IVR Technical Leaflet

LED TECHNOLOGY CAUSING ELECTROMAGNETIC INTERFERENCE

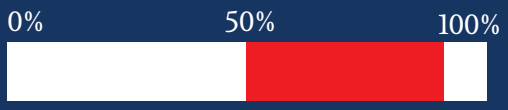
Experience demonstrates that LED lighting can cause electromagnetic interference (EMI) and thereby significantly can degrade the operation of shipboard radio communication and navigation equipment.

Poorly or too cheaply designed LED lamps have an integrated switching regulator, which radiates electromagnetic radiation with a wide HF spectrum due to its fast switching flanks.

Although the lighting complies with the various relevant standards such as the EN 60945 en EN 55015 for navigation lights and searchlights, installation in the vicinity of antennas interferes with radiotelephone reception. The interference ceases when the lights are switched off.

There is also LED technology lighting that does not cause disruptions in the reception of AIS information

For example, the AIS device's range can be reduced by between 50% and 90%. This interference can be generated by certain navigation lights, searchlights or lights for adornment purposes (including within the wheelhouse) using LED technology. This interference is particularly apparent when the lighting is located close to antennas.



LED lighting has been identified as having the potential to become a major source of EMI, as it can affect the operation of many radio services over a wide range of frequencies, both directly through radiated emissions and indirectly though conducted emissions over electrical supplies. This EMI does not have to come from the vessel. There are cases known where LED's used in a work of art near or in the waterway caused interference.

This electromagnetic interference may give rise to dangerous situations, thus affecting safe inland navigation.

How to find out if there is

LED INTERFERENCE

Strong radio interference from LED sources may not be immediately evident to maritime radio users. Nonetheless, it may be possible to test for the presence of LED interference by using the following procedures

1. Turn off LED light(s).
2. Tune the VHF radio to a quiet channel (e.g. Ch. 13).
3. Adjust the VHF radio's squelch control until the radio outputs audio noise.
4. Re-adjust the VHF radio's squelch control until the audio noise is quiet, only slightly above the noise threshold.
5. Turn on the LED light(s).

If the radio now outputs audio noise, then the LED lights have raised the noise floor. (Noise floor is generally the amount of interfering signals / static received beyond the specific signal or channel being monitored.)

If the noise floor is found to have been raised, then it is likely that both shipboard VHF marine radio and AIS reception are being degraded by LED lighting.

REQUIREMENTS

LED searchlights must comply with standard EN 60945 (2002) including IEC 60945 corrigendum 1 (2008) or standard IEC 60945 (2002) including IEC 60945 corrigendum 1 (2008).

EN 60945 IEC 60945 IEC 60945

A test for correct operation can be performed when inspecting radio communication systems to check that LED lighting is not interfering with their operation.

Be aware

Electrical and electronic equipment must be installed such that the electromagnetic interference to which they give rise does not impair the correct functioning of navigation and radiocommunication systems and equipment.

It is the shipowner's responsibility to pay particular attention to the associated LED light sources and light fittings regarding the electromagnetic interference they may cause to internal radiocommunication equipment.