



LED emergency lighting luminaires provide major benefits for facilities managers

In a building emergency, especially fire, fast panic-free evacuation can easily make the difference between life and death, which is why UK legislation requires reliable, good quality emergency lighting. Bernard Pratley, Technical Manager at ICEL, the emergency lighting arm of the Lighting Industry Federation (LIF), argues that the latest LED emergency lighting makes this easier to achieve, with significant extra benefits for hard-pressed facilities managers.

Most people unfamiliar with a building tend to leave it the same way that they entered it, often ignoring shorter escape routes. Therefore, emergency lighting and escape route illumination must make it easy for those evacuating, e.g. supermarkets, retail outlets, office and public buildings (Figures 1 & 2), to see clearly enough to safely and quickly make their way out, using the nearest and shortest designated exit paths. Can the latest generation of white light LEDs help facilities managers with their legal duty of care to protect all people in their buildings and to comply with other regulatory requirements? The answer is 'yes'.

While LEDs can produce bright, pure colours, warm white and cool white can also be produced. The major lamp manufacturers have invested heavily in improving these products' price/performance ratio to the extent that they are now progressively becoming suited to an expanding range of general lighting applications. Emergency lighting is one application that they are ideal for.

LED lighting has several benefits over conventional lighting, such as the fluorescents that have been ubiquitous in emergency lighting luminaires for many years. For example, LEDs are energy efficient. Compared with equivalent fluorescents, good LED emergency

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exit sign and luminaires (Figures 3 & 4) often show energy savings of 30% or more because the light can be much more focused to its purpose, which will save significant costs over the installation's life. LEDs are small, so are usually clustered to provide sufficient light, reducing the energy efficiency to a degree. Even clustered, LED lighting is efficient and compact, but to achieve optimum LED lighting performance, dedicated control gear (drivers), optics and fittings are necessary. This is a significant benefit in itself, because there are exciting possibilities, with sleek, modern and unobtrusive luminaire designs being possible.

LEDs are also very robust, have an excellent low temperature performance and are easily digitally controlled, but perhaps the most remarkable attribute of LED lighting is its long life; there are high quality products available that will operate for 50, 000 hours or more, yet still provide 70% of the original light output. This brings significant time and money-saving maintenance advantages for facilities managers, of which more later.

LEDs have been used in exit signs for about three years, but the technology has progressively improved to the extent that there are now LED equivalents for most conventional lamp types, with the cost reducing all the time. Therefore, LEDs are now also suitable for a wider range of emergency lighting luminaires, bringing their many benefits to lighting designers, building and facilities managers and building occupants. Excellent examples of what is possible are P4's Stairway LED system (Figure 5) and TriLED recessed escape route luminaire (Figure 6).

LEDs typically have a 60-degree beam, so when correctly installed at a 3m mounting height at recommended spacings, emergency lighting luminaires should have no trouble achieving 1 lux at the floor, using just two 1W LEDs, plus LED control gear, inverter and suitable self-contained battery for a three-hour duration.

Standards changes affecting facilities managers

Compliance with BS EN 60598-2-22, the emergency lighting luminaires standard, and

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EN50172 (BS 5266 series), the emergency escape lighting application standards, together ensure that there will be sufficient illumination for people to see and be directed towards emergency exits, with exit or directional signs being in view everywhere along the escape route. Note that BS 5266-1, the umbrella Code of Practice for emergency lighting, calls up the two relevant application standards: EN 1838/BS 5266-7, which covers lighting levels and also exit sign illuminance values; and EN 50172/BS 5266-8, which covers other areas such as testing frequencies etc.

Exit signs must be clear even at maximum viewing distances, according to application standard EN1838/BS 5266-7. The luminaire construction standard EN60598-2-22 defines minimum luminance levels that signs must attain in relation to viewing distances. LEDs help achieve this; Figure 7 shows a good example of a modern exit sign.

BS5266 Part 1 is currently being revised. This Code of Practice has, until recently, been treated as a prescriptive standard, but now the legal requirement is that non-domestic buildings must be safe at all times, even if mains power failure occurs. Therefore, nearly all such buildings must have emergency lighting fitted. However, any risks associated with individual buildings, established by a risk assessment to be carried out by owner/occupiers - which often involve facilities managers - must be 'limited to tolerable levels'. The one size fits all approach will no longer be sufficient; emergency lighting must now be targeted at individual buildings far more than used to be the case. For example, although BS5266 doesn't call for emergency lighting in small rooms, if the risk assessment shows a need for emergency lighting, then it should be fitted. Previously, Fire Officers carried out such assessments, but the 'responsible person', such as some facilities managers, is now among those involved.

Savings on maintenance

It will also no longer be adequate to 'fit and forget' emergency lighting; it must always be in full working order. Maintained emergency lighting and exit signs are ideal for best building safety, but not necessarily so from a maintenance perspective. This is because 8W

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fluorescent lamps in such applications have a typical working life of around 6,000 hours; if they are illuminated several hours a day, regular lamp replacement will be required. Here, good quality LED emergency lighting has a distinct advantage over traditional types because of its significantly longer life. Replacing lamps is always time consuming and costly, and often disruptive too, requiring access to fittings mounted along escape routes and above exits. Such areas often cannot be obstructed during working hours, necessitating costly out of hours working. In addition, there are the costs of lamp replacement and failed lamp disposal.

Therefore, there is no reason today not to use good quality LED emergency lighting products from reputable manufacturers, such as that shown in Figure 8. As a safeguard, purchasers could check that the products being installed have come from an Industry Committee for Emergency Lighting (ICEL) member.

Auto-testing of emergency lighting

While even good quality LEDs will eventually fail, their longer working lives can mean that maintenance staff may tend to forget to test regularly. Building landlords, occupiers and employers are obliged by law under the Regulatory Reform (Fire Safety) Order to carry out risk assessments to ensure that their premises are easy to escape from. BS5266: Part 10 - the emergency lighting code of practice - and Fire Safety legislation under Section 7 (testing, maintenance and record keeping) mean that the designated 'responsible person' concerned must ensure that emergency lighting systems are regularly tested and record the results, so that their emergency lighting systems are properly maintained in full working order. This will demonstrate that the 'responsible person' has carried out the required duty of care, which is essential, bearing in mind that he or she may be asked to prove, possibly in a court of law, that the requirements have been met.

Monthly and annual testing of every luminaire is necessary, with central battery system indicators being visually inspected daily. All self-contained emergency lighting must be functionally tested for 5 -10 minutes minimum every month, and tested for full rated

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duration of typically three hours at least every year. Accurate records must be kept. In large buildings, this can be a lengthy job that may be impossible to achieve whilst keeping the building in a legal, fully working state.

Automatic testing (see Figure 9) solves these problems cost-effectively by regularly checking, without human intervention, that emergency lighting batteries and luminaires are working correctly. The system generates reports automatically on any fault that requires remedial action. Test results still need to be recorded manually and logged, but the person recording does not spend time carrying out the tests themselves, and need not be electrically qualified. Even manual recording can be avoided by using automatic data collection.

The case is strengthened by the importance given to the correct functioning and proper testing of emergency lighting under BS5266-Part 10:2008, which also promotes automatic test systems to BS EN 62034. Automatic testing, therefore, can save much time and money, and the high responsibility of conventional testing is reduced - providing confidence. Some people take less care than they should over testing and maintenance; automatic testing largely obviates this.

ICEL believes, therefore, that automatic testing is more reliable than manual testing and can be more cost-effective, providing peace of mind into the bargain. Consideration should be given to installing automatic emergency lighting testing systems conforming to BS EN 62034 because of their reliability and cost-effectiveness. The reduced testing and lower labour costs compared with manual testing can provide real savings over time. Facilities managers can see even complex systems payback in two to four years.

ICEL provides specific training courses for Emergency Lighting requirements, suitable for designers, maintenance engineers and facilities managers.

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CAPTIONS:

CAPTION 1 (file - ORBIK_Master.jpg)

Figure 1: Emergency lighting and escape route illumination must make it easy for those evacuating buildings to see clearly enough to safely and quickly make their way out, using the nearest and shortest designated exit paths (photo Orbik).

CAPTION 2 (file - ORBIK_RomneySitumaster.jpg)

Figure 2: Most people unfamiliar with a building, such as a hospital, tend to leave it the same way that they entered it, often ignoring shorter escape routes. This is why exit signs are so necessary (photo Orbik).

CAPTION 3 (file - EMERGILITE_Serenga_Escape_Route.jpg)

Figure 3 shows Emergi-Lite's Serenga escape route sign, powered by LEDs, which provide excellent soft illumination, whilst achieving energy and space savings.

CAPTION 4 (file - ORBIK_Geneva_LED.jpg)

Figure 4: Orbik's Geneva recessed 8W or LED emergency luminaire.

CAPTION 5 (file - P4_StairwayLED.jpg)

Figure 5: P4's Stairway LED system is an excellent example of LEDs allowing designers to 'think outside the box'.

CAPTION 6 (file - P4_TRILED_EscapeRouteLum.jpg)

Figure 6: This very compact LED-powered escape route fitting by P4 shows what is possible in terms of innovative design.

CAPTION 7 (file - ORBIK_Rota_LED.jpg)

Figure 7: Orbik's Rota LED exit sign, which can be wall or ceiling mounted.

CAPTION 8 (file - EMERGILITE_SerengaSunLiteLED.jpg)

Figure 8: The Serenga Sun-Lite surface-mount LED luminaire by Emergi-Lite combines high light output with energy saving - using 25% less power than a comparable 8WT5 fluorescent system.

CAPTION 9 (file - ADVANCED_ELEC_Lx_Family.jpg)

Figure 9: Lx system products from Advanced Electronics. The Lx control panels are fully compatible with all LiTe products and provide a cost-effective emergency lighting testing and monitoring.

Notes:**1) About ICEL**

ICEL (www.ice1.co.uk) is the foremost UK authority on emergency lighting, and its members are manufacturers of components and products for emergency lighting fittings. ICEL's representatives serve on BSI and International Standards committees, developing harmonised product and application standards. Therefore, ICEL members are well placed to give advice on product selection and can be expected to provide good quality emergency lighting products.

2) Emergency lighting under BS EN 60598-2-22

Self-contained luminaires - These provide maintained or non-maintained emergency lighting in which all the elements (such as the battery, lamp, control unit, and test and monitoring facilities where provided) are contained within the luminaire or adjacent to it (within 1m cable length).

Centrally supplied (slave fittings) - In these fittings, the lamp and some of the control gear is located in the luminaire, but the charger and battery (and often the changeover device) is located remotely, providing the supply to a number of luminaires. Central power units may supply the luminaires with a range of DC voltages, or at 230V AC from an inverter. To operate on DC, some are specifically designed as emergency luminaires; others are converted mains luminaires.

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