Exit Signs

ENERGY SAVING - FACT SHEET

Background

Illuminated exit signs are required to mark exit pathways in all non residential buildings. Exit signs are, in effect, lighting fixtures that are on all the time. When all of the other lighting systems in a building fail, exit signs must remain in operation to ensure occupant safety.

The codes and standards governing the configuration of the sign, its brightness, and where and how it is placed in the building are complex and vary by jurisdiction.

In the past, incandescent lamps were use for exit signage. Most exit signs currently in place are probably lit by incandescent. Incandescent sources also have a disadvantage beyond their high power consumption in that they can fail when subject to shock and vibration, such as when a door is slammed.

New Technologies

Newer technology exit signs can significantly conserve energy, reduce labor demand, and save money. All exit signs manufactured on or after January 1, 2006 must have an input power demand of 5 watts or less per face.

1. Light Emitting Diode (LED) exit signs are presently the preferred choice for both new exit signs and retrofitting existing exit signs. LED's, which are small "chunks" of aluminum-indium-gallium-phosphide (for green) and Indium-gallium-nitride (for red and amber), can provide significant brightness in low wattage clusters when attached to a power supply. While LED exit signs have an extremely long life (10+ years), LED illumination does depreciate over time. Signs with letter strokes comprised of LED's may be harder to see from an oblique angle. LED technology is also available in direct retrofit kits for use in existing incandescent signs.

2. Compact fluorescent lamps are narrow diameter bulbs with "rare earth tri-phosphors" that use electronic ballasts to yield higher lamp efficacy and better color. Fluorescent lamps consume approximately one fourth less power than incandescent, last longer, and won't fail when a door slams. Fluorescent sources are ideal for use in the "stencil" type of exit sign which some experts claim have the best visibility.

3. Electro-luminescent (EL) is a very low wattage lamp that can make up the entire sign face with its lettering and symbols.

4. Tritium self-luminous exit signs use the radioactive decay of tritium gas inside a borosilicate glass tube with a phosphor coating. Since these signs are expensive and have disposal issues, they are used only where the physical application of a power supply system is difficult.

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TURNING PENNIES INTO DOLLARS THROUGH ENERGY EFFICIENCY 4

A magical thing happens when you implement low-to-no cost energy efficiency measures: small savings from monthly energy bills start turning into big savings.

For example, replacing older inefficient exit signs with LEDs typically costs between $20 to $40 to purchase and install but can save up to $37 a year in energy costs and $26 a year in labor costs, paying for the initial investment in the first or second year of installation. Although first year savings in energy might only be a few dollars, once the energy savings pays back the initial investment, guaranteed savings will grow over time by as much as $500 per sign over the life of the LED exit sign. In a building with 10 exit signs, that's a cost savings of $5,000 that, once the signs are installed, you don't have to do any more work to enjoy. And with energy prices trending upwards, savings will be even greater in the future. For more information on how to save energy and dollars contact, Tom Rhodes at tom.rhodes@ncdenr.gov or Alex Naar at (252) 737-1346 or anaar@nccommerce.com

Understanding for Informed Choices

Many newer exit sign options are promoted with lamps or self-luminous materials that have surprisingly long lives. The key, however, is not light source life but the time interval to the point where the light output depreciation renders the brightness of the device below the minimum allowed by code. Check the fine print in warranties before making a selection.

Wattage ratings are based on normal and emergency (higher brightness) operation. Sign wattage varies widely within each group of light source types. "Energy Star" ratings assume a maximum of 5 watts per sign face.

Conversion kits are an alternative to purchasing a new exit sign. However, they must meet code and pass inspection.

LED (and incandescent) lamps may be disposed of as ordinary solid waste. Compact fluorescent lamps contain mercury and should be recycled through a licensed hazardous waste handler. Many of the rechargeable back-up batteries in exit signs should also be managed as hazardous waste and recycled.

Other Considerations

Exit signs are part of the building emergency system. As such, they must operate during a loss of power. Batteries are typically used as a backup power source. The batteries are recharged during the time that the building's general lighting is turned on. Very low wattage lighting like LED's are helpful in prolonging battery life.
A record of all maintenance and inspections of signs must be kept.

Signs should be inspected at least once each month and the emergency and battery backup systems exercised. A well designed exit sign will have a built in testing mechanism. An appropriate group cleaning and group lamp replacement plan is important. Longer life lamps, such as LEDs, can help reduce the risk of inspection violations due to frequent failures of incandescent lamps.

CALCULATE YOUR POTENTIAL SAVINGS

New or existing Sign Type	Wattage Range per Face	Default Average Watts (a) per Face		Default Annual Operating Hours		Quantity Exit Sign Faces		/1000	Annual kiillowatt Hours		Your Power Rate (b)		Your Annual energy $
Incandescent	10 to 40	25	x	8750	x		/1000			x		=	
Fluorescent	9 to 25	17	x	8750	x		/1000			x		=	
Electroluminescent	0.8 to 1.0	0.9	x	8750	x		/1000			x		=	
LED	1.0 to 3.0	3	x	8750	x		/1000			x		=	
Tritium	0	0	x	8750	x	0	/1000		0	x	0	=	0

Note: use the default for existing and proposed signs unless actual watts are known

Proposed Replacement Sign:

(1) Cost of Sign $ = _____ (2)Installation $ = _____ est. 0.5 hours/sign

(3) Annual Energy Saving $ = _____ Simple Payback (1+2)/3 = _____ years

(a) use for estimating purposes unless actual watts are known, (b) Average electric rate in NC is $.0860/kWh

Payback Periods

Typical LED retrofit kits for incandescent exit lamps typically cost less than $40 and have a quick payback. Costs for new LED exit signs can be higher than for incandescent or fluorescent, but the payback periods for new LED applications are typically less than 2 years.

References

1. IESNA Handbook, Ninth Edition.
2. Energy Star Exit Signs
www.energystar.gov/index.cfm?c=exit_signs.pr_exit_signs
3. Lighting Research Center NLPIP on Exit Signs-1994,
www.lrc.rpi.edu/programs/NLPIP/PDF/VIEW/SRExit.pdf
4. VisitNC newslink January 27, 2010 issue, Article 14

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