



Maritime and Coastguard Agency

MARINE GUIDANCE NOTE

MGN 393 (M+F)

Navigation Light Units: Maintenance and the Use of New Technology Light Sources, such as Light Emitting Diodes (LEDs), as Navigation Lights on SOLAS and non-SOLAS Vessels.

Notice to all Owners, Masters and Officers of Merchant Ships, Owners and Skippers of Fishing Vessels, Boat Owners, Yacht Owners and Boatmen and Manufacturers of products.

This notice should be read in conjunction with Annex 1 of the International Regulations for Preventing Collisions at Sea (COLREGs) 1972 as amended, MSN 1781(M+F) and the MCA's Instructions for the Guidance of Surveyors - Survey of Lights and Signalling Equipment.

PLEASE NOTE:-

Where this document provides guidance on the law it should not be regarded as definitive. The way the law applies to any particular case can vary according to circumstances - for example, from vessel to vessel and you should consider seeking independent legal advice if you are unsure of your own legal position.

Summary

- To provide guidance for SOLAS and non-SOLAS vessels on the requirements and performance standards, for new technology light sources, as required by the International Maritime Organization (IMO) Resolution MSC.253(83), Section 4.3 (Special requirements for lights using LEDs), COLREGs and The MCA's Instructions for the Guidance of Surveyors - Survey of Lights and Signalling Equipment.

1. Background:

- 1.1 New technologies allow manufacturers to introduce applications of everyday products into the marine environment, such as LED lights.
- 1.2 So that new technology light sources perform to their maximum capability, this guidance gives information about installation criteria and COLREGs compliance.
- 1.3 Some new technology light sources ensure long life and low power consumption. These characteristics are highly desirable for use in navigation lights to reduce battery drain, maintain light intensity over a wide voltage range and to reduce maintenance costs.

1.4 Navigation lights fitted to UK registered commercial vessels must be of a type approved by a nominated body (the MCA's Instructions for the Guidance of Surveyors - Survey of Lights and Signalling Equipment, 1.1, 1.2 (Statutory Provisions) & 2.3.2). Caution is advised if LED light sources are retrofitted to existing lanterns as this may invalidate the type approval for that lantern. Manufacturers' advice should be sought before substitutions are made.

1.5 Recreational and small craft owners should satisfy themselves that their vessels fully comply with the requirements for the carriage of navigation lights and that any replacement light sources for incandescent lights perform within the requirements set out in COLREGs, and are suitable if fitted to sailing vessels.

2. Installation:

2.1 The installation of navigation lights should comply with the COLREGs, Annex 1 (Positioning and Technical details of Lights and Shapes). Guidance is in the MCA's Instructions for the Guidance of Surveyors – Survey of Lights and Signalling Equipment.

2.2 Manufacturers' instructions on installation, maintenance and replacement should be closely followed and:

- Replacement items, such as lamps or new technology light sources, should be identical or equivalent to the original.
- Chromatic accuracy of any replacement light source, when placed behind a lens, should comply with COLREGs in all respects.
- Before the installation of new technology light sources, such as LEDs, in existing lanterns the manufacturers of the mounting/lighting unit should be consulted to assess suitability.
- If there is any doubt as to the suitability or compatibility of "replacement lamps" with the lantern, then the replacement item should not be used.
- If in any doubt about the compliance of the unit, when assembled, if possible seek advice from the manufacturer of the lantern rather than the supplier of any replacement light source.

3 Maintenance:

3.2 Owners, Masters, Officers and Skippers should ensure that their navigation lights are maintained, and repaired, in accordance with the manufacturers' instructions.

3.3 Regular, prudent inspection of navigation lights, including light sources, lenses and electrical connections, should take place to ensure they perform to the standard laid down in COLREGs.

4. Equipment Checks:

4.1 To ensure the navigation lights continue to comply with the relevant COLREGs there are a few basic maintenance points and simple guidelines that can be followed. These are by no means exhaustive:

- Check all lights work before leaving port and an hour prior to use, periodically during the voyage, and especially during poor visibility and at night.
- The performance of lights can be affected by the age of the installation including switches, wiring and electrical connections all of which should be checked regularly.
- Acrylic and Polycarbonate lens types can be affected by sunlight, specifically by the UV component of sunlight. Over time, this produces an effect known as "milking", where the lens turns to a cream / yellow colour. This affects the accuracy and performance of the lights.

- Glass lenses need to be checked for cracking or coating with salt. This affects the accuracy and performances of the lights.
- Coloured filters can also be affected by UV sunlight and the chromatic accuracy of the light may be dramatically reduced.
- Check for heat damage of the lens from the lamp. This causes an effect called “crazing” as the plastic becomes “diffuse”, thus the chromatic accuracy of the light is dramatically reduced, particularly during “heeling”.
- Lenses may suffer “blasting” from sand and salt. Regular cleaning and compliance with manufacturer’s instructions can ensure the lights continue to comply with COLREGs.
- Check that alternative power supplies, alternative lanterns, switching arrangements are fully functional before leaving port and periodically thereafter.

5 SOLAS Vessels

5.1 In addition, for new technology light sources, such as LEDs, the Performance Standards set out by IMO Resolution MSC.253(83), Section 4.3 (Special requirements for lights using LEDs) should be applied (Annex 1 of this document). There are associated documents referenced in this Resolution which should also be applied.

6 Definitions

6.1 *Associated equipment* means equipment necessary for the operation of NLs and NLCs.

6.2 *COLREGs* means Convention on the International Regulations for Preventing Collisions at Sea, 1972, including their annexes.

6.3 *Lamp* means a source producing light, including incandescent sources, Light Emitting Diodes (LED) and other non-incandescent sources.

6.4 *Length* means the length overall.

6.5 *Navigation Light (NL)* means the following lights:

.1 masthead light, sidelights, sternlight, towing light, all-round light, flashing light as defined in Rule 21 of COLREGs;

.2 all-round flashing yellow light required for air-cushion vessels by Rule 23 of COLREGs; and:

.3 manoeuvring light required by Rule 34(b) of COLREGs.

The light source includes lamps, its housing, placing and means for delimiting the angle of lighting.

6.6 *Navigation Light Controller (NLC)* means a device enabling operational control of a Navigation Light.

6.7 *SOLAS* means the International Convention for the Safety of Life at Sea, 1974, as amended.

More Information

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4 Navigation Lights

4.1 General

4.1.1 Unless expressly required otherwise, NLs should appear steady and non-flashing.

4.1.2 Lenses of NLs should be produced in a robust, non-corroding material, which should ensure a long-term durability for the optical qualities of the lens.

4.1.3 A masthead light, sidelights and a sternlight installed on board a ship not less than 50 m in length should be duplicated or be fitted with duplicate lamps.

4.1.4 Only lamps specified by the manufacturer should be used in each particular NL to avoid reduction of NL's performance due to unsuitable lamps.

4.1.5 A sufficient number of spare lamps for NLs should be carried onboard, taking into account the duplication of NLs or lamps, as appropriate.

4.2 Luminous intensity distribution

4.2.1 In the horizontal directions where decrease of luminous intensity to "practical cut-off" is required by section 9 of Annex I to COLREGs, the luminous intensity should be no more than 10% of the average luminous intensity within the prescribed sector for vessels not less than 12m in length.

4.2.2 Within the prescribed sector in which the minimum luminous intensity is required by section 9 of Annex I to COLREGs, the horizontal intensity distribution of the light should be uniform in such a way that the measured minimum and maximum luminous intensity values (in candelas) do not differ by more than a factor of 1.5, to avoid luminous intensity changes which may result in the appearance of a flashing light for vessels not less than 12 m in length.

4.2.3 Within the prescribed sector in which the minimum luminous intensity is required by section 10 of Annex I to COLREGs, the vertical intensity distribution of the light should be uniform in such a way that the measured minimum and maximum luminous intensity values (in candelas) do not differ by more than a factor of 1.5, to avoid luminous intensity changes which may result in the appearance of a flashing light for vessels not less than 12 m in length.

4.3 Special requirements for lights using LEDs

The luminous intensity of LEDs gradually decreases while the electricity consumption remains unchanged. The rate of decrease of luminous intensity depends on the output of LEDs and temperatures of LEDs. To prevent shortage of luminous intensity of LEDs:

.1 An alarm function should be activated to notify the Officer of the Watch that the luminous intensity of the light reduces below the level required by COLREGs;

Or

.2 LEDs should only be used within the lifespan (practical term of validity) specified by the manufacturer to maintain the necessary luminous intensity of LEDs. The lifespan of LEDs should be determined and clearly notified by the manufacturer based on the appropriate test results on the decrease of luminous intensity of the LEDs under various temperature conditions and on the temperature condition of LEDs in the light during operation, taking the appropriate margin into account.