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ILLUMINATING TRENDS IN EMERGENCY LED LIGHTING

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LED lighting innovations are ushering in demand for new LED emergency lighting products and solutions.

TRENDS
in Emergency Lighting

Emergency lighting is an integral part of the overall lighting and power system of every business, institution and venue.

The increased demand for emergency lighting is due to a rising awareness and increased enforcement of the national, state and local lighting safety codes. This emphasized focus on **LED lighting drastically increases opportunities for finding diverse solutions to emergency lighting needs.**

Emergency lighting is integral to the nation's overall power and lighting system. As LED lighting solutions continue to expand, the focus has been on improved energy efficiency, smarter control systems and improved quality of light. Recent developments build on these needs and include improving capabilities between new LED luminaries and new LED technologies, reducing size & cost of emergency lighting solutions and creating compatible, interoperable smart lighting controls and systems.

TRENDS in Emergency Lighting

Emergency Lighting primarily follows developments in the larger lighting industry.

The primary trends in emergency lighting include:

- a shift to LED lighting
- continued pressure to reduce costs, reduce size, code changes
- power distribution systems focused on centralizing, as opposed to decentralizing, the emergency source of power
- a trend toward smart, networked, connected, or automated systems
- a focus on systems solutions, such as low voltage DC lighting systems.

LED lighting technology is the key driving force behind new concepts, innovations, and applications.

LED lighting technology has accelerated the trends toward more energy efficient systems, digital controls for smart, networked, and connected lighting systems with built-in automation capabilities.

As LED lighting innovations continue to improve, there are increasing pressures to reduce cost, including total life-cycle costs (recurring and non-recurring costs) which include:

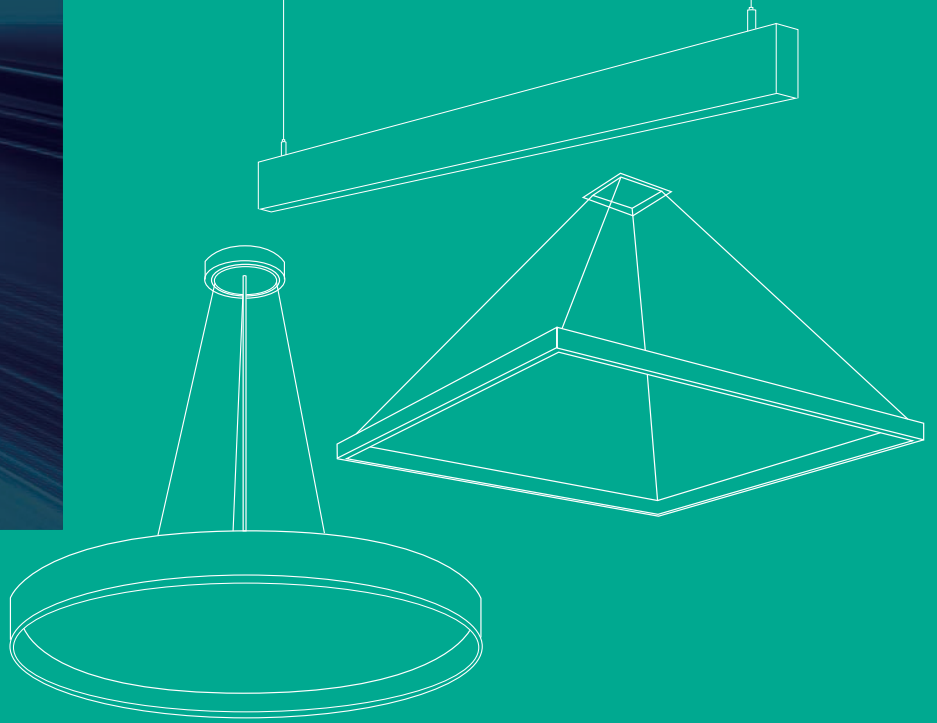
- initial purchase price
- installation costs (field or factory installation)
- operating costs
- maintenance costs
- in some cases, replacement and disposal costs.

Luminaire manufactures and suppliers are searching for ways to reduce their emergency lighting factory or value-add costs and improve the effectiveness of their supply chain management objectives.

LED lighting has ushered in great opportunities for smaller luminaire designs and increased focus on architectural lighting for egress path lighting, offering new aesthetically pleasing designs and form-factors. These new luminaire designs present challenges for placement of the emergency lighting equipment. The result is an increased demand for smaller emergency lighting solutions.

LiFePO4 vs Ni-Cd

The demand for smaller emergency LED drivers is one key influencing factor causing the trend toward Lithium Iron Phosphate batteries (LiFePO4), which are now becoming more cost-competitive to Ni-Cd batteries. The LiFePO4 battery is a higher valued battery than the Ni-Cd battery. LiFePO4 batteries are the optimum choice for Emergency LED Drivers.



CENTERALIZED SOLUTIONS in Emergency Lighting

Some applications are considering a more centralized approach

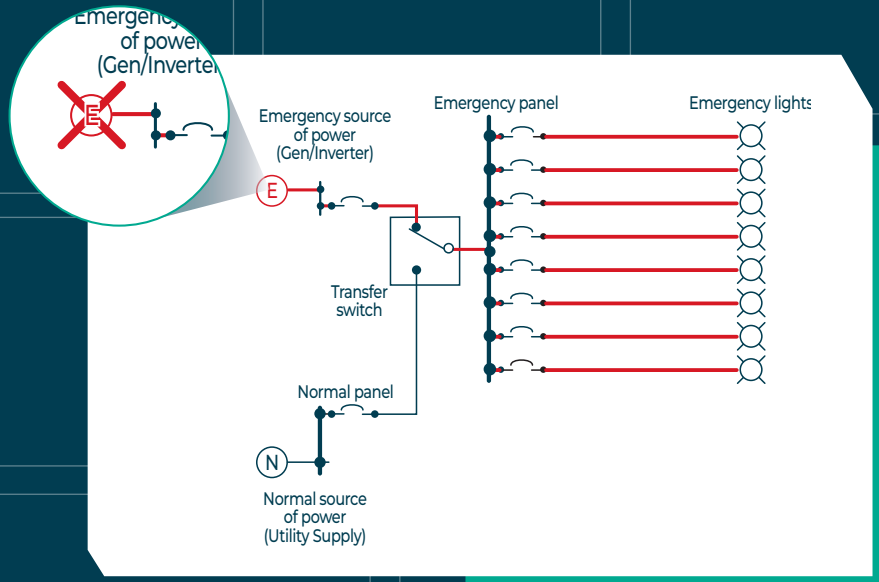
The trend toward LED luminaries is also influencing the emergency lighting solution decision to use a more centralized solution, such as using sine-wave inverters to eliminate the emergency LED driver altogether.

CENTERALIZED SOLUTIONS in Emergency Lighting

As mentioned earlier, there is a trend toward a more centralized solution using sine-wave inverters as the remote emergency source of power, as opposed to a decentralized solution using self-contained battery powered-emergency LED drivers.

There are several factors that influence the decision between centralized versus decentralized source of power. Cost is the largest driving factor. Opportunities to re-visit the cost factor are best presented for new construction projects or “deep” renovation projects. As the number of emergency luminaries increase for a given facility, opportunities to reduce costs improve for the centralized solution. The trend is toward a more balanced approach, where there are multiple pseudo-centralized smaller inverters used as opposed to one large, centralized inverter.

The obvious **benefit of using a more centralized approach, or a pseudo-centralized approach, is that several LED luminaries can be operated in emergency-mode with one inverter**, provided that the inverter has the appropriate power capabilities and that the proper emergency lighting control devices are used. The high efficiency of LED luminaries has been an influencing factor in the use of remote inverters. Additionally, **remote inverters can be located in climate-controlled environments such as an IT room or a power distribution room**, which helps narrow the operating temperature range requirements for the inverter and its battery, which further reduces cost.



SPOF

A more centralized approach, however, increases the risk of a less reliable life-safety system. If the centralized inverter or generator fails, then the entire portion of the emergency lighting system dependent upon that centralized source of emergency power would fail. This is called a single point of failure (SPOF). SPOFs are undesirable in any system with a goal of achieving high reliability and high availability. This is one of many reasons why individual emergency LED drivers (emergency battery packs) are the preferred choice.

TECHNOLOGY AND INNOVATION
in Emergency Lighting

1 Technology and Innovation

LED technology has been the predominant driving force behind new developments in emergency lighting. Second to LED technology are developments made in LiFePO4 batteries, which enables increased power and smaller size.

Constant Power Emergency LED Drivers

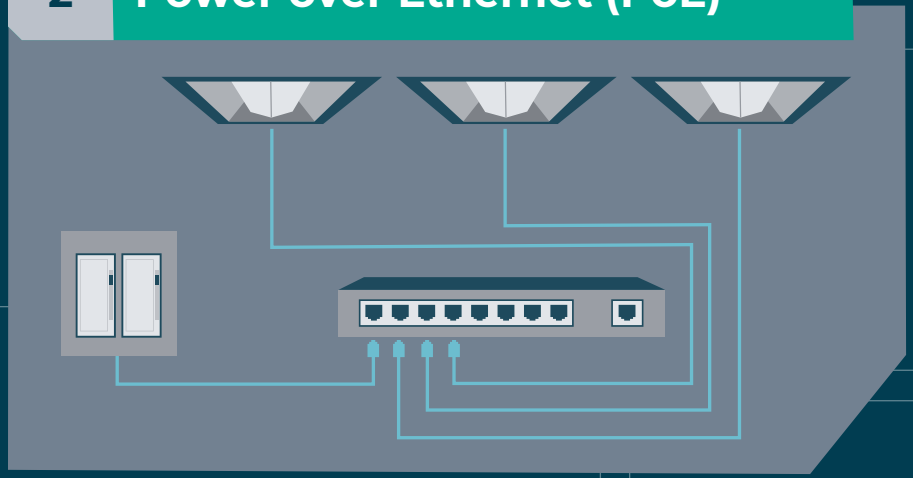
The constant power output of an emergency LED driver has created a significant impact. The constant power output Emergency LED driver delivers a constant (fixed) power to the LED array for all output voltages within its range, and for the total 90-minute runtime. Therefore, one constant power output emergency LED driver model may be used for many different models of LED fixtures, which helps OEMs stock fewer Emergency LED Driver SKUs. This reduces supply chain complexities, improves inventory efficiencies, and reduces operating costs. Another benefit of the constant power LED driver is that it optimally utilizes the battery's full capacity, thereby improving the overall emergency LED driver value.

Digital connected lighting

Large efforts have been devoted to developments in digital controls for lighting applications, including digital networking equipment, digital communications equipment, IoT, integrated sensors, and smart automation. However, apart from some specialized areas and a total systems approach, these developments have not yet produced significant widespread opportunities for indoor emergency egress lighting solutions. Some obstacles include cost, the lack of standardization, and lack of regulations. Building and product safety regulators are faced with growing concerns with risks of exposing life safety equipment to security issues and cyber threats.

TECHNOLOGY AND INNOVATION in Emergency Lighting

2 Power over Ethernet (PoE)



One significant innovation has been the developments made in Power over Ethernet (PoE) emergency lighting. Developments in the PoE standard, IEEE 802.3 (af, at, bt), and developments made in UL 2108 have contributed to advancements in PoE lighting, which have contributed to an increasing need for PoE emergency lighting.

3 DALI Technology

Another significant digital networking and controls technology is DALI technology. The DALI-2 protocol now incorporates provisions for emergency lighting. **DALI technology is more prevalent in Europe**; however, it is readily adaptable to other regions such as North America, therefore it is a technology to watch.

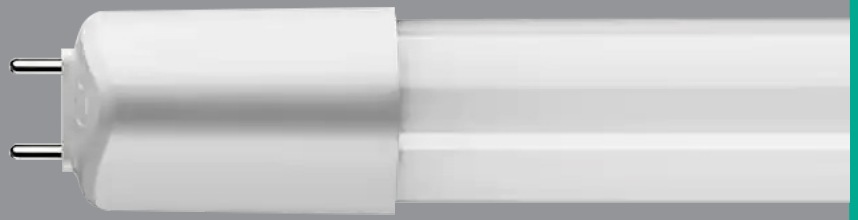
TECHNOLOGY AND INNOVATION in Emergency Lighting

Integration technology continues to advance in almost every industry. Integrating the power conversion electronics within LED modules has led to the development of integrated tubular LED lamps (TLEDs). This is primarily a retrofit product, however there are emergency lighting needs arising from retrofitting with TLEDs.

Type B TLEDs have all of the power conversion electronics integrated within the LED lamp so that it connects directly to the AC line or power source. In addition to TLEDs, there are other commercial integrated LED modules now with improved efficiency.

4 10 W Constant Power Emergency Lighting Power Supply for Type B TLED Tubes

5 Tubular LED Lamps (TLEDs)



One emergency lighting solution for these integrated LED light sources is an inverter. This is one application for micro inverters. Typically, the power levels are 5 to 60 Watts, and are used to operate one, two, or three fixtures that use TLEDs or other highly integrated LED modules. Micro inverters are uniquely versatile and equipped with high-temperature batteries so that they can be mounted in plenum spaces adjacent to or nearby the luminaire. Another emerging emergency lighting solution is an emergency lighting high-voltage DC power supply. These DC power supplies offer a viable solution for TLEDs where the TLEDs are compliant with regulations and compatible with the DC power supplies.

AS A FORERUNNER IN LED INNOVATION

ACE LEDS can keep you on the razor's edge of industry trends and innovative solutions.

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