in accordance with 3.4.4. Fixture 11747196 may be used to adapt the mount to the vibration test equipment. Upon completion of the vibration test, the mount shall be examined and inspected to meet the requirements of 3.5 through 3.11 inclusive.

4.4.5 Vibration "B". The mount shall be mounted utilizing the keyway and four mounting bolts torqued to 85-90 foot-pounds and then subjected to the vibration

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requirements in accordance with 3.4.5. Fixture 11747196 may be used to adapt the mount to the vibration test equipment. Upon completion of the vibration test, the mount shall be examined and inspected to meet the requirements of 3.5 through 3.11 inclusive.

4.5 Locating keys for M137A2 telescope. Install the mount on holding fixture, 11747950, and place a parallel bar across the locating keys for the M137A2 telescope. Use a dial indicator across the parallel bar to verify compliance with the requirements of 3.5.

4.6 Mounting surfaces of M17A1 quadrant. Install the mount on holding fixture, 11747950, and use a dial indicator across the mounting surfaces for the M17A1 quadrant (bolt hole locations) to verify compliance with the requirements of 3.6.

4.7 Performance. Test fixture, 10555619, equipped with inspection aide support assembly, 10553898, and with fixture adapter, 13042935, or functional equivalent shall be used for the inspection of M171A1 mount. Position the test fixture on a vibration free surface in accordance with the set-up instructions outlined on drawing 10555619. Install inspection aide support assembly in accordance with the set-up instructions outlined on 10553898. Install fixture adapter in accordance with the set-up instructions outlined on 13042935. Follow all set-up and operating instructions prior to securing the mount to the fixture. Verifications shall be done with the starting position of the mount as follows:

a. The mounting surface (internal surface) of the mount shall be in a vertical plane within 1.0 mils.

b. The locating keyway of the mount shall be in a horizontal plane within 10 seconds.

c. The four mounting bolts shall be torqued to 85 to 90 foot pounds.

d. The top locating surface for the M137A2 telescope shall be parallel to the locating keyway of the mount within 0.5 mils.

e. The elevation and cross level vial bubbles shall be centered within the thickness of a graduation line.

4.7.1 Locating keys for M17A1 quadrant. With the mount positioned as specified in 4.7, the locating keys for the M17A1 quadrant shall be level within the tolerance specified in 3.7.1.

4.7.2 Elevation level vial. With the mount positioned as specified in 4.7, confirm that the mounting surface of the M137A2 telescope is level, and observe the elevation level vial bubble is centered within the width of a level vial graduation line to confirm conformance with 3.7.2.

4.7.3 Elevation adjustment range. With the mount positioned as specified in 4.7 and with the leveling adapter, 10558253-11, attached, rotate the fixture to elevate and

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depress the mount to the limits of its excursion in both elevation and depression. When at the limits of excursion, place the inspection aid, 8658940, on the leveling adapter or observe the elevation reading on the scale of the fixture to confirm that the mount meets the requirements of 3.7.3.

4.7.4 Elevation plumb travel. This test may be performed in conjunction with 4.7.3. Mount sighting device, 10549200, to the telescope mounting surface with its line of sight parallel to the telescope locating keys. Position a wall target with an appropriately labeled azimuth scale for the distance it is placed from the objective end of the sighting device and place the vertical line of the wall target in coincidence with the vertical reticle of the sighting device. While looking through the sighting device at the plumbed reference, elevate and depress the mount throughout the excursion range. Any deviation of the line of sight from the plumbed reference shall be within the limits specified in 3.7.4.

4.7.5 Pitch adjustment range. Position the mount as specified in 4.7 and mount sighting device, 10549200, to the telescope mounting surface with its line of sight parallel to the telescope locating keys. Assure that the cross level vial bubble is centered (zero cant). Rotate the pitch adjustment to the limit of its excursion in one direction. When at the limit of excursion, place the inspection aid, 8658940, on the surface of the sighting device and measure the pitch angle at the limit. Repeat in the opposite direction. Pitch elevations at the limit shall meet the requirements of 3.7.5.

4.7.6 Pitch plumb travel. Position the mount as specified in 4.7 and mount sighting device, 10549200, to the telescope mounting surface with a line of sight parallel to the telescope locating keys. Assure that the cross level vial bubble is centered (zero cant). Position a wall target with appropriately labeled azimuth scale for the distance it is placed from the objective end of the sighting device and place the vertical line of the wall target in coincidence with the vertical reticle of the sighting device and ensure that it is plumb. While observing the position of the reticle of the sighting device in relation to the vertical line of the wall target, rotate the pitch adjustment to the limits of its excursion and observe any deviation. Any deviation of the line of sight from the plumbed reference shall be within the limits specified in 3.7.6.

4.7.7 Pitch adjustment backlash. Position the mount as specified in 4.7. Assure that both of the mount's level vial bubbles are centered. Turn pitch knob at least one complete turn counter clockwise and then center the elevation level bubble using only a clockwise motion of the pitch knob without overtravel. Place inspection aid, 8658940, on the telescope mounting surface, measure the elevation read by the inspection aid and record. Scribe an index line on the mount casting nearest to the pitch knob. Place an index pointer on the pitch knob directly opposite the scribed index line. The index pointer may be held in place mechanically or by the use of commercial putty. Turn pitch knob at least one half turn clockwise and then return it to the position previously established by the indices in a counter clockwise motion without overtravel. Place inspection aid on the telescope mounting surface, measure the elevation read by the inspection aid and compare with initial reading. The difference between these readings is the backlash and it shall be within the limits specified in 3.7.7.

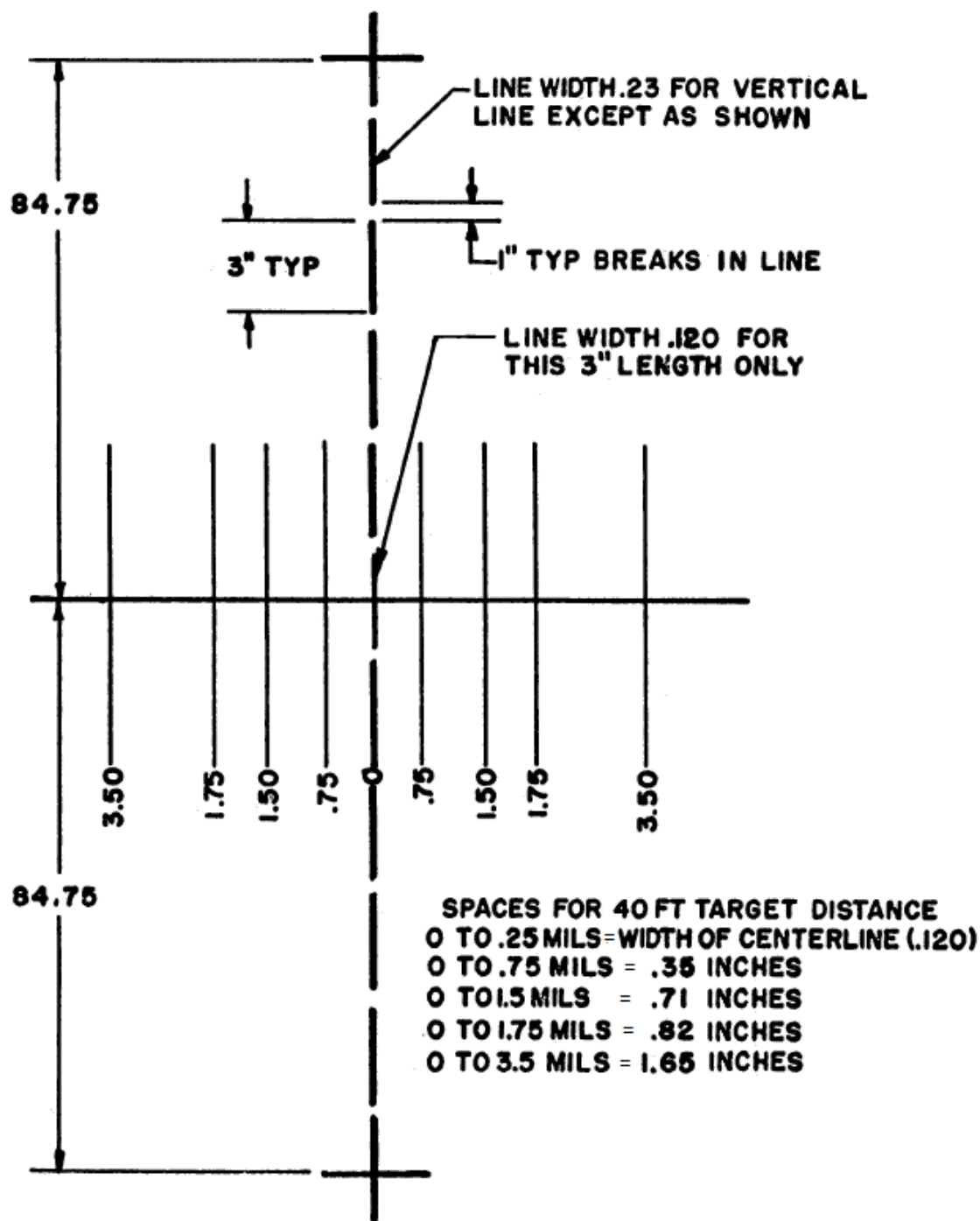
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4.7.8 Cant adjustment range. Position the mount as specified in 4.7 and mount sighting device, 10549200, to the telescope mounting surface. Rotate the cant adjustment to the limit of its excursion in one direction. When at the limit of excursion, place the inspection aid, 8658940, on the surface of the sighting device and measure the cant angle at the limit. Repeat in the opposite direction. Cant elevations at the limit shall meet the requirements of 3.7.8.

4.7.9 Cant adjustment backlash. Position the mount as specified in 4.7 and install leveling adapter, 10558253-11 on the quadrant mounting surface. Assure that both of the mount's level vial bubbles are centered. Turn cant knob at least one complete turn counter clockwise and then center the cant level bubble using only a clockwise motion of the cant knob without overtravel. Place inspection aid, 8658940, on the leveling adapter, measure the cant read by the inspection aid and record. Scribe an index line on the mount casting nearest to the cant knob. Place an index pointer on the cant knob directly opposite the scribed index line. The index pointer may be held in place mechanically or by the use of commercial putty. Turn cant knob at least one half turn clockwise and then return it to the position previously established by the indices in a counter clockwise motion without overtravel. Place inspection aid on the leveling adapter, measure the cant read by the inspection aid and compare with initial reading. The difference between these readings is the backlash and it shall be within the limits specified in 3.7.9.

4.7.10 Mount rigidity. Position the mount as specified in 4.7 and install sighting device, 10549200, to the telescope mounting surface. Position the wall target shown in Figure 3 or equivalent, 40 feet from the objective end of the sighting device and align the plumbed vertical line of the wall target with the reticle of the sighting device. Apply a 20 pound load to the left side of the telescope support, perpendicular to the keyways and 1-2 inches down from the telescope mounting surface. Gradually release the load. Observe and record the displacement of the vertical line as seen through the sighting device. Apply a 20 pound load to the right side of the telescope support, perpendicular to the keyways and 1-2 inches down from the telescope mounting surface. Gradually release the load. Observe and record the displacement of the vertical line as seen through the sighting device. Repeat the above procedure at elevations of 800 mils, 1100 mils, and 1333 mils. The total lateral movement of the lines of sight from the vertical line of the target board shall be within the limits specified in 3.7.10 at the corresponding elevations.

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Figure 3. Mount rigidity wall target.

4.7.11 Azimuth correction. Position the mount as specified in 4.7 and install sighting device, 10549200, to the telescope mounting surface with its line of sight parallel to the telescope locating keys. The pitch and cross level vials shall be set at zero. Use inspection aid, 8658940, on a cross-leveled inspection aide support assembly, 10553898, for all elevation readings throughout the azimuth correction test. Position a wall target



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with appropriately labeled azimuth scale for the distance it is placed from the objective end of the sighting device and place the vertical line of the wall target in coincidence with the vertical reticle line of the sighting device and ensure that it is plumb. Using the test fixture, create a cant angle of 88.9 mils as indicated on the fixture. Then cant the mount an equal amount in the opposite direction until the mount's cant level bubble is centered. Elevate the fixture to 300 mils elevation as read by the inspection aid on the cross-leveled inspection aide support assembly. The actual fixture elevation will be 301.18, as read on the scales of the fixture. Table VII can be referenced for the actual elevation readings of the fixture. Set the elevation level vial bubble to the level position using the pitch adjustment. Adjust the sighting device to the 27.0 mils azimuth correction setting and observe that the position of the vertical line of the sighting device reticle is in coincidence with the vertical line of the wall target within the tolerance specified in 3.7.11. The azimuth correction test shall be performed in the left and right direction as specified in 3.7.11. The above procedure shall be performed at each of the elevation settings and applicable cant angles in accordance with Table VII. Azimuth corrections at each elevation and cant angle shall be within the tolerances specified in 3.7.11.

TABLE VII. Azimuth correction test fixture elevations.

Reference elevation (mils)	Cant angle (mils)	Actual fixture elevation (mils)
300	88.9	301.18
600	88.9	602.60
900	88.9	904.76
1200	88.9	1209.50
300	177.8	304.77
600	177.8	610.54
1100	177.8	1130.25

4.8 Level vial illumination. With fresh batteries installed, the mount shall be placed in a room having a controlled light source. With the room completely dark and after the tester has become dark adapted, the lights within the mount shall be switched on and the level vial bubbles and graduation lines shall be observed for conformance to 3.8 while the lights are slowly brought up to full brightness.

4.9 Knob torque. Use a standard torque measuring device with adapter 11747949 or equivalent to test the running torque of the pitch and cross level adjustment knobs for conformance to 3.9. Each knob shall be rotated a minimum of 3 turns in each direction.

#### 4.10 Interchangeability.

4.10.1 Interchangeability of mounting surface of M171A1 mount.  
Interchangeability shall be verified by the insertion, seating, securing, and subsequent removal of maximum interchangeability gage, 11747840, on the mounting surface of the M171A1 mount.

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4.10.2 Interchangeability of mounting surface for M17A1 quadrant.

Interchangeability shall be verified by the insertion, seating, securing, and subsequent removal of maximum interchangeability gage, 11747844, on the mounting surface for the M17A1 quadrant on the M171A1.

4.10.3 Interchangeability of mounting surface for M137A2 telescope.

Interchangeability shall be verified by the insertion, seating, securing, and subsequent removal of maximum interchangeability gage, 11747889, on the mounting surface for the M137A2 telescope on the M171A1.

4.11 Workmanship. Workmanship of the M171A1 mount 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 Mount, Telescope, and Quadrant: M171A1 supports a panoramic telescope and an elevation quadrant for laying the artillery weapon for indirect fire in azimuth and elevation, respectively.

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 SPI 13005103 as applicable (See 6.5).
- d. Applicable stock number.

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- 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 should 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 1423 in the contract. When the contractor submits inspection equipment designs to the Government for approval, he should 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 13005103     -     Special Packaging Instruction for Mount, Telescope, and  
Quadrant: M171A1

6.6 Thermal shock. Caution should be exercised during environmental testing to avoid subjecting the mount 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 Subject term (key word) listing.

Howitzer  
M777  
M198  
Towed Artillery

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6.8 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

Preparing activity:  
Army-AR  
(1240-2012-005)

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>.