EVERYTHING YOU NEED TO KNOW ABOUT EXIT SIGNS

Everything Building Managers, Facility Engineers, Energy Specifiers and Electricians need to know about EXIT signs, but didn't know to ask.

LEDs IN EXIT SIGNS: DRAWBACKS AND MISCONCEPTIONS

LEDs have become an increasingly popular means of illumination for exit signs due to their dramatic operating cost savings over the predominant incandescent lamp. The lower wattage and longer life of LEDs can reduce the operating costs of an exit sign from an average of $50 to $5 annually. In spite of these benefits, the biggest drawback is that LED exit signs are very dim. An exit sign of reduced visibility increases the chance that people might not safely find their way out of a building in an emergency. Specifiers, installers and end-users may have been unwittingly trading lower operating costs for an increase in potential liability associated with safe wayfinding in emergencies.

In addition to the risks associated with the initial dimness, manufacturers of LED exit signs and retrofit kits have glaringly neglected to inform their customers that as a light source, the light output of LEDs diminishes over time. Moreover, LEDs dim at different rates depending on the which LED technology is used and how they are operated. To make matters worse, many manufacturers further mislead customers by claiming 80-100 year lifetimes and offer 25 year warranties. What they neglect to mention in the fine print was that while LEDs may continue to emit some light for many years, most will become ineffective as an exit sign light source in just a few years. These tactics reinforce the misconception that LEDs will continue to shine as brightly over their installed life as when they were first installed.

STANDARDS LAG TECHNOLOGY

Underwriters Laboratories (UL) sets the minimum visibility, electrical and fire safety standards for emergency lighting. This standard is known as UL 924, Eighth Edition. The brightness of the exit sign letters and the uniformity of illumination are the key determinants of visibility. The latest revision to this standard became effective in August, 1997. This is the first time that UL began to harmonize the old standard based on the relatively stable light output of incandescent and fluorescent lamps and the newer lamp technologies that diminish in brightness over time. In this latest revision, UL created a more stringent standard for retrofit kits, while maintaining the previous standards for new exit signs. UL's emphasis on retrofit kits was due to the proliferation of retrofit kits that were being installed in signs for which they were not tested or approved.

UL 924 & EXIT SIGN RETROFIT KITS

To ensure that exit sign visibility was not compromised with inferior or mis-specified retrofit kits, UL924 raised the uniformity and brightness requirements above those required for new exit signs. In effect, these changes make retrofit kits safer than new exit signs because the visibility requirements are higher.

UL realized that some retrofit kits are made for specific exit signs, while others are intended to retrofit all exit signs. Those intended for specific exit signs have lower brightness standards than those intended for general usage. Thus, UL created two categories of standards for retrofit kits. Exit Fixture General (EFG) was created for general usage and Exit Fixture Specific (EFS) for use in specific exit signs.

Glossary

Following are explanations of various terms used to evaluate exit sign lighting:

20 Point Visibility Test: Brightness is measured at 20 different predetermined ½" points on the letters EXIT.

Uniformity Ratio (UR): The UR is the ratio of the brightest and the dimmest of the 20 test points in the visibility test. For example: if the brightest point is 138.2 FL and the dimmest point is 18.7 FL, the UR would be 138.2:18.7, or 7.39:1 FL.

Foot Lambert (FL): This is a measurement of brightness of a particular point used to measure exit signs.

CD/M2: Candela/square meter is also used to communicate brightness in exit signs. Although it is not an apples-to-apples comparison, the conversion is 1FL = 3.43 cd/m2.

Directional Indicator Brightness Requirements: The requirements for the directional indicators is the same for both retrofit kits and with new exit signs at 2.5 FL. Brightness is measured at 5 points on each of the directional indicators.

Stencil EXIT signs: Stencil signs have solid colored green or red diffuser panels behind opaque sections with the letters **EXIT** cut out. White light sources can be used for either color, or discrete colored light sources can be used for the respective diffuser panel.

Panel (Open-faced) EXIT signs: White translucent backgrounds, normally a frosted glass panel, with either green or red translucent letters. White light is required for these signs.

Edge-Lit EXIT signs: Edge-lit exit signs are clear acrylic panels with either green or red silk screened letters. Illumination is directed from the top surface down the acrylic. White light illuminates both colors, or discrete color light sources can illuminate the respective EXIT letter color.

Underwriters Laboratories (UL)-Listing or Classification: Only new exit signs are listed. Retrofit kits are classified. The UL label will designate if the product is listed or classified. Any retrofit kit with a listing mark is either counterfeit or part of old inventory where UL approval has now expired.

EXIT FIXTURE GENERAL (EFG)

This retrofit kit standard has the highest brightness and UR requirements of any new exit sign or retrofit kit, and is therefore the safest of all UL exit sign standards.

Retrofit kits for the EFG category are tested in eight exit signs that represent all the sizes and dimensions of exit signs in the United States. The interiors of these exit signs are painted flat black to eliminate the use of internal reflections in the illumination of the exit signs. The minimum brightness required in this category is 6 FL (20.58 cd/m2) at each of the 20 test points. The UR requirement for EFG is 20:1 or less. This category also delineates between the performance of green and red Stencil exit signs. Approval is given for either red, green or both colors.
Currently, only one LED retrofit kit manufacturer has passed the new UL924 requirements for red stencil signs. Re-Energy's T-1™ retrofit kit is the second, and it works for both red and green. With its white light, it also works to illuminate green and red panel signs, as well. This category only applies to Stencil exit signs.

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EXIT FIXTURE SPECIFIC (EFS)

The EFS category is for retrofit kits that are designed for use in specific exit sign models. These are often upgrade kits made by a manufacturer for one of their older incandescent models. The minimum brightness requirements for this category of retrofit kit is 4.0 FL (13.68 cd/m2). The UR for this category is also 20:1. The model numbers of each exit sign the kit was approved for must be listed in the product literature. For example, Conservation Alliance's new retrofit kit is limited to use in Lithonia's model # MSW3R. Installation of an EFS kit into an unapproved sign invalidates its UL classification and opens up potential liability issues during emergencies. Many people do not know of the distinction between EFG and EFS and unknowingly install EFS kits in signs in for which they were not approved.

PANEL AND EDGE LIT EXIT SIGN RETROFIT KITS

UL has not developed standards for these types of exit sign because LEDs, nor any other technology has been previously adapted into retrofit kits for these sign types. Based on the extended capabilities of Re-Energy's technology and products, we are working with UL to create retrofit kit standards for both Panel and Edge Lit exit signs.

NEW EXIT SIGNS

New exit signs require a minimum of 2.5 FL (8.57 cd/m2). The UR requirements for new exit signs are only 50:1. Between the brightness levels and the UR, new exit signs requirements are only 40% the levels of an EFG exit sign retrofit kit.

BRIGHTNESS AND LAMP LIFE IN NEW LAMP TECHNOLOGIES

Newer lamp technologies such as LEDs, electroluminescent and the T-1 rate lamp life differently than standard fluorescent and incandescent lamps. The older technologies rate lamp life as the point when half of a grouping of lamps burn out. Conversely, the newer lamp technologies rate lamp life as the point when light output depreciates to half of their initial brightness. These lamps continue to emit light for a long time. They do not have filaments to burn out. Rather, their light output depreciates over time.

LAMP LIFE AND EFFECTIVENESS IN EXIT SIGNS

Lamp life and their effectiveness in exit signs are usually not similar. Although LEDs may continue to emit some light after 100,000 hours (11.42 years), the brightness of the exit sign at that time may be next to zero. As the 2.5 FL minimum brightness for new signs is the lowest required by UL 924, many manufacturers of new signs only use enough LEDs to slightly exceed this minimum requirement. Brightness studies performed by Rensallear Polytechnic Institute demonstrate that there is no new LED exit sign that exceeds 8 FL. The average brightness of the most popular exit signs is only 5.3 FL.