

Exit Lighting – High Efficiency



Technology Group: Lighting

Description: Exit signs are found in all federal facilities. Because they are required to operate continuously, the various exit sign lighting technologies have dramatic differences in terms of energy consumption as well as maintenance and replacement costs. The key to wise selection is to balance purchase cost, operation cost, and performance. The current lighting options for exit signs are:

Incandescent: Most exit signs use two tube-shaped incandescent lamps. Energy consumption is the highest of all the exit lighting options, and lamp life is the lowest unless the lamp is operated with less-than-rated voltage (e.g., supplying a 240-watt lamp with 120 volts). However, for many years this was the only option (and still is the least expensive first-cost option), so it continues to be popular, especially for decision-makers who won't be paying the electric bills. Some state energy codes no longer allow this type.

Light Ropes: Light ropes use a number of small incandescent lamps within a clear, flexible plastic tube, somewhat similar in appearance to a small string of clear miniature Christmas lights. Light ropes have a considerably longer expected life and better energy efficiency than traditional incandescent lamps.

Fluorescent: Many exit signs now use a small fluorescent lamp inserted into a socket.

Cold Cathode Tube: A newcomer to the exit sign lighting arena, this is the same technology that is used to light laptop computer screens. They perform well and are quite bright, and their longer life helps to make up for their higher cost.

LED: LED lights come in red, green, and clear models, but red is the most common. Light-emitting diode (LED) lighting is rapidly becoming the standard in exit sign lighting due to their energy efficiency and long life, but their dimmer light can be a concern in some applications.

Electroluminescent: Light is produced by phosphors between foil and a clear electrode. This type of lighting is quite efficient and expected life is long, but because it is expensive compared to LED models, it is not very popular.

Applications: Exit signs are required by law in all commercial and institutional buildings and must operate continuously. There are currently over 100 million exit signs in use throughout the United States. These signs consume 22-35 billion kilowatt-hours of electricity annually. The majority of these signs use incandescent lamps for illumination, so significant savings can be achieved by taking advantage of a more energy-efficient lighting technology.

In most applications, it is more economical to install a retrofit kit in place of an existing incandescent lamp rather than replacing it with a new model. In deciding whether to replace an old exit sign or upgrade it with a retrofit kit, compare the life cycle cost, not just the initial cost. Consider the age of the existing fixture, installation cost, maintenance cost, energy costs, and the application. Not all retrofit kits will fit all exit signs.

Consider purchasing an exit light that has earned the Energy Star label. Energy Star compliant exit signs guarantee that the sign will use less than 5 watts per face, have a five-year warranty from the manufacturer, and exceed the National Fire Protection Association (NFPA) Life Safety Code 101 guidelines.

Performance/Costs: The table below compares costs of several exit lighting options.

Cost of New Exit Lighting Options						
Typical Lamp Characteristics				Annual Energy Cost	Annual Maintenance Cost	Total Annual Operating Costs
Type	Wattage	Life (yrs)	Initial Cost			
Incandescent	40	0.5	\$6	\$25	\$10	\$42
Light Rope	8	3.5	\$9	\$5	\$2	\$10
Fluorescent	11	1.1	\$22	\$7	\$5	\$33
Cold Cathode	5	10.0	\$55	\$3	\$1	\$10
LED	5	20.0	\$22	\$3	\$0	\$5
Electroluminescent	1	10.0	\$190	\$1	\$1	\$20

Note: This table assumes 7.0 cents per kWh. \$20/hour maintenance labor. and total includes replacement.

Availability: All of these lighting technologies are widely available from many manufacturers in both new lamps and in retrofit kits, and can be used in exit signs with one or two faces. Check the Energy Star website listed below for a list of models meeting Energy Star guidelines.

For Additional Information:

Energy Star Labeled Exit Signs

A complete listing of exit lights which meet the Energy Star rating of 5 watts or less.

<http://www.epa.gov/appdstar/exit/products.html>

Exit Signs, the Forgotten Retrofit

An EnviroSense Green Lights Update. *A nice primer on the economic savings offered by exit sign retrofits.*

<http://es.epa.gov/partners/green/glights3.html#7>

Lighting Resource Center: Specifier Reports – Exit Signs

Report compares 57 different exit signs and sign retrofit kits for luminance, luminance contrast, readability, and visibility in smoke.

<http://www.lrc.rpi.edu/NLPIP/Online/SR/SRExit.pdf>

Product Efficiency Recommendations

FEMP site with buyer tips, cost-effectiveness example, where to find products, complying models

<http://www.eren.doe.gov/femp/procurement/begin.html>

Credits: Exit sign graphic courtesy of the National Renewable Energy Laboratory.

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