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Ships and marine technology — Navigation — Daylight signalling lamps

Navires et technologie maritime — Navigation — Lampes de signalisation diurne

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 25861 was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation*.

Introduction

ISO 17884 "*Ships and marine technology — Searchlights for high-speed craft*" specifies many requirements that are also applicable for this International Standard, ISO 25861 "*Ships and marine technology — Navigation — Daylight signalling lamps*". For a clearer structure, it is proposed for the future to merge these International Standards into one International Standard with a general part and an Annex A for searchlights and an Annex B for daylight signalling lamps.

Ships and marine technology — Navigation — Daylight signalling lamps

1 Scope

This International Standard applies to daylight signalling lamps, which are required for certain ships pursuant to Chapter V of the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended, and Chapter 8 of the International Code of Safety for High-Speed Craft, in force, in accordance with the Performance Standards for Daylight Signalling Lamps [IMO Resolution MSC.95(72)].

Where the wording of this International Standard is identical to that in MSC.95(72), all such text is printed in italics and the resolution and paragraph numbers are indicated in brackets.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17884, *Ships and marine technology — Searchlights for high-speed craft*

IEC 60529, *Degrees of protection provided by enclosures (IP Code*)

IEC 60598-1, *Luminaires — Part 1: General requirements and tests*

IEC 60945, *Maritime navigation and radiocommunication equipment and systems — General requirements — Methods of testing and required test results*

IMO Resolution A.694(17*), General requirements for shipborne radio equipment forming part of the Global maritime distress and information system (GMDSS) and for electronic navigational aids*

IMO Resolution A.813(19), *General requirements for electromagnetic compatibility (EMC) for all electrical and electronic ship's equipment*

IMO Resolution MSC.95(72), *Performance standards for daylight signalling lamps*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17884 and the following apply.

NOTE The IMO-used expressions “half angle of divergence” and “tenth angle of divergence” are synonymous to “half peak divergence” and “tenth peak divergence”.

3.1
daylight signalling lamps
lamps suitable for transmitting white light signals to an observer by focused light beams which may be fixed or portable

[MSC.95(72), 4]

3.2
switch-off time
the period of time required for luminous intensity to decrease to 5 % of the required luminous intensity after the daylight signalling lamp has been switched off

[MSC.95(72), 4]

4 Requirements

4.1 Required functions and their availability [MSC.95(72), 1.2, 5.1]

Daylight signalling lamps shall *be suitable for conveying information between ships, or between ship and shore, by means of light signals, both by day and by night.*

Daylight signalling lamps shall *be suitable for giving light signals, which can be clearly distinguished visually as separate signals by an observer.*

4.2 Switch-on and switch-off time [MSC.95(72), 5.2.6]

The sum of switch-on and switch-off times shall *not exceed 500 ms.*

4.3 Luminous intensity [MSC.95(72), 5.2]

By day and with an atmospheric transmission of 0,8, the visibility of light signals emitted by daylight signalling lamps shall *be at least 2 nautical miles, equalling a required luminous intensity of 60 000 cd.*

The axial luminous intensity of daylight signalling lamps shall *reach at least 90 % of the maximum luminous intensity.*

The luminous intensity of daylight signalling lamps shall *have its maximum in the centre of the luminous intensity distribution. It* shall *decrease evenly from the centre of luminous intensity distribution.*

The half peak divergence α_h shall *not exceed 9°, the tenth peak divergence* α_t shall *not exceed 14°.*

The effective light emission sectors of daylight signalling lamps shall *be circular.*

4.4 Chromaticity of the emitted light [MSC.95(72), 5.2.5]

The chromaticity of the white signal light shall *lie within the following corner coordinates of the* chromaticity *diagram specified by the International Commission on Illumination (CIE)*, see Table 1.

Table 1 — Chromaticity coordinates

Chromaticity coordinates	*x*	*0,525*	*0,525*	*0,452*	*0,310*	*0,310*	*0,443*
	y	*0,382*	*0,440*	*0,440*	*0,348*	*0,283*	*0,382*

4.5 Malfunctions, warnings, alarms and indications [MSC.95(72), 5.3]

Daylight signalling lamps shall *be provided with an indication of their operational status.*

If a separate power supply is used, instead of using shipborne power supply, daylight signalling lamps shall be provided with a battery charge level indicator, fixed to the daylight signalling lamp or the battery housing.

4.6 Ergonomic and operational controls [MSC.95(72), 6]

Daylight signalling lamps and any battery required for operation shall *be designed in such a way that safe handling in the intended application is ensured. The daylight signalling lamp* shall *be capable of being operated by personnel wearing* heavy working *gloves.*

The operational controls of daylight signalling lamps shall *meet the requirements of IMO Resolution A.694(17) and the applicable requirements of* IEC 60945.

4.7 Durability and resistance to environmental conditions [MSC.95(72), 7.1]

Daylight signalling lamps shall be constructed in accordance with IEC 60598-1.

The illuminant shall *be safely fitted in the daylight signalling lamp; use of screwed sockets* shall *be avoided.*

Daylight signalling lamps shall *be designed in such a way that the illuminant can be easily replaced also in the dark.*

The sighting mechanism shall *be mounted in a fixed attitude, parallel to the optical axis.*

All parts of daylight signalling lamps shall *be made of anti-magnetic material.*

A degree of protection of at least IP 56 according to IEC 60529 shall be reached.

Daylight signalling lamps shall *be so constructed that the accumulation of condensed water is avoided.*

The materials used shall *withstand heat generation during operation.*

With respect to durability and resistance to environmental conditions, daylight signalling lamps shall *meet the* requirements specified in IMO *Resolution A.694(17) and the applicable* requirements of IEC 60945.

4.8 Electromagnetic compatibility (EMC)/interference [MSC.95(72), 7.2]

With respect to electrical and electromagnetic compatibility/*interference daylight signalling lamps* shall *meet the requirements of* IMO *Resolutions A.694(17) and A.813(19) and the applicable* requirements of IEC 60945*.*

The tests shall be carried out only on daylight signalling lamps that are not purely resistive loads.

4.9 Power supply [MSC.95(72), 7.3]

Daylight signalling lamps shall *not be solely dependent upon the ship´s main or emergency sources of electrical energy.*

Daylight signalling lamps shall *be provided with a portable battery with a complete weight of not more than 7.5 kg.*

The portable battery shall *have sufficient capacity to operate the daylight signalling lamp for a period of not less than 2 h.*

The power supply of daylight signalling lamps shall *meet the requirements of* IMO *Resolution A.694(17) and the applicable* requirements of IEC 60945 and ISO 17884.

4.10 Maintenance [MSC.95(72), 7.4]

With respect to maintenance, daylight signalling lamps shall *meet the requirements of* IMO *Resolution A.694(17) and the applicable* requirements of IEC 60945*.*

4.11 Back-up and fall-back arrangements [MSC.95(72), 8]

Each daylight signalling lamp shall *be provided with at least three spare illuminants complying with the type-tested illuminant.*

4.12 Safety precautions [MSC.95(72), 9]

The outer parts of daylight signalling lamps shall *not reach temperatures during operation which restrict their manual use.*

Additionally, daylight signalling lamps shall *meet the safety requirements of* IMO *Resolution A.694(17) and the applicable* requirements of IEC 60945*.*

The maximum surface temperature shall be in accordance with the requirements of IEC 60598-1.

4.13 Permanent operation and life duration

The permanent operation and life duration of fixed daylight signalling lamps shall meet the requirements of ISO 17884.

4.14 Shock

Fixed daylight signalling lamps shall meet the requirements of ISO 17884.

4.15 Pan and tilt ranges for fixed daylight signalling lamps

Fixed daylight signalling lamps shall meet the requirements of ISO 17884.

4.16 Mounting

4.16.1 If the signalling lamp is pedestal-mounted, a clear radius of 900 mm about the pivot point of the lamp is essential to cover the areas inboard, forward and aft of the lamp.

4.16.2 When a lamp is mounted on a pedestal, the height of the sighting mechanism is to be maintained at a height of 1,5 m above the deck. It may be necessary to fit a platform around the pedestal to achieve this height.

4.16.3 Where a lamp is fitted on a pedestal with a platform more than 230 mm above a deck, a guardrail 1,3 m high is to be fitted around the platform.

5 Type approval tests

5.1 Testing of the luminous intensity

For the testing of the luminous intensity, see the requirements of ISO 17884. In addition, the following requirements apply.

a) Photometer

The photometer shall have an accuracy of at least 0,2° in the horizontal and vertical directions.

For the purpose of measuring the switch-on time and the switch-off time, the photometer shall be able to take not less than 250 readings per second with an integration time constant equal to or less than 4 ms.

b) Geometry

The limiting photometric distance shall be determined experimentally.

c) Procedure

The calibration of the whole measuring set-up shall be checked with the aid of a suitable calibration lamp that has been traced back by calibration to the national standard at the measuring distance selected for the test to be carried out. The check shall be documented.

d) Measurement of luminous intensity

All the measured values (luminous intensity distribution curves, current and voltage during the measurements, ambient temperature, checking of the calibration of the measuring section) shall be documented.

5.2 Testing of the chromaticity

For testing of the chromaticity, see ISO 17884. In addition, the following requirements apply.

a) Colorimeter

The check of the colorimetric measuring system shall be documented.

b) Geometry

The measuring distance between the illuminant of the daylight signalling lamp and the colorimeter head shall be adjusted in such a way that the detector surface is illuminated fully and uniformly.

c) Measurement of chromaticity

All the measured values (chromaticity coordinates, current and voltage during the measurements, ambient temperature, checking of the calibration of the measuring section) shall be documented.

5.3 Measurement of the switch-on and the switch-off time

The switch-on and the switch-off time shall be measured separately with the photometer at the optical axis of the daylight signalling lamp. The switch-on time shall be measured from 0 cd up to 57 000 cd and the switch-off time shall be measured from maximum luminous intensity down to 3 000 cd. The test shall be performed three times.

5.4 Test of durability and resistance to environmental conditions

Durability and resistance to environmental conditions shall be tested in accordance with the requirements of IEC 60945 and IEC 60529.

5.5 Test of the capacity of the battery

The daylight signalling lamp shall be equipped with an illuminant with the maximum power consumption which is covered by the approval.

The battery shall be charged in accordance with the instructions of the manufacturer and then connected to the daylight signalling lamp. After this, the daylight signalling lamp shall be operated continuously for a period of two hours. At the end of the two-hour operating period, the luminous intensity shall be measured at the optical axis of the daylight signalling lamp while it is still connected to the battery.

The test shall be carried out three times with every battery type which is to be covered by the approval.

The test is deemed to have been passed if the measured luminous intensity in every case reaches at least 60 000 cd.

5.6 Maximum surface temperatures

The maximum surface temperatures shall be tested in accordance with IEC 60598-1.

5.7 Pan and tilt ranges for fixed daylight signalling lamps

In the case of fixed daylight signalling lamps, the pan and tilt ranges shall meet the requirements of ISO 17884. The measured angles shall be recorded.

5.8 Test of the lamp life duration

The lamp life duration shall be tested in accordance with ISO 17884.

5.9 Shock test

Fixed daylight signalling lamps shall be tested in accordance with ISO 17884.

6 Test report

The test report shall include the information specified for the test report in ISO 17884 and the following:

— reference to this International Standard;

— all test results: the switch-on and switch-off time recordings; the measurements of luminous intensity; and the test of the capacity of the battery.

7 **Documentation** [MSC.95(72), 11]

7.1 The manufacturer shall provide sufficient documentation to enable competent crew members to maintain and operate daylight signalling lamps efficiently.

7.2 The documentation shall be in accordance with ISO 17884 and shall include:

a) a *description of adjustment of* the *sighting mechanism;*

b) any *special tools required, maintenance material and spare parts (e.g. spare covers);*

c) particulars for maintenance of battery, lifetime of battery and battery replacement.

7.3 *Instructions for operation of equipment* shall include*:*

a) general information on mains connection;

b) a *description of ways of checking the parallel adjustment of the sighting mechanism and luminous intensity axis.*

7.4 *Documentation for daylight signalling lamps* shall *meet the requirements of* IMO *Resolution A.694(17)* and shall additionally comply with the applicable requirements of IEC 60945.

8 Marking and identification [MSC.95(72), 10]

Marking and identification shall comply with ISO 17884 and include the following:

a) *On the illuminant, the manufacturer's label and the voltage and power consumption* shall *be marked clearly and durably.*

b) Where the illuminant is recharged from an external source, the battery shall be marked with the voltage, amperage charge rate and polarity of sockets.

c) If a separate power supply is used, the battery and battery recharger shall be marked with battery type, polarity and number.

d) The compass safe distance for equipment fitted on or near the bridge. The safe distance shall be measured in accordance with IEC 60945.

Bibliography

[1] ISO 8468, *Ships and marine technology — Ship's bridge layout and associated equipment — Requirements and guidelines*

[2] IEC 60068-2-6, *Environmental testing — Part 2: Tests — Test Fc: Vibration (sinusoidal)*

[3] IEC 60092-201*, Electrical installations in ships — Part 201: System design — General*

[4] IEC 60447, *Basic and safety principles for man-machine interface, marking and identification — Actuating principles*

[5] *International Regulations for Preventing Collisions at Sea (COLREGs)*, as amended

[6] IMO Resolution A.830(19), *Code on alarms and indicators*

[7] IMO Resolution MSC.97(73), *International code of safety for high-speed craft, 2000 (2000 HSC Code)*

[8] IMO Resolution MSC.128(75), *Performance standards for a bridge navigational watch alarm system (BNWAS)*

[9] *International Convention for the Safety of Life at Sea (SOLAS)*, 1974, as amended

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