Exit Signs

Exit Signs in a few words...

Electrical exit signs (connected to a source of power) differ from battery units as they shall be illuminated at all times during normal AC operation, and not only upon loss of AC power. This has a direct impact on the admissible energy consumption referenced in government regulations (National Resources Canada NRCan, CSA C-860), which is a maximum of 5 watts per legend. A legend is defined as a single word, either “SORTIE” or “EXIT”. There are also bilingual exit signs with: “SORTIE EXIT” or “EXIT SORTIE”, quite common in applications such as airports or federal buildings. A bilingual exit sign is acceptable up to a maximum of 10 watts per face. The legend must also meet visibility standards including: lettering dimensions (minimum 150mm height, etc.), average brightness, uniformity, and lettering/background contrast ratio. The most popular light source is based upon solid state LED technology, which is capable of meeting both lumen output and energy efficiency requirements. Two different methods are used to illuminate the legend. The most common is found in back-lit signs, which use a light source located behind the legend, illuminated through a red diffuser panel. The other method uses a clear, white or mirrored plastic (acrylic) face panel - on which the legend is etched or silkscreened. The light source is installed in the top portion of the panel. Light is transmitted from the top edge of the panel, which is where the “edge-lit“ exit sign gets its name from. In general, back-lit exit signs are more economical and provide more uniform illumination of the legend. On the other hand, acrylic edge-lit exit signs are more high-end, elegant fixtures.

EDGE-LIT EXIT SIGNS

Three types of fixtures are available for emergency lighting applications.

The first type is the self-powered exit sign, with rechargeable battery for emergency mode operation.

Next is the remote exit sign, or AC/DC exit sign: in addition to normal AC power supply, it includes DC input (6Vdc, 12Vdc, etc.) for remote power supply from a separate battery backup. Installation of such exit signs requires DC wiring between both fixtures.

And finally, the AC only exit signs, for applications where emergency power is supplied from an remote AC Central System.

In addition to electrical exit signs, there are power free, self-luminous fixtures, which incorporate as light source radioactive materials such as tritium gas. Their brightness level is very low, that is 2-3% the minimum level required for an electrical sign. However, they are safer and easier to install in hazardous/explosion-proof environments such as coal mines, natural gas installations, etc. As these signs are not electrical signs, they are not subject to CSA standards such as C860-07.

OTHER EQUIPMENT – COMBINATION UNITS

A well established fixture type, the combined unit or “combo“, includes both a small battery unit and an AC/DC exit sign. An economical and easy to install alternative (installs to a single electrical box), the combo offers both an exit sign indicating the direction of egress as well as emergency lighting on the path of egress.

Several years have passed since the Canadian Energy Efficiency Regulation applicable to Internally Lighted Exit Signs came into effect on November 1, 2004.

The Regulations, published by the Ministry of Natural Resources of Canada (NRCan) Office of Energy Efficiency, limit energy consumption and also address the visibility performance of exit signs. Technical criteria are directly referenced to Canadian Standards Association standard number CAN/CSA C860-01 standard in effect in Canada. In short, the actual power consumed by an exit sign shall not be greater than 5 watts per legend, defined as the single word displayed: specifically “SORTIE” or “EXIT”. For double face exit signs, the acceptable power consumption is doubled or not greater than 10 watts, and the same rule applies to a bilingual exit sign with the words “SORTIE EXIT” or “EXIT SORTIE“. The visibility criteria include minimum dimensions of the legend, ie: letter height, width and stroke (respectively, 150mm, 50mm and 19mm) and average brightness and uniformity levels. Following these new criteria, manufacturing of exit signs using incandescent light sources was practically abandoned and replaced by a new generation of exit signs based on light emitting diode (LED) technology.

EXPLOSION-PROOF ENVIRONMENT EXIT SIGNS

Does CSA C860 standard apply to all exit signs, and in all applications?

Actually, there are no exceptions: compliance is required in all cases, even though the solution may be hard to find. For example, equipment for use in hazardous locations, such as areas classified under Class I, Division 1 (or Class I, Zones 0 and 1), defined as locations where flammable gases, vapors or liquids are present frequently or under normal operating conditions.

Required luminaries are designed specifically to meet CSA standards for explosion-proof equipment. The heavy-duty luminaries are rated for lamp wattages ranging from 50-250W. Constructed of die-cast aluminum, the units feature a resistant prismatic glass globe providing hemispherical light distribution. Until now, because of these characteristics, traditional exit signs were using 15-25W incandescent lamps in order to provide sufficient illumination of the legend. Conversely, a LED exit sign is typically rectangular and relatively thin (4-8cm). The light source is axial, LEDs forming a line inside the exit sign. Illumination of the legend is indirect and produced through multiple reflections.

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So, how is it possible to develop a LED exit sign that meets CSA-C860 using a bulky heavy-duty luminary dedicated to hazardous locations Class I, Division 1?

Thomas & Betts R&D group has found a solution and developed a special LED lamp series, easy to install in the lamp base of explosion-proof type luminaries. This lamp includes a few dozens of high performance AlInGaP LEDs, configured in a unique pattern: horizontally, distribution is radial, at 360 degrees, while vertically, light is focused on the sign legend. This innovative design allows meeting the visibility criteria on standard size legends (EXIT 28cm x 15cm, SORTIE 42cm x 15cm), while limiting power consumption to between 3 to 4.7 watts per double face sign.

LED lamps are dedicated to various voltage ratings: 6V, 12V, 24V or 120V and operate on DC and AC, supplying power to the exit sign from emergency lighting unit equipment or central AC or DC systems. Lamps are listed/certified CSA C-US to CSA T.I.L. B-69 and UL1993 standards for LED technology based lamps or lamps with integral ballast. This further reinforces the assurance of performance and safety of the exit signs using these lamps.

The new exit sign series of Thomas & Betts includes fixtures designed for installation in all hazardous location classifications: Class I Divisions 1 and 2, Groups A, B, C and D; Class II Divisions 1 and 2, Groups E, F, and G; Class III Divisions 1 and 2.

Specifiers specialized in industrial lighting are now assured they can specify certified hazardous location equipment also approved and compliant to CSA C-860 standards.