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SUPERSEDING
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(See 6.5)

MILITARY SPECIFICATION

# BINOCULAR, SHIP, 20-POWER, AND ACCESSORIES

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers a 20-power ship binocular of the prismatic stereoscopic type; a carriage which permits the binocular to be moved in both azimuth and elevation; and a pedestal, on which the carriage may be mounted.

1.2 Classification. The 20-power ship's binocular with carriage and pedestal shall be the following mark: Mark 3 Mod 5, 20-power, 120 millimeter (mm) aperture.

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

PPP-B-576 - Boxes, Wood, Cleated, Veneer, Paper Overlaid.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple Wall.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 6650

MILITARY

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|---|---|
| MIL-P-116 | - Preservation, Methods of. |
| MIL-G-174 | - Glass, Optical. |
| MIL-C-675 | - Coating of Glass Optical Elements (Anti-Reflection). |
| MIL-S-901 | - Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for. |
| MIL-A-3920 | - Adhesive, Optical, Thermosetting. |
| MIL-P-15024 | - Plates, Tags and Bands for Identification of Equipment. |
| MIL-P-15024/5 | - Plates, Identification. |
| MIL-M-15071 | - Manuals, Technical Equipments and Systems Content Requirements for. |
| MIL-E-16400 | - Electronic, Interior Communication and Navigation Equipment, Naval Ship and Shore: General Specification for. |
| MIL-C-20696 | - Cloth, Coated, Nylon, Waterproof. |
| MIL-I-45208 | - Inspection System Requirements. |

STANDARDS

MILITARY

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|---|---|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-167-1 | - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited). |
| MIL-STD-810 | - Environmental Test Methods. |
| MIL-STD-831 | - Test Reports, Preparation of. |
| MIL-STD-1186 | - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods. |
| MS16858 | - Valve; Gas Inlet; Nonmagnetic. |

2.1.2 Other Government drawings and publication. The following Government drawings and publication form a part of this specification to the extent specified herein.

DRAWINGS

NAVAL SHIP ENGINEERING CENTER, MECHANICSBURG DIVISION (NAVSEC MECHDIV)

| | |
|---|---|
| 9240-003 | - Ship Binocular, 20-Power. |
| 9240-004 | - Ship Binocular Carriage. |
| 9240-005 | - Ship Binocular Pedestal. |

PUBLICATION

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

| | |
|---|---|
| NAVSHIPS S9421-AA-MMA-010 | - Ship Binocular, 20-Power MK III MOD 4/5 |

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

2.2 Other publications. The following documents form a part of this specification to the extent specified herein.

UNIFORM CLASSIFICATION COMMITTEE AGENT
Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.1), a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 Assembly nomenclature. The binoculars covered herein shall be segmented into major assemblies having the following nomenclature as applicable:

Ship binocular, 20-power, Mark 3 Mod 5
Ship binocular carriage, Mark 3 Mod 5
Ship binocular pedestal, Mark 3 Mod 5

Unless otherwise indicated herein, the term "binocular assembly" shall be taken to mean the complete instrument including carriage and pedestal, and the term "binocular" shall be taken to mean the ship binocular less carriage and pedestal.

3.3 General features. The equipment shall be sturdily constructed of materials as specified in Drawings 9240-003, 9240-004 and 9240-005. Materials and processes not specified in Drawings 9240-003, 9240-004 and 9240-005 or elsewhere herein shall be selected in accordance with MIL-E-16400 for exposed equipment. Materials which provide a nutrient medium for fungus and insects shall not be used. Materials which will support combustion or which are capable of causing an explosion shall not be used. Plastic material having a burn rate in excess of 1.5 inches per minute or which may produce harmful toxic effects shall not be used.

3.3.1 Metals. Lightweight metals shall be used wherever practicable. Magnesium or magnesium alloys in any form shall not be used. Metal parts shall be of suitable corrosion-resisting materials or other materials treated in a satisfactory manner to render them adequately resistant to corrosion.

3.3.2 Lubricants. Greases, lubricating materials and waxes used in the instrument shall not cause or contribute to filming of the optical surfaces nor support fungus growth.

3.3.3 Finish. Exposed, nonbearing metal surfaces shall be thoroughly cleaned of all grease, oil and dirt, and shall be pretreated and painted in accordance with applicable sheets of Drawings 9240-003, 9240-004 and 9240-005.

3.3.4 Temperature and humidity. The completely assembled ship binocular shall withstand without mechanical damage (which would cause malfunctioning or inoperation) the temperature and humidity tests specified in 4.6.3 and 4.6.8.

3.3.5 Salt fog. The binoculars shall be so designed that there will be no tendency for any of the rotatable, movable or removable parts to freeze upon exposure to salt fog, when subjected to the salt fog test specified in 4.6.4. After completion of the test and cleaning, the base metal of any part or structure shall not be visible through the finish or coating, nor shall there be any evidence of blistering, softening, separation from the base metal, corrosion products or other coating failure.

3.3.6 Shock and vibration.

3.3.6.1 Binocular carriage and pedestal assembly. The binocular carriage and pedestal assembly shall withstand the vibration test and the high shock test for vital equipment specified in 4.6.5 and 4.6.6. Components of the binocular shall withstand the specified shock and vibration tests without damage to themselves or to any part of the binocular and without creating a hazard to personnel operating or in close vicinity to the binocular. Within these limitations, movement of the binocular from its locked positions of elevation, azimuth and height during the shock test, and movement of the binocular from its locked positions of elevation and azimuth during the vibration test will be permitted. In accordance with MIL-S-901, the binocular system shall be tested with the carriage in both the fully extended and fully retracted positions. As a result of this test, no optical element shall be broken, cracked or dislodged. The binocular shall not incur any permanent deformation. Controls and adjustments shall operate freely. Only minor adjustments will be permitted to make this unit fully operable.

3.3.6.2 Binocular. The binocular only shall withstand the vibration test and the high shock test for vital equipment specified in 4.6.5 and 4.6.6. Components of the binocular shall withstand the specified shock and vibration tests without damage to themselves or to any part of the binocular and without creating a hazard to personnel operating or in close vicinity to the binocular. Within these limitations movement of the binocular from its locked positions of elevation, azimuth and height during the shock test, and movement of the binocular from its locked positions of elevation and azimuth during the vibration test will be permitted. In accordance with MIL-S-901, the binocular shall be tested with the carriage in both the fully extended and fully retracted positions. As a result of this test, no optical element shall be broken, cracked or dislodged. The binocular shall not incur any permanent deformation. Controls and adjustments shall operate freely. Only minor adjustments will be permitted to make this unit fully operable.

3.3.6.3 Carriage. The carriage only with simulated binocular size and weight or binocular shall withstand the vibration test and high shock test for vital equipment specified in 4.6.5 and 4.6.6. Components of the carriage shall withstand the specified shock and vibration test without damage to themselves or to any part of the carriage and without creating a hazard to personnel operating or in close vicinity to the carriage. Within these limitations, movement of the carriage from its locked positions of elevation azimuth and height during the shock test, and movement of the carriage from its locked positions of elevation and azimuth during the vibration test will be permitted. In accordance with MIL-S-901, the carriage shall be tested with the carriage in both the fully extended and fully retracted positions. The carriage shall not incur any permanent deformation. Controls and adjustments shall operate freely. Only minor adjustments will be permitted to make this unit fully operable.

3.3.6.4 Pedestal. The pedestal only with simulated binocular and carriage size and weight or carriage and binocular shall withstand the vibration test and the shock test for vital equipment specified in 4.6.6. The pedestal shall withstand the specified shock and vibration test without damage to any part of the pedestal and without creating a hazard to personnel operating or in close vicinity. The pedestal shall be tested in accordance with MIL-S-901. The pedestal shall not incur any permanent deformation.

3.3.7 Marking. Major assemblies listed in 3.2 shall have an identification plate in accordance with type H (annodized-hydrated aluminum) of MIL-P-15024 and MIL-P-15024/5. The identification plates for the major assemblies shall be in accordance with Drawings 9240-003, 9240-004 and 9240-005.

3.4 Construction of major assemblies.

3.4.1 Ship binocular. The ship binocular shall be constructed in accordance with Drawing 9240-003.

3.4.2 Ship binocular carriage. The carriage shall be constructed in accordance with Drawing 9240-004.

3.4.3 Ship binocular pedestal. The pedestal shall be constructed in accordance with Drawing 9240-005.

3.5 Binocular.

3.5.1 Optics.

3.5.1.1 Glass. Optical glass used in this instrument shall conform to MIL-G-174. Optics shall be free from strain, striae, seeds, stones, bubbles and other optical defects which will be visible to the unaided eye when viewed through the eyepieces of the assembled binocular against a background brightness of 3 candlepower per square inch and color temperature 6500 Kelvin.

3.5.1.2 Coating. Optical surfaces, required by applicable sheets of Drawing 9240-003 to have a low reflectance coating in accordance with MIL-C-675 shall be coated with a multi-layer broad band low reflectivity coating in lieu of magnesium flouride. Reflectance shall not exceed values

established on the drawings. In case of conflict between detail drawings and MIL-C-675, detail drawings shall take precedence. Coatings shall withstand the environmental tests specified in 4.6.9.

3.5.1.3 Entrance pupil. The effective diameter of the objective lens shall be 120 ± 2 mm.

3.5.1.4 Magnification. The magnification of the ship binocular shall be 20 diameters, plus or minus 2 percent. The magnifications of the two oculars of a single binocular shall not differ by more than 1 percent.

3.5.1.5 Resolving power. The resolving power of each ocular, and of the two oculars in combination, shall be 3 seconds or less, for parallel lines.

3.5.1.6 Exit pupil. The diameter of the exit pupil shall be not less than the diameter of the effective aperture of the objective lens divided by the true magnification.

3.5.1.7 Field of view. The true field of view shall be not less than 3 degrees, 30 minutes.

3.5.1.8 Eye relief. The distance of the eye point from the last optical surface of the eyepiece shall be not less than 20 nor more than 25 mm.

3.5.1.9 Erecting system. The erecting system shall be prismatic.

3.5.1.10 Eyepieces. The plane of the axes of the eyepieces shall be in or parallel to the plane determined by the axes of the objective lenses.

3.5.1.11 Aberrations. The optical design shall be such that the binocular, as a whole, is well corrected. Spherical aberration, lateral chromatic aberration, coma and distortion shall be kept to a minimum. There shall be no ghost images or other extraneous reflections.

3.5.1.12 Collimation. When two parallel pencils are projected into the two objectives, the conjugate pencils emerging from the two eyepieces shall be parallel within the following limits at the infinite focus of the eyepieces and for any setting of the interpupillary distance scale:

(a) Seven minutes of arc in the direction perpendicular to the plane determined by the two entrant pencils.
(b) Seven minutes of arc convergence and 28 minutes of arc divergence in directions lying in a plane parallel to the plane determined by the two entrant pencils. The images of a distant vertical formed by each of the two oculars shall be parallel to each other to within 1 degree, and neither image shall depart from the vertical by more than 1 degree.

3.5.1.13 Filters. The binocular shall be equipped with a variable-density filter controlled by a single knob. The polarizing components of this filter shall be oriented so that, when set for maximum transmission, ghost images or extraneous reflections will not be formed. Maximum transmission of the filter shall exceed 25 percent; minimum transmission settings shall occur simultaneously in each ocular. Filters shall be made from first-quality, selected glass, free from striae, flaws or other defects which would impair

their optical quality. The optical surfaces shall be well-polished and free of visible surface defects. The prismatic effect of each shall not exceed 1/8 diopter. The positive or negative refractive power of a filter shall not exceed 0.08 diopter in any meridian, and shall not have a difference in refractive power in any two meridians of more than 0.08 diopter. The polarizing material shall be substantially free of wrinkles or undulations visible to the unaided eye by reflected light. Filters shall be free of opaque particles in the bounded polarizing material over their entire area. They shall also be free of birefringent inclusions, and shall not impair the acuity of vision. The resolving power of the assembled filter shall be 1 minute or better in all positions.

3.5.1.14 Optical cement. Optical cement shall conform to MIL-A-3920.

3.5.2 Housing. The housing shall be made of aluminum and shall be capable of containing an atmosphere of dry nitrogen at 2 pounds per square inch ($lb/in^2$). Release of gas pressure within the housing shall not affect collimation beyond the limits specified in 3.5.1.12. Inlet and outlet connections shall be provided for introducing and circulating dry nitrogen. The binocular shall be so designed that the circulating dry nitrogen passes over a maximum number of the internal air-glass surfaces. The inlet valve shall be in accordance with MS16858.

3.5.3 Eyepieces. The eyepieces shall be of the internally-focusing type. Eyepieces shall be individually adjustable from plus 1 to minus 3 diopters. Each eyepiece shall be provided with a scale and an index line indicating the true diopter setting to within 1/4 diopter. The scale shall be graduated at each 1/2 diopter, and each whole diopter line shall be numbered (see 3.5.1.10).

3.5.4 Interpupillary distance. The binocular shall be so designed that the interpupillary distance is continuously adjustable from 56 to 74 mm by means of meshed gears. There shall be an interpupillary scale graduated every 2 mm and with the 60-mm and 70-mm graduations numbered "60" and "70", respectively.

3.5.5 Eyeguards. Material and design of the eyeguards for the binocular shall be in accordance with Drawing 9240-003. The eyeguards shall exclude stray light from the eyes of the observer, and shall protect the observer from injury in event of an unexpected ship movement. The eyeguards shall be securely attached to the binocular to prevent their being accidentally detached during normal use; however, they shall be readily removable to allow replacement.

3.5.6 Headrest. The headrest for the binocular shall be in accordance with Drawing 9240-003. The headrest shall be securely attached to the binoculars; however, it shall be readily removable to allow replacement.

3.5.7 Handles. Two corrosion-resistant steel handles with vinyl plastic grips shall be provided to allow quick and easy training of the binocular in elevation and azimuth.

3.5.8 Sunshades. The binocular shall be equipped with attached cylindrical, sliding sunshades of flexible synthetic rubber extending approximately 4 inches in front of the objectives. The sunshades shall be securely attached

to the binoculars to prevent their being accidentally detached during normal use; however, they shall be readily removable to allow replacement.

3.5.9 Sights. Open sights shall be provided on top of the binocular housing to facilitate training of the binocular on the target. The sights shall be readily replaceable without causing release of gas pressure within the binocular housing.

3.6 Ship binocular carriage. The binocular carriage shall provide for smooth and easy movement of the binocular in azimuth and elevation. It shall also incorporate a height adjusting mechanism.

3.6.1 Elevation. The carriage shall permit rotation of the binocular about a horizontal axis passing approximately through the center of gravity of the binocular. The angle of rotation shall be from 10 degrees depression to 60 degrees elevation of the horizontal line of sight. A locking device shall be provided for securing the binocular at any desired elevation within this range.

3.6.2 Azimuth. The carriage shall provide for free rotation about a vertical axis. A locking device shall be provided for securing the binocular at any desired azimuth. An index shall be provided to permit reading the azimuth on which the line of sight is trained by reference to a graduated horizontal circle. The circle shall be graduated in 1-degree intervals and every tenth degree shall be numbered in the clockwise direction from 0 degree to 350 degrees. It shall be adjustable so that the 0- to 180-degree axis of the circle can be aligned with the fore-and-aft axis of a ship.

3.6.3 Height adjustment. A manually operated mechanism shall be provided for adjusting the height of the binocular through a range of 8 inches. A locking device shall be provided for securing the binocular at any desired height within this range.

3.7 Ship binocular pedestal. A fixed-height pedestal shall be provided for mounting the binocular in its carriage, and shall be of such a height that the optic axis of the eyepieces is 5 feet 3 inches above the base of the pedestal, when the binocular is set for zero elevation and the carriage height adjusting mechanism is set at the center of its range.

3.8 Cover. A grey colored coated cloth cover, the material of which shall conform to MIL-C-20696, shall be provided to protect the binocular from the weather. The cover shall be in accordance with Drawing 9240-003.

3.9 Technical manual. Unless otherwise specified (see 6.2.1), a Government furnished copy of technical manual S9421-AA-MMA-010 shall be packed with each binocular. An updated approval and procurement record page in accordance with MIL-M-15071 shall be furnished by the binocular manufacturer and inserted in each technical manual (see 6.2.2).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own 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.

4.1.1 Inspection system program plan. When specified (see 6.2.1), the contractor shall establish and maintain an inspection system program plan in accordance with MIL-I-45208 (see 6.2.2).

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

(a) First article inspection(see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall be conducted on one binocular and shall consist of the tests shown in table I. Shock and vibration tests shall be conducted before completion of all other tests.

TABLE I. First article inspection.

| Test | Requirement paragraph | Test paragraph |
|---|---|---|
| General examination | 3.3 through 3.3.3, 3.3.7, 3.4, 3.5.4 through 3.8 | 4.5 |
| Optical measurements | 3.5.1.1, 3.5.1.3 through 3.5.1.14 and 3.5.3 | 4.6.1 |
| Collimation | 3.5.1.12 | 4.6.1.1 |
| Gas tightness | 3.5.2 | 4.6.2 |
| Temperature | 3.3.4 | 4.6.3 |
| Salt fog | 3.3.5 | 4.6.4 |
| Vibration | 3.3.6 | 4.6.5 |
| Fungus | 3.3, 3.3.2 | 4.6.7 |
| Shock | 3.3.6 | 4.6.6 |
| Humidity | 3.3.4 | 4.6.8 |
| Low reflectance coatings | 3.5.1.2 | 4.6.9 |

4.3.1 First article test report. A first article test report shall be furnished in accordance with the data ordering document (see 6.2.2).

4.4 Quality conformance inspection. Quality conformance inspection shall consist of group A, B and C tests in accordance with 4.4.3, 4.4.4 and 4.4.5.

4.4.1 Lot. A lot shall consist of all binoculars offered for delivery at one time and produced on the same facilities using identical materials and manufacturing and assembly procedures.

4.4.2 Rejected lots. If any inspection lot is rejected, the contractor may withdraw the lot and rework it to correct defects, or screen out defective units, as applicable and reinspect. Such lots shall be separated from new lots and shall be clearly identified as reinspected lots. Rejected lots shall be reinspected using tightened inspection in accordance with MIL-STD-105.

4.4.3 Group A tests. Binoculars offered for delivery shall be subjected to the group A test shown in table II. Binoculars failing any group A test shall be rejected.

TABLE II. Quality conformance inspection.

| Test | Requirement paragraph | Test paragraph |
|---|---|---|
| Group A | | |
| General examination | 3.3 through 3.3.3, 3.3.7, 3.4 and 3.5.4 through 3.8 | 4.5 |
| Optical measurements | 3.5.1.1, 3.5.1.3 through 3.5.1.14 and 3.5.3 | 4.6.1 |
| Collimation | 3.5.1.12 | 4.6.1.1 |
| Gas tightness | 3.5.2 | 4.6.2 |
| Group B: | | |
| Low temperature | 3.3.4 | 4.6.3.1, 4.6.3.3 |
| High temperature | 3.3.4 | 4.6.3.2, 4.6.3.3 |
| Group C: | | |
| Low temperature | 3.3.4 | 4.6.3.1, 4.6.3.3 |
| High temperature | 3.3.4 | 4.6.3.2, 4.6.3.3 |
| Salt fog | 3.3.5 | 4.6.4 |

TABLE II. Quality conformance inspection. - Continued

| Test | Requirement paragraph | Test paragraph |
|---|---|---|
| Humidity | 3.3.4 | 4.6.8 |
| Vibration | 3.3.6 | 4.6.5 |
| Low reflectance coatings | 3.5.1.2 | 4.6.9 |
| Shock | 3.3.6 | 4.6.6 |

4.4.4 Group B tests. A random sample shall be selected from each lot of binoculars in accordance with MIL-STD-105, inspection level S-2, and subjected to the group B tests of table II. If any sample binocular fails any group B test, the entire lot shall be rejected.

4.4.5 Group C tests. When required by the Government (see 6.2.1), one binocular selected at random shall be subjected to the group C tests of table II. Failure of any one of the tests shall be cause for rejection of the entire lot represented by the sample.

4.4.6 When specified (see 6.2.2), a quality conformance inspection report shall be furnished for group A tests. Inspection reports in accordance with MIL-STD-831 shall be furnished for group B and C tests.

4.5 General examination. The completed binocular and accessories shall be given a thorough examination to determine that they conform to the applicable specifications and approved working drawings with respect to material, finish, workmanship, construction, assembly, dimensions and marking identification plates. This examination shall be limited to those examinations that may be performed without disassembling the unit in such a manner that its performance, durability or appearance would be affected.

4.6 Test procedures.

4.6.1 Optical measurements. An examination, measurement or check, as applicable, shall be made of each of the following items to determine compliance with this specification:

(a) Defects in optical elements.
(b) Entrance pupil.
(c) Magnification.
(d) Resolving power.
(e) Exit pupil.
(f) True field of view.
(g) Eye relief.
(h) Erecting system.
(i) Eyepieces.
(j) Aberrations.
(k) Collimation.

(l) Light transmission of filters.
(m) Optical cement.
(n) Eyepiece diopter settings.

4.6.1.1 Collimation shall be checked at interocular settings of 60, 62, 64, 66, 68, 70, 72 and 74 mm. Collimation shall be checked initially and finally with an internal pressure of 2 $lb/in^2$. Collimation shall be rechecked before and after gas tightness (see 4.6.2), vibration (see 4.6.5) and shock (see 4.6.6) tests. The effect of release of internal pressure on collimation shall be determined (see 3.5.2).

4.6.2 Gas tightness. After final assembly and adjustment, each binocular shall be inflated with dry nitrogen to an internal pressure of 5 $lb/in^2$ and sealed off. After an interval of not less than 24 hours, the internal pressure of the binoculars shall be measured. Any loss in internal pressure exceeding 0.125 $lb/in^2$ after correction for changes in ambient temperature, shall be cause for rejection. Prior to the final collimation check required by 4.6.1, internal pressure shall be released to 2 $lb/in^2$. On first article tests, in addition to the above, the internal pressure shall be determined before and after temperature (see 4.6.3), salt fog (see 4.6.4), vibration (see 4.6.5) and shock (see 4.6.6) tests.

4.6.3 Temperature tests.

4.6.3.1 Low temperature. The binocular shall be tested in accordance with MIL-E-16400. The temperature range shall be no. 2 as specified in MIL-E-16400.

4.6.3.2 High temperature. The binocular shall be tested in accordance with MIL-E-16400. The temperature range shall be no. 2 as specified in MIL-E-16400.

4.6.3.3 The assembled unit shall be examined upon completion of the temperature tests to determine compliance with 3.3.4.

4.6.4 Salt fog test. The binocular shall be tested as specified by method 509.1 of MIL-STD-810.

4.6.5 Vibration test. The binocular carriage and pedestal shall be subjected to the type I environmental vibration test of MIL-STD-167-1. The assembled unit shall be examined upon completion of the vibration test to determine conformance to 3.3.6.

4.6.6 Shock test. The binocular carriage and pedestal shall be subjected to the grade A, deck mounted class I, lightweight, type A shock test of MIL-S-901. The assembled unit shall be examined upon completion of the shock test to determine conformance to 3.3.6.

4.6.7 Fungus test. The binocular shall be subjected to the fungus test specified in method 508.1 of MIL-STD-810.

4.6.8 Humidity test. The binocular shall be subjected to the humidity test specified in MIL-E-16400.

4.6.9 Low reflectance coatings. Optical surfaces having multi-layer coatings shall be subjected to the following tests:

(a) Humidity - There shall be no visible evidence of film deterioration after 24 hours exposure to air at 120 degrees Fahrenheit and 98 ± 2 percent relative humidity.
(b) Durability - After test (a), the sample shall be subjected to the abrasion resistance test specified in MIL-C-675.
(c) Film deterioration - There shall be no visible evidence of film deterioration after the sample has been immersed in a 6-ounce NaCL per gallon of water solution for 24 hours.
(d) Reflectance - Light reflectance shall be measured to determine compliance with 3.5.1.2.

4.7 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified (see 6.2.1).

5.1.1 Level A. The preservation compounds, cushioning materials and methods specified herein shall conform to MIL-P-116.

5.1.1.1 Binocular. The binocular shall be unit protected and packaged in accordance with method III of MIL-P-116 and as follows: Contact preservative compounds shall not be used. Points or areas of lubrication shall be lubricated as required for normal service use. Exposed optical surfaces shall be protected against damage to the glass and the anti-reflection treatment coating. Assemblies shall be cushioned and individually packed in containers for the level of packing specified (see 5.2 and 6.2.1). A manual (see 3.9) shall be packaged in a sealed minimum 4 mil polyethylene bag with each binocular assembly.

5.1.1.2 Cover. The binocular cover (see 3.8) shall be folded and unit protected and packaged in a sealed flexible container. The unit package shall meet the requirements for method III of MIL-P-116. One packaged cover shall be placed within each binocular assembly shipping container.

5.1.1.3 Carriage. The carriage shall be unit protected and packaged in accordance with method I of MIL-P-116. Rotating and movable parts not lubricated for normal service use shall be lubricated and protected with preservative conforming to type P-9 of MIL-P-116. The carriage shall be cushioned and individually packed in containers for the level of packing specified (see 5.2 and 6.2.1).

5.1.1.4 Pedestal. Pedestals shall be unit protected and packaged in accordance with method III of MIL-P-116. Pedestals shall be individually packed for shipment. Type and style of box shall be at the option of the contractor.

5.1.2 Level C. Preservation and packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use and may conform to the contractor's commercial practice when such meets these requirements.

5.2 Packing. Packing shall be level A, B or C as specified (see 6.2.1).

5.2.1 Level A.

5.2.1.1 The binocular, carriage and pedestal assemblies shall be individually packed in containers conforming to any one of the following specifications at the option of the contractor:

| Specification | Classification |
|---|---|
| PPP-B-601 | Overseas type |
| PPP-B-621 | Class 2 |

Box closure strapping or banding shall be as specified in the applicable box specification or appendix thereto.

5.2.2 Level B.

5.2.2.1 The binocular, carriage and pedestal shall be individually packed in containers conforming to any one of the following specifications at the option of the contractor:

| Specification | Classification |
|---|---|
| PPP-B-576 | Class 2 |
| PPP-B-601 | Domestic type |
| PPP-B-621 | Class 1 |
| PPP-B-636 | Weather-resistent |
| PPP-B-640 | Class 2 |

Box closure shall be as specified in the applicable box specification or appendix thereto.

5.2.3 Blocking, bracing, anchoring and cushioning of container contents shall be in accordance with MIL-STD-1186.

5.2.4 Level C. Packing shall be accomplished in a manner which will ensure acceptance by common carrier and will afford protection against physical or mechanical damage during direct shipment from the supply source to the first receiving activity for immediate use. The shipping containers or method of packing shall conform to the Uniform Freight Classification, Ratings, Rules and Regulations, or other carrier regulations as applicable to the mode of transportation and may conform to the contractor's commercial practice when such meets these requirements.

5.3 Marking. Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. The binocular covered by this specification is a 20-power prismatic stereoscopic ship binocular used to magnify distant objects which in effect brings the objects closer so that they may be seen in greater detail.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number and date of this specification.
(b) When first article is required (see 3.1).
(c) Procedure for obtaining Government-furnished technical manuals (see 3.9).
(d) When specified inspection system is required in accordance with MIL-I-45208 (see 4.1.1).
(e) Whether group C tests are required (see 4.4.5).
(f) Whether group A quality conformance test reports are required (see 4.4.6).
(g) Level of preservation-packaging and packing required (see 5.1, 5.1.1.1, 5.1.1.3 and 5.2).

6.2.2 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of FAR 52.227-7031 are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

| Paragraph no. | Data requirement title | Applicable DID no. | Option |
|---|---|---|---|
| 3.9 | Approval and procurement record page | DI-M-2044 | Type I of MIL-M-15071 |
| 4.1.1 | Inspection system program plan | DI-R-4803 | MIL-I-45208 |
| 4.3.1 | First article inspection report | DI-T-4902 | ---- |
| 4.4.6 | Reports, test | DI-T-2072 | ---- |

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4 or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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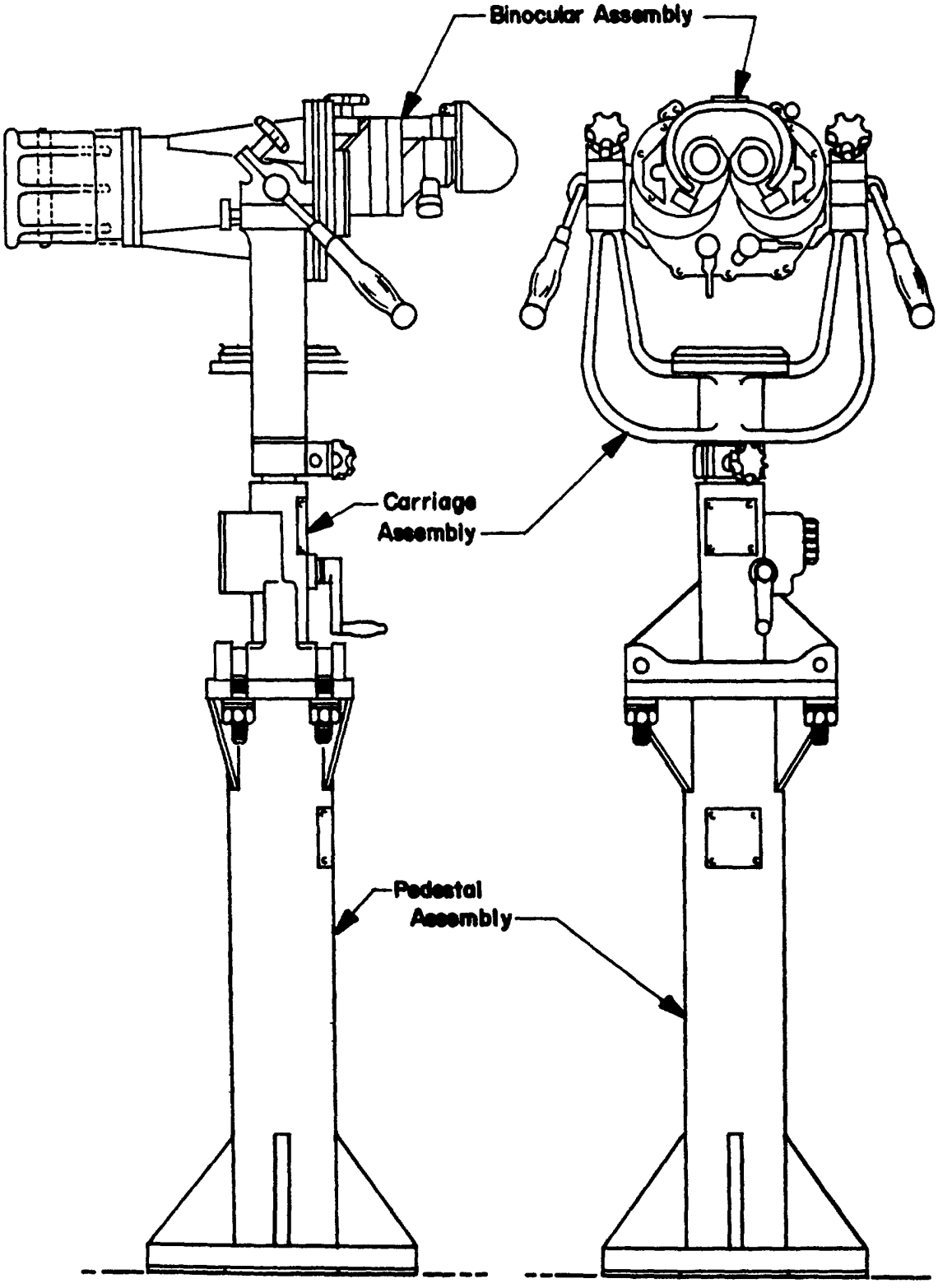


SH 2154

FIGURE 1. General arrangement.

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# 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)* |
|---|---|
| | ☐ VENDOR |
| | ☐ USER |
| b. ADDRESS *(Street, City, State, ZIP Code)* | ☐ MANUFACTURER |
| | ☐ 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)* |

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