

METRIC

A-A-59005  
9 July 1996  
SUPERSEDING  
MIL-S-24656  
16 August 1985

COMMERCIAL ITEM DESCRIPTION  
SEXTANT, MARINE

The General Services Administration has authorized the use of this commercial item description as a replacement for MIL-S-24656 which is canceled.

**1. Scope.**

1.1 This Commercial Item Description covers requirements for the Marine Sextant. The sextant is an endless tangent screw marine sextant for measuring the elevations (angular altitude) of celestial bodies above the terrestrial horizon.

**2. Salient characteristics.**

**2.1 Materials.**

**2.1.1 Frame.** Sextant frame is to be of metal, using a thermosymmetrical construction method to minimize temperature variation distortion and assure sight accuracy. Frame shall be colored black to minimize reflectivity.

**2.1.2 Mirrors.** All mirrors shall be luminized, stable, nonhygroscopic, free from strain, striae, stones, large bubbles, or small bubbles in quantity. Glass surfaces shall be free of scratches, open bubbles, strain, or other visible defects. Mirrors shall be abrasion resistant.

**2.1.3 Filters.** The filters shall be luminized and stained mineral glass. The glass shall be stable, nonhygroscopic, and free from bubbles, stones and striae. The surface of the filters shall be free of visual scratches, pits, or other defects.

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, ATTN: 03R42, 2531 Jefferson Davis Hwy, Arlington, VA 22242-5160.

AMSC N/A

FSC 6605

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**2.1.4 Telescope.**

**2.1.4.1 Body.** The telescope body shall be of metal, with a non-reflective black finish. The telescope shall be furnished with a protective rubber eyepiece, and shall have an adjustment mechanism that allows focusing of the eyepiece over the operational range.

**2.1.4.2 Lenses.** The lenses shall be of first quality annealed optical glass, made from first-class stock, and shall be accurately ground, polished, and centered. The optical system shall be corrected for color and spherical aberration. The lenses shall be mounted free from strain. Lenses shall be abrasion resistant.

**2.1.4.3 Characteristics.** Telescope characteristics shall be as follows:

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (a) Magnification                | 4 ± 5 percent                    |
| (b) Free aperture                | 40 ± 1 millimeter (mm)           |
| (c) Effective focal length:      |                                  |
| (1) Objective lens               | 110 millimeter (mm)              |
| (2) Ocular lens                  | 28 millimeter (mm) ± 1 percent   |
| (d) Resolution:                  |                                  |
| (1) Objective lens               | 9.5 seconds ± 5 percent          |
| (2) Eye or telescope combination | 14 seconds ± 5 percent           |
| (e) Transmission                 | 87 ± 5 percent                   |
| (f) Exit pupil diameter          | 10.5 millimeter (mm) ± 5 percent |
| (g) Definition                   | Good                             |
| (h) Eyepiece focusing range      | +2 to -4 diopters                |
| (i) Weight                       | 227 grams (8 ounces) maximum     |

**2.1.5 Carrying and Storage Case.** A ruggedized case for storage, carrying and shipping shall be provided with an operator's manual explaining the use of the sextant. Means shall be provided to secure the tangent screw (worm) in a disengaged position from the rack and to block or otherwise restrain the index arm to prevent movement or damage in while in the case. The case shall contain the following tools and accessories, securely stowed:

- (a) One tool for adjusting screws
- (b) One spare index mirror
- (c) One spare horizon mirror
- (d) Two spare light bulbs
- (e) One peep sight
- (f) Two spare batteries
- (g) One brush

In addition to the above, provision shall be made for case storage of sextant batteries during shipment and storage of the instrument.

**2.2 Sextant Functional Performance Requirements.**

**2.2.1 Measurement Range.** The range of measurement for the sextant shall be 130°, from -5° to +120°.

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**2.2.2 Accuracy.** The sextant accuracy shall be  $\pm 8$  seconds or better throughout the range of arc.

**2.2.3 Mirror adjustments.** The horizon mirror and index mirror shall each be capable of adjustment perpendicular to the frame. In addition, the horizon mirror shall have a provision for adjustment for parallelism with the index mirror.

**2.2.4 Filter Movement.** Movement of any one or more filters shall not affect the position of any other filter. Filters shall remain where positioned during handling of the sextant.

**2.2.5 Scale Graduations.** The vernier scale shall read to 12" (0.2'), and have infinite adjustment capability with a cylindrical drum. The drum and vernier graduations shall be of equal thickness. Graduations shall be clear and distinct.

**2.2.6 Illumination.** Sextant lighting is to be provided by LED with power source contained in the limb to reduce susceptibility to corrosion of lighting systems. When the light switch is depressed on the sextant, the arc, vernier and drum graduations shall be evenly illuminated, such that the graduations can be read in a completely darkened room. The divisions of the vernier scale shall be illuminated. The arc scale shall be illuminated at least 12 degrees on each side of the index mark on the index arm. Sextant shall be designed for use in dark-adapted areas.

**2.2.7 Index Arm Movement.** When the micrometer drum is turned, the index arm movement shall be smooth over the entire arc and shall have no interference, tight spots, loose spots or other irregularities. Angular tooth accuracy on the arc is to be better than  $\pm 0.00028^\circ$ . The precision of the tooth accuracy is to be carried throughout the range of the drum and arc. Tooth accuracy is to be better than 0.0002/mm.

**2.2.8 Handle.** Sextant frame shall have attached to it an adjustable grip with 40° angle adjustment (to fit the individual user and reduce user fatigue).

**2.2.9 Repeated operation.** The sextant shall withstand repeated operation without degradation of accuracy, signs of wear, or loosening of screws.

**2.2.10 Artificial horizon.** A provided bubble attachment is to be used as a replacement for the 4x40 telescope assembly when the horizon is not visible or for land-based use. The bubble attachment shall be a self-contained subassembly with an independent power source for illumination. Direct Current (DC) battery power is to be provided through a positive on/off switch. The unit shall provide 2.5 power magnification with a 28 millimeter (mm) objective lens. The bubble attachment shall use the common telescope mounting device.

**2.2.11 Weight.** The instrument weight of the sextant (without telescope) shall not exceed 1.9 kilograms (4 pounds 3 ounces.)

**2.2.12 Preservation.** All parts shall be of suitable corrosion resistant material or materials treated in a satisfactory manner to render them adequately resistant to corrosion.

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**2.2.13 Calibration chart.** Each sextant shall include a calibration chart indicating the instrument error every 15 degrees, from 0 to 120 degrees.

**3. Regulatory Requirements.** The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

**4. Quality Assurance Provisions.**

**4.1 Certification statement.** The contractor shall certify and maintain substantiating evidence that the product offered meets the salient characteristics of this Commercial Item Description, and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices, and is the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance prior to first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

**5. Preservation, packaging, packing, labeling and marking.** Preservation, packing, and marking shall be as specified in the contract or order.

**6. Notes.**

**6.1 Ordering Data.** Acquisition documents should specify the following:

- (a) Title, number, and date of this Commercial Item Description.
- (b) Manufacturer name and model desired.
- (c) Quantity required.

MILITARY INTERESTS:

CIVIL AGENCY COORDINATING ACTIVITIES  
GSA - FSS

Military Coordinating Activity

Navy - SH

Custodians

Air Force - 99  
Navy - SH

Preparing activity:

Navy - SH  
(Project 6605-0457)

Review activity

Air Force - 71