

ANNEX 12

**RESOLUTION MSC.94(72)
(adopted on 22 May 2000)**

**PERFORMANCE STANDARDS FOR NIGHT VISION EQUIPMENT FOR
HIGH-SPEED CRAFT (HSC)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

RECALLING FURTHER the provisions of Chapter X of the International Convention for the Safety of Life at Sea, 1974, as amended, by which the International Code of Safety for High Speed Craft (HSC Code) was made mandatory since 1 January 1996, under which the fitting of night vision equipment, as part of the navigational equipment on board HSC, is required,

RECOGNIZING that the use of night vision equipment on board HSC will improve the ship's safety when navigating at night and that the navigational information provided by this equipment constitutes a useful addition to that provided by radar equipment,

BEARING IN MIND the obligation for type approval of night vision equipment according to the HSC Code,

HAVING CONSIDERED the recommendation made by the Sub-Committee on Safety of Navigation at its forty-fifth session,

1. ADOPTS the Recommendation on Performance Standards for Night Vision Equipment for High-Speed Craft, set out in the Annex to the present resolution;
2. RECOMMENDS Governments to ensure that night vision equipment installed in compliance with the HSC Code on or after 1 July 2002 conform to performance standards not inferior to those specified in the annex to the present resolution.

ANNEX

RECOMMENDATION ON PERFORMANCE STANDARDS FOR NIGHT VISION EQUIPMENT FOR HIGH-SPEED CRAFT (HSC)

1 OBJECTIVES OF NIGHT VISION EQUIPMENT FOR HIGH-SPEED CRAFT

Night vision equipment facilitates the detection at night of hazards to navigation above the water surface, thus providing essential information to the navigator for collision avoidance and safe navigation of High-Speed Craft. Typical hazards to HSC include, for example, small unlit boats, floating logs, oil drums, containers, buoys, ice, hazardous waves and whales.

2 APPLICATION

These performance standards should be applied to night vision equipment, which is required for HSC pursuant to Chapter 13, of the International Code of Safety for High-Speed Craft (HSC Code).

3 RELATED REQUIREMENTS INVOLVED

The following standards should be additionally applied, as far as applicable:

- Resolution A.694 (17) on General Requirements for Shipborne Radio Equipment forming Part of the Global Maritime Distress and Safety System (GMDSS) and for Electronic Navigational Aids;
- IEC Publication 447 "Man-Machine Interface (MMI) - Actuating Principles";
- IEC Publication 60945 "Maritime Navigation and Radiocommunication Equipment and Systems -General Requirements, Methods of Testing and Required Test Results";
- IEC Publication 61162 "Maritime Navigation and Radiocommunication Equipment and Systems - Digital Interfaces"; and
- ISO/IEC Publication 9126 "Information Technology, Software Product Evaluation, Quality Characteristics and Guidelines for their Use"

4 DEFINITIONS

"Night vision equipment" means any technical means enabling the position and aspect of objects above the water surface relative to one's own craft to be detected at night.

"High-Speed craft" means any craft to which the definition in chapter 1 of the HSC Code applies.

"Standard test target" means a target that simulates the real hazard of a surface object that can be found at sea such as, small unlit boats, floating logs, oil drums, containers, buoys, ice, hazardous waves and whales.

5 FUNCTIONAL REQUIREMENTS

5.1 Required functions and their availability

At night, night vision equipment should be capable of detecting objects above the water surface within a certain distance from one's own craft, and of displaying the information pictorially in real time, to assist in collision avoidance and safe navigation.

5.2 Reliability, accuracy and discrimination

5.2.1 Continuous operation

Night vision equipment on board HSC, while navigating at sea, should be capable of continuous operation from after sunset until before sunrise. After the equipment has been switched on it should be operational in less than 15 min.

5.2.2 Standard test target

The standard test target should be a black metal target of such a size that when at least 50% is immersed, 1.5 m long x 0.5 m high remains above the water at right angles to the desired direction of detection. Administrations may use other smaller targets to reflect local conditions.

5.2.3 Detection range

With the required field of view, the equipment should detect the standard test target at a distance of not less than 600 m with a minimum probability of 90%, when the target has been immersed in the sea for at least 24 hours under mean starlight conditions without clouds and without moon.

5.2.4 Field of view

The required horizontal field of view should be at least 20°, 10° on either side of the bow. The vertical field of view should be at least 12° and should be sufficient to enable the equipment to fulfil the performance requirements of this standard as well as being able to see the horizon.

Optionally other fields of view may be provided. Their selection should be made with a non locking switch, which returns to the required field of view when released.

5.2.5 Pan and tilt ranges of the fields of view

The axis of the field of view of the equipment should be capable of being moved at least 20° horizontally to either side.

The elevation axis of the field of view should be capable of being adjusted by at least 10° to compensate for the trim of the craft.

5.2.6 Speeds of panning of the fields of view

By activation of a single control element, the axis of the field of view should be capable of being returned automatically to the ahead position at a minimum angular speed of 30°/s. The system should be capable of panning at a minimum angular speed of 30°/s

5.2.7 Heading indication

When inside the field of view, the heading marker of the craft should be indicated on the display with an error not greater than $\pm 1^\circ$.

When outside the field of view, a visual indication of relative bearing with an error of not greater than $\pm 1^\circ$ should be provided.

5.2.8 Roll or pitch

The performance of the night vision equipment should be such that when the craft is rolling and/or pitching up to $\pm 10^\circ$, the performance requirements in this standard should be complied with.

5.2.9 Clear view

Arrangement should be provided to ensure efficient cleaning of the sensor head/lens from the operating position. Administrations may require some additional facilities such as de-icing.

5.2.10 Optical interference

Measures should be taken, to ensure that objects commonly encountered at sea and in ports should not be displayed less clearly on the monitor of the night vision equipment because of dazzle effects, reflection, blooming, or any other effects due to the surroundings.

5.3 Malfunctions, alarms and indications

The night vision equipment should include a visual indication of any failure.

5.4 Software requirements

5.4.1 The operational characteristics of the software should meet the following requirements, in particular:

- .1 self-description of the functions implemented by means of software;
- .2 display of user interface status; and
- .3 software protection against unauthorized changes.

5.4.2 If certain functions of night vision equipment are implemented using software, such software should meet the applicable requirements of international standards*.

6 ERGONOMIC REQUIREMENTS

6.1 General

The night vision equipment should be designed in accordance with sound ergonomic principles.

* Refer to IEC Publication 60945

6.2 Operational controls

- 6.2.1 The number of operational controls should be limited to the minimum required for operation.
- 6.2.2 Double functions of operational controls should be avoided.
- 6.2.3 The functions of the individual operational controls should be clearly labelled.
- 6.2.4 The functions of night vision equipment should be activated directly through the operational controls; menu-driven controls should be avoided.
- 6.2.5 The operational controls should be clearly identifiable in the dark. If illumination is used, the brightness should be adjustable.
- 6.2.6 The operational controls of night vision equipment should meet the requirements of resolution A.694(17), as well as applicable requirements of international standards.*

6.3 Presentation of information

- 6.3.1 The status of operation of the equipment should be continuously displayed.
- 6.3.2 The display should be non-dazzling and non-flickering. The display should be capable of displaying an image of at least 180 mm diagonal.
- 6.3.3 The selected field of view, if more than one is provided (see paragraph 5.2.4), should be continuously indicated at the operating position.

7 DESIGN AND INSTALLATION

7.1 Durability and resistance to environmental conditions

Night vision equipment should withstand the environmental conditions specified in resolution A.694(17) and in the applicable international standards.*

7.2 Interference

With respect to electrical and electromagnetic interference, night vision equipment should meet the requirements of resolution A.694(17) and the applicable international standards.**

7.3 Power supply

The power supply of night vision equipment should meet the requirements of resolution A.694(17) and the applicable international standards.**

7.4 Installation

7.4.1 Full installation instructions to meet the requirements of paragraphs 7.4.2 to 7.4.6 should be included in the documentation (see section 12).

* Refer to IEC Publication 447

** Refer to IEC Publication 60945

7.4.2 The controls of night vision equipment should be installed in the workstation for navigating and manoeuvring, within easy reach of the navigator.

7.4.3 The observation distance from a dedicated display should not exceed 2.3 times the image diagonal.

7.4.4 The sensor of the night vision equipment should be installed in such a way that:

- .1 the horizontal panning area required in paragraph 5.2.5 is free of blind sectors up to 30° on either side; and
- .2 in the required field of view, in the direction right ahead, visibility of the water surface for the vertically tilted sensor is not reduced by more than two craft's lengths by the blind angle of own craft.

7.4.5 Night vision equipment should be installed in such a way that its operation and detection functions are not impaired by head wind and/or true wind up to 100 knots and roll and/or pitch angles up to $\pm 10^\circ$.

7.4.6 Its performance should not be impaired by vibration occurring during normal craft's operation.

7.5 Maintenance

With respect to maintenance, night vision equipment should meet the requirements of resolution A.694(17) and the applicable international standards*. Where the manufacturer requires maintenance at specific periods, an operating hours meter should be provided.

8 INTERFACING

Interfaces with other radio and navigation equipment should meet applicable international marine interface standards**. A recognized international video output standard for image recording should be provided.

9 BACK-UP AND FALL-BACK ARRANGEMENTS

In the event of failure of the pan-tilt device, the sensor should be capable of being fixed in the ahead position while underway.

10 SAFETY PRECAUTIONS

The safety features of night vision equipment should meet the requirements of resolution A.694(17) and the applicable international standards.*

* Refer to IEC Publication 60945

** Refer to IEC Publication 61162

11 MARKING AND IDENTIFICATION

Night vision equipment should be marked in accordance with the requirements of resolution A.694(17) and the applicable international standards.*

12 DOCUMENTATION

Night vision equipment should be delivered complete with its technical documentation. Such documentation should include the following information, if applicable:

General information:

- manufacturer;
- type designation;
- general description of equipment; and
- ancillary equipment and description;

Instructions for installation:

- general installation instructions;
- power supply (voltage, power consumption, frequency) and earthing information.

Operation of equipment:

- description of functions, controls, display;
- description of start-up procedures;
- calibration of equipment and error messages;
- testing capabilities of equipment;
- description of software used and interfaces.

Troubleshooting; maintenance and service:

- special tools required, maintenance material and spare parts (e.g. fuses, spare bulbs);
- equipment care and maintenance on board HSC;
- available services.

Documentation for night vision equipment should also meet the requirements of resolution A.694(17) and the applicable international standards.*

* Refer to IEC Publication 60945

