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U.S. Department  
of Transportation

United States  
Coast Guard



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### INTERIM GUIDELINES – March 11, 1999

#### Position- Indicating Light for Survival Craft

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#### **1 Scope**

The position- indicating light used on Coast Guard approved lifeboats and liferafts must meet the requirements of, and be tested and approved under these guidelines.

#### **7 Approval Procedure**

A position-indicating light is approved by the Coast Guard under the procedures in Subpart 159.005 of this chapter.

##### **(a) Pre-approval review**

The pre-approval review application submitted to the Commandant under 159.005-5 of this chapter must include preliminary plans covering the arrangement and construction of the position-indicating light.

##### **b) Approval tests**

The approval inspection and tests under section 27 must be conducted by an independent laboratory accredited by the Coast Guard under Subpart 159.010 of this chapter.

##### **(c) Final application**

At the conclusion of the testing, the manufacturer must submit the test report, plans, and quality control procedures required under 159.005-9(a)(5) of this chapter. In order to be considered complete, the final plans under 159.005-12 of this chapter must include:

- (a) the general arrangement or top assembly drawing;
- (b) drawings of each component and subassembly made specifically for the position-indicating light;
- (c) bills of material or parts lists identifying

hardware, materials, and other purchased parts and components;

(d) sufficient additional detail necessary to determine that each requirement of these guidelines is met; and

(e) the maintenance and training material under section 31.

## **15 Construction**

(a) The position-indicating light must be designed to be attached to the uppermost point of the canopy or enclosure of:

- (1) an inflatable liferaft;
- (2) a rigid liferaft;
- (3) a totally enclosed lifeboat; or
- (4) a partially enclosed lifeboat.

(b) The position-indicating light must be powered by a replaceable water-activated or dry cell battery.

(1) The battery must be of a type that will not deteriorate due to dampness or humidity.

(2) The storage life of the battery must be twice as long as the period between its date of manufacture and its expiration date. The storage life is considered to be the amount of time after its date of manufacture that the battery can be stored under typical environmental conditions on a vessel and still have sufficient power to pass the test in section 27.

## **21 Performance**

Each position-indicating light must meet the performance standards of paragraphs 4.1.3.3 and 4.4.7.10 of the International Life-Saving Appliance Code (LSA Code). If the unit includes an interior light, the interior light

must meet paragraphs 4.1.3.4 and 4.4.7.11 of the LSA Code. (see enclosure (1)).

## **23 Marking and labeling**

All marking and labeling must be in the English language. Marking and labeling in additional languages is permitted. The position-indicating light must be permanently and indelibly marked with:

- (a) Name of manufacturer.
- (b) Model designation.
- (c) U.S. Coast Guard approval number.
- (d) Date of manufacture and date of expiration of the battery.

## **27 Approval inspections and test**

Position-indicating lights must pass the tests in section 10.1 and 10.4 of the International Maritime Organization's Recommendation on Testing of Life-Saving Appliances (see enclosure (2)).

## **31 Training and maintenance material**

The manufacturer must make training material and maintenance material available to purchasers of Coast Guard approved position-indicating lights. These must be submitted to the Commandant (CG-5214) for approval with the final plans under 159.005 of this chapter. The training material and the maintenance material must each consist of a page or pages suitable for insertion into a loose leaf binder, or else the material provided to the lifeboat or liferaft manufacturer for inclusion in their manuals. These materials must be in the English language. Materials including additional languages are permitted.

(a) The training material must contain instructions and information on operating the

position-indicating light. The material must be stated in easily understood terms, illustrated wherever possible.

(b) The maintenance material must consist of information on how to install, check, care for, and repair the position-indicating light. This should include a description of the battery expiration dating, as well as an explanation as

to whether or not the light is “disposable”, or one that has a replaceable battery. The battery or light replacement process should be explained, along with how the light should be examined and tested at annual lifeboat or liferaft inspections. Simple repairs, such as bulb replacement should also be covered.

# INTERNATIONAL LIFE-SAVING APPLIANCE (LSA) CODE

## PREAMBLE

1 The purpose of this Code is to provide international standards for life-saving appliances required by chapter III of the International Convention for the Safety of Life at Sea (SOLAS), 1974.

2 On and after 1 July 1998, the requirements of this Code will be mandatory under the International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended. Any future amendment to the Code will be adopted and brought into force in accordance with the procedure laid down in Article VIII of that Convention.

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4.1.3.3 A manually controlled lamp shall be fitted to the top of the liferaft canopy. The light shall be white and be capable of operating continuously for at least 12 h with a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere. However, if the light is a flashing light it shall flash at a rate of not less than 50 flashes and not more than 70 flashes per min for the 12 h operating period with an equivalent effective luminous intensity. The lamp shall light automatically when the canopy is erected. Batteries shall be of a type that does not deteriorate due to dampness or humidity in the stowed liferaft.

4.1.3.4 A manually controlled lamp shall be fitted inside the liferaft capable of continuous operation for a period of at least 12 h. It shall light automatically when the canopy is erected and be of sufficient intensity to permit reading of survival and equipment instructions. Batteries shall be of a type that does not deteriorate due to damp or humidity in the stowed liferaft.

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4.4.7.10 A manually controlled lamp shall be fitted [to the lifeboat]. The light shall be white and be capable of operating continuously for at least 12 h with a luminous intensity of not less than 4.3cd in all directions of the upper hemisphere. However if the light is a flashing light it shall flash at a rate of not less than 50 flashes and not more than 70 flashes per min for the 12 h operating period with an equivalent effective luminous intensity.

4.4.7.11 A manually controlled lamp or source of light shall be fitted inside the lifeboat to provide illumination for not less than 12h to permit reading of survival and equipment instructions; however, oil lamps shall not be permitted for this purpose.

**INTERNATIONAL MARITIME ORGANIZATION**  
**Recommendation on TESTING OF LIFE-SAVING APPLIANCES**  
**as amended through resolution MSC.81(70), December 1998**

## 10 POSITION-INDICATING LIGHTS FOR LIFE-SAVING APPLIANCES

### 10.1 Survival craft and rescue boats light test

10.1.1 Twelve liferaft canopy lights, lifeboat enclosure or lifeboat cover lights, as the case may be, and twelve survival craft interior lights should be subjected to the temperature cycling as prescribed in 1.2.1.

*1.2.1 The [lights] should be alternately subjected to surrounding temperatures of -30°C and +65°C. These alternating cycles need not follow immediately after each other and the following procedure, repeated for a total of 10 cycles, is acceptable:*

- .1 an 8 h cycle at +65°C to be completed in one day; and*
- .2 the specimens removed from the warm chamber that same day and left exposed under ordinary room conditions until the next day;*
- .3 an 8 h cycle at -30°C to be completed the next day; and*
- .4 the specimens removed from the cold chamber that same day and left exposed under ordinary room conditions until the next day.*

If the same type of light is used for both canopy, enclosure or cover and interior, only twelve lights of that type need to be tested. If the lifeboat enclosure light, the lifeboat cover light or the lifeboat internal light is connected to the lifeboat's electrical network and can be supplied with electrical power from any one of the lifeboat's batteries as well as from the lifeboat's engine-driven generator set, the light should only be subject to the test as far as practicable.

10.1.2 In the case of sea-activated power sources, four survival craft lights of each type should, following at least ten complete temperature cycles be taken from a stowage temperature of -30°C and be operated immersed in seawater at a temperature of -1°C ; four of each type should be taken from a stowage temperature of +65°C and be operated in seawater at a temperature of +30°C ; and four of each type should be taken from ordinary room conditions and immersed in fresh water at ambient temperature. The canopy, enclosure or cover lights should be of white colour and should provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for a period of not less than 12 h (see 10.4). The interior lights should provide sufficient luminous intensity to read survival instructions and equipment instructions for a period of not less than 12 h.

10.1.3 In the case of dry-activated power sources, provided they will not come into contact with seawater, four survival craft lights of each type should, following at least ten complete temperature cycles be operated at an air temperature of -30°C , four of each type at an air

temperature of +65°C , and four of each type at ambient temperature. The canopy, enclosure or cover lights should be of white colour and should provide a luminous intensity of not less than 4.3 cd in all directions of the upper hemisphere for a period of not less than 12 h (see 10.4). The interior lights should provide sufficient luminous intensity to read survival instructions and equipment instructions for a period of not less than 12 h.

10.1.4 In the case of a flashing light, it should be established that the rate of flashing for the 12 h operative period is not less than 50 flashes and not more than 70 flashes per minute and the effective luminous intensity is at least 4.3 cd(see 10.4).

10.4 Common Tests for All Position Indicating Lights (additional lights are required to carry out the environmental tests.)

#### **10.4.1 Vibration Test**

Regulations: IEC 945 :3<sup>rd</sup> edition (November.1996), paragraph 8.7

##### Test Procedure

One unit shall be subjected to a vibration test according to IEC 945 :3<sup>rd</sup> edition (November.1996), paragraph 8.7.

##### Acceptance Criteria

The survival craft lights shall function after the test.

#### **10.4.2 Mould Growth Test**

Regulation: LSA Code 1.2.2.4

##### Test Procedure

One unit should be subjected to the mould growth test defined as follows:  
(Note: The mould growth test may be waived where the manufacturer is able to produce evidence that the external materials employed will satisfy the test.)

The light shall be inoculated by spraying with an aqueous suspension of mould spores containing all the following cultures:

Aspergillus niger;  
Aspergillus terreus;  
Aureobasidium pullulans;  
Paecilomyces variotii;  
Penicillium funiculosum;  
Penicillium ochro-chloron;  
Scopulariopsis brevicaulis;

Trichoderma viride.

The light shall then be placed in a mould growth chamber which shall be maintained at a temperature of  $29\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$  and a relative humidity of not less than 95 %. The period of incubation shall be 28 days. After this period the light shall be inspected.

#### Acceptance Criteria

The light shall be rot-proof and not be unduly affected by fungal attack.

There shall be no mould growth visible to the naked eye and the light shall function after the test.

### **10.4.3 Switch Arrangement Test**

#### Test Procedure

One unit shall be subjected to the switch arrangement test.

A test person, wearing immersion suit gloves, must be able to switch the light in its normal operational position on and off three times.

#### Acceptance Criteria

The light must function properly.

### **10.4.4 Corrosion and Seawater Resistance Test**

#### Test Procedure

One unit shall be subjected to a corrosion and seawater resistance test according to IEC 945 :3<sup>rd</sup> edition (November 1996) paragraph 8.12.

(Note 1: If there are no exposed metal parts the Corrosion and Seawater Resistance Test need not be conducted.)

(Note 2: The Corrosion and Seawater Resistance Test may be waived where the manufacturer is able to produce evidence that the external metals employed will satisfy the test.)

#### Acceptance Criteria

There shall be no undue deterioration of metal parts and the unit shall function.

### **10.4.5 Solar Radiation Test (not for Survival Craft Interior and Lifejacket Lights)**

### Test Procedure

One unit shall be subjected to a solar radiation test according to IEC 945 :3<sup>rd</sup> edition (November 1996) paragraph 8.10.

(Note: The Solar Radiation test may be waived where the manufacturer is able to produce evidence that the materials employed will satisfy the test, i.e. UV stabilised.)

### Acceptance Criteria

The mechanical properties and labels of the unit shall be resistant to harmful deterioration by sunlight. The unit shall function after the test.

## **10.4.6 Test for Oil Resistance (not for Survival Craft Interior Lights)**

### Test Procedure

One unit shall be subjected to the Oil Resistance test according to IEC 945 :3<sup>rd</sup> edition (November 1996) paragraph 8.11.

### Acceptance Criteria

After this test the unit shall not be unduly affected by oil and shall show no sign of damage such as Shrinking, cracking, swelling, dissolution or change of mechanical qualities. Furthermore, the survival craft exterior light shall function after the test.

## **10.4.7 Rain Test, and Water-Tightness Test**

### Test Procedure

One unit shall be subjected to a rain test according to IEC 945 :3<sup>rd</sup> edition (November 1996) paragraph 8.8.

After having passed the rain test, the unit and the complete power source shall be immersed horizontally under not less than 300 mm of fresh water for at least 24 h.

### Acceptance Criteria

The unit shall comply with the requirements of IEC 945 :3<sup>rd</sup> edition (November 1996) paragraph 8.8.2, and shall function after the rain test. Additionally, after the water-tightness test the unit shall function and there shall be no evidence of water inside the unit.

## **10.4.8 Fire Test (not for Survival Craft Interior Lights)**

### Test Procedure

One unit shall be subjected to a fire test. A test pan at least 30 cm x 35 cm x 6 cm shall be placed in an essentially draught-free area. Water shall be put in the bottom of the test pan to a depth of not less than 1 cm followed by enough petrol to make a minimum total depth of not less than 4 cm. The petrol shall then be ignited and allowed to burn freely for at least 30 s. The unit shall then be moved through the flames, facing them, with the unit's light not more than 25 cm above the top edge of the test pan so that the duration of exposure to the flames is at least 2 s.

### Acceptance Criteria

The unit shall not sustain burning or continue melting after being totally enveloped in a fire for a period of at least 2 s and after being removed from the flames. Furthermore, the unit shall function after the test.

## **10.4.9 Measurement of Luminous Intensity**

### Test Procedure

If the voltage at five minutes of operation is lower than the recorded voltage at the end of life it is permissible to use a lamp from the same build standard for the light output test. Using the lowest recorded voltage a light output test can be carried out as described below. The voltage of the specified number of test units should be monitored continuously for the specified time. To make sure that all the test units provide a luminous intensity of not less than the specified luminous intensity in all directions of the upper hemisphere after the specified time of operation, the following test shall be performed.

It must be demonstrated to the satisfaction of the inspecting surveyor that at least one light from each of the specified temperature ranges that the required luminous intensity is achieved in all directions of the upper hemisphere using a photometer which is calibrated to the photometric standards of the appropriate National or State Standards Institute. (Note: CIE Publication No. 70 contains further information.) The lowest voltage light of the cold temperature test sample lot, the highest voltage light of the high temperature test sample lot and the mean voltage light of the ambient temperature sample lot should be selected. These three lights must be used for the light output tests. In the event that a lamp filament burns out during the light output test, a second light from the same performance test lot may be used.

Luminous intensity should be measured by a photometer directed at the centre of the light source with the test light on a rotating table. Luminous intensity should be measured in a horizontal direction at the level of the centre of the light source and continuously recorded through a 360 degree rotation. These measurements should be taken in the azimuth angles at 5 degree intervals above the horizon up to the single measurement at 90 degrees, (vertical). Luminous intensity should then be measured in a vertical direction, beginning at the centre of the light source at the point of lowest recorded light output, and continuously recorded through an arc of 180 degrees.

### Acceptance Criteria

The test lights shall continue to provide a luminous intensity of not less than the specified intensity in all directions of the upper hemisphere for a period of at least the specified time. All measured data of luminous intensity and voltage shall be documented. In the case of a flashing light, it shall be established that the rate of flashing for the specified operating period is not less than 50 flashes and not more than 70 flashes per minute and that the effective luminous intensity is at least the minimum specified intensity in all directions of the upper hemisphere.

The effective luminous intensity is to be found from the formula:

$$\left[ \frac{\int_{t_1}^{t_2} I dt}{0.2 + (t_2 - t_1)} \right]_{\text{avg}}$$

where: I is the instantaneous intensity  
0.2 is the Blondel-Rey constant  
and  $t_1$  and  $t_2$  are time limits of integration in seconds

Note: Flashing lights with a flash duration of not less than 0.3 seconds, not including incandescence time, may be considered as fixed lights for the measurement of luminous intensity. Such lights shall provide the required luminous intensity in all directions of the upper hemisphere. (Incandescence time is the time interval between switch on and the luminous intensity reaching the required minimum luminous intensity.)

### **10.4.10 Chromaticity**

#### Test Procedure

One unit shall be tested for chromaticity to determine that it lies within the boundaries of the area “white” of the diagram specified for each colour by the International Commission on Illumination, (CIE). The chromaticity of the light shall be measured by means of colorimetric measurement equipment which is calibrated to the appropriate National or State Standards Institute. (Note: CIE Publ. No. 15.2 contains further information.) Measurements on at least four points of the upper hemisphere shall be taken.

#### Acceptance Criteria

The measured chromaticity coordinates should fall within the boundaries of the area of the diagram, as per CIE.

The boundaries of the area for white lights are given by the following corner co-ordinates:

x	0.500	0.500	0.440	0.300	0.300	0.440
y	0.382	0.440	0.433	0.344	0.278	0.382

(Draft standard CIE DS 004.2/E-1996, Colours of Light Signals, with colour tables.)