

MIL-M-13331 (Ord)

22 March 1954

SUPERSEDING

Army 51-75-47

9 October 1940

## MILITARY SPECIFICATION

### MOUNT, TELESCOPE, M18A1

#### 1. SCOPE

1.1 This specification covers a mount used to hold a panoramic telescope of the M12 Series for laying the gun in azimuth.

#### 2. APPLICABLE SPECIFICATIONS, STANDARDS, DRAWINGS, AND PUBLICATIONS

2.1 The following specification and drawing, and specifications and drawings referenced thereon, of the issue in effect on date of invitation for bids, form a part of this specification:

#### SPECIFICATION

U. S. ARMY

51-7 - Instruments, Fire-Control; General Specification  
Governing the Manufacture and Inspection of

#### DRAWING

ORDNANCE CORPS

Class 90, Division 65 Mount, Telescope, M18A1

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

#### 3. REQUIREMENTS

3.1 General requirements.- General requirements and associated tests specified in Specification 51-7 which are common to all fire control instruments shall be applicable to this specification.

3.2 Materials.- Materials shall be in accordance with the applicable drawings and specifications specified herein and referenced on Drawing, Class 90, Division 65.

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3.3 Vibration. - The mount shall be vibrated between 2 to 2-1/2 minutes at an amplitude of not less than 1/16 inch (1/8 inch total movement) and a frequency of 30 cycles per second after which it shall meet all requirements.

3.4 Adjustment.

3.4.1 With the Mount, Telescope, M18A1 mounted so that the longitudinal axis of the actuating arm is horizontal, the bracket vertical as shown on assembled view drawings, and the axis of the socket for the panoramic telescope vertical, the mount shall be adjusted as follows:

3.4.1.1 The elevation level bubble shall be adjusted to show the bubble central with respect to the level vial graduations.

3.4.1.2 The line of sight adjusting screw shall be adjusted to bring the line of sight of a suitable M12 series panoramic telescope (or collimating gage and telescope) set at "0" deflection, parallel to the planes of the attaching surfaces of the bracket.

3.4.2 The cross level vial shall be adjusted to show the bubble central with respect to its graduations when the mount is set up as specified in 3.4.1, and shall be adjusted by means of the cross level worm to such position that when the actuating arm is rotated the deviation of the line of sight of the panoramic telescope from the point of intersection on a target is zero, or in case of an instrument with inherent error, minimum.

3.5 Accuracy.

3.5.1 With the mount set up and cross leveled as specified in 3.4.1 and 3.4.2, the mount shall meet the following requirements:

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3.5.1.1 The axis of the socket for the panoramic telescope shall be vertical, in the cross level plane, within a tolerance of 1/2 mil.

3.5.1.2 The intersection of the crosslines of the reticle shall not deviate more than 3/4 mil, either horizontally or vertically, from a point on a target when the actuating arm is rotated from 15° depression to 65° elevation.

3.5.1.3 The intersection of the crosslines of the reticle shall not deviate from a plumb line more than 1/2 mil when the vertical travel of the telescope and mount is accomplished by means of the worm through the maximum travel permitted by the rocker.

3.5.2 Backlash in the worm and worm wheel mechanisms shall not exceed the following limits:

- a. In the rocker worm mechanism, 3 minutes elevation displacement
- b. In the cross level worm mechanism, 2 minutes cross level displacement

3.5.3 With a panoramic telescope mounted in place and using a plumb line as a target, the "Azimuth Correction Test" shall show readings on the azimuth scale of the panoramic telescope as tabulated in the Azimuth Correction Column below:

Angle of Cross Level (Cant) €	Elevation Angle X	Azimuth Correction λ	Tolerance
Degrees Left or Right	Degrees	Degrees	
8	30	4°35'38"	±1.5 mils (5'-5")
8	45	7°55'23"	±2.0 mils (6'-45")
8	65	16°37'5"	±2.5 mils (8'-45")

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NOTE. The Mount, Telescope, M18A1 automatically sets off the amount of azimuth correction necessary in gun pointing due to elevating the gun with the trunnions out of level. The correction varies with the cross level angle and the angle of elevation and is calculated by means of the following formula:

$$\tan \lambda = \tan \chi \sin \epsilon \quad \text{in which}$$

$\lambda$  = azimuth correction

$\chi$  = elevation angle (=angle turned by actuating arm about its longitudinal axis, starting with axis of actuating arm pivot horizontal)

$\epsilon$  = angle of cross level (=angle between axis of actuating arm and the horizontal)

3.5.4 All moving parts shall function smoothly and properly without irregularities, undue friction or looseness.

3.5.5 The electrical system shall function properly and shall illuminate the bubbles on the mount, the azimuth scale and micrometer, and the crosslines of the reticle of the panoramic telescope, so that they are plainly visible in a dark room.

3.6 Temperature - The temperature requirement and test Type III of Specification 51-7 shall apply except that minus 65°F shall be substituted for minus 45°F.

3.7 Workmanship shall be in accordance with Specification 51-7.

#### 4. SAMPLING, INSPECTION AND TEST PROCEDURES

4.1 Unless otherwise specified each mount shall be inspected for conformance with this specification and as specified in Specification 51-7.

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4.2 Azimuth correction test.- The mount, with a panoramic telescope in place in its socket shall be attached to a surface which is in a position to hold the axis of the actuating arm at the angle of cross level ( $\phi$ ) with the horizontal. The mount shall be leveled by means of the worms and level bubbles on the mount. The axis of the actuating arm pivot shall be brought into a horizontal position. The panoramic telescope shall be directed at a plumb line target. The actuating arm shall be rotated through the angle equal to the elevation angle ( $\chi$ ), measured in a plane perpendicular to the axis of the actuating arm. The azimuth correction angle ( $\psi$ ) through which the head of the panoramic telescope must be turned to bring the line of sight back into coincidence with a plumb line shall be measured on the azimuth circle of the panoramic telescope.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking.- Packaging, packing, and marking shall be in accordance with instructions forming part of the contract or as furnished by the contracting officer in connection with the contract.

## 6. NOTES

6.1 Ordering data.- Invitation for bids and contracts should specify the title, number and date of this specification, and type of packing.

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