

Exit Signs

UTILITY SAVINGS INITIATIVE (USI)-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 used 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.

1) Light Emitting Diode (LED) exit signs are presently the preferred choice for both new exit signs and retrofitting existing exit signs. While LED exit signs have an extremely long life (10+ years), LED illumination does depreciate over time. 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.

NCDOA Upgrades to LED Exit Signs

In 1995 the Facility Management Division of the NC Department of Administration launched a program to replace incandescent exit signs with Light Emitting Diode (LED) exit signs. The project, originating from an employee suggestion program, involved the replacement of 1734 exit signs in over 5 million square feet of state-owned facilities in downtown Raleigh, NC. The \$137,000 project resulted in less than a two year payback. The majority of the cost savings, more than \$80,000/year, comes from avoided labor savings of frequent change-outs of incandescent lamps. Energy cost savings are estimated at \$48,600 per year with a total reduction of 607,000 kWh per year in electrical consumption savings. Total annual cost savings to the state is estimated at \$166,600. After a few initial unit failures, the LED exit signs continue to perform well, reducing labor demand and saving energy and lamp replacement costs. For more information on the project, contact Sid Chambers, Division of Facility Management, NCDOA, (919) 733-3855 or email: sid.chambers@ncmail.net

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.

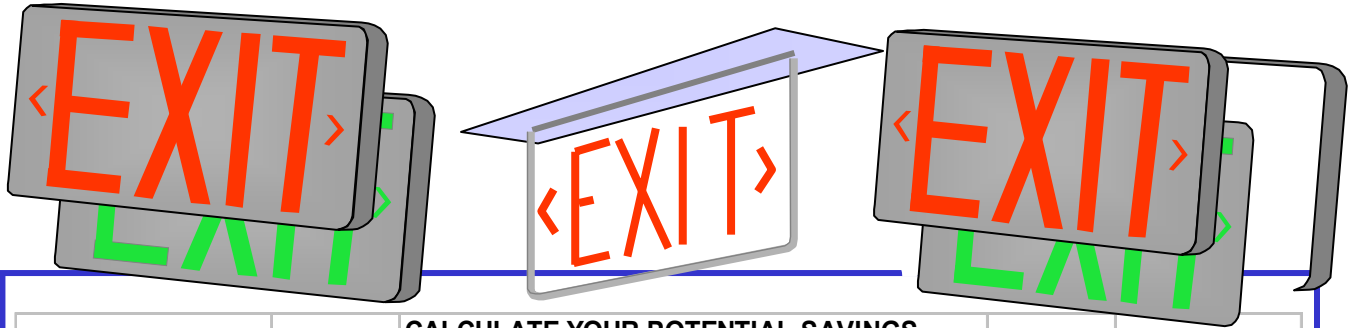
Conversion kits are an alternative to purchasing a new exit sign. However, they must meet code and pass inspection.

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.

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									
	Wattage	Default	Default						
New or existing	Range	Average	Annual	Quantity		Annual	Your	Your	
Sign Type	per Face	Watts (a)	Operating	Exit Sign		killowatt	Power	Annual	
		per Face	Hours	Faces		Hours	Rate (b)	energy \$	
Incandescent	10 to 40	25	<input checked="" type="checkbox"/> 8750	<input checked="" type="checkbox"/>	/1000	<input type="text"/>	<input checked="" type="checkbox"/>	=	<input type="text"/>
Fluorescent	9 to 25	17	<input checked="" type="checkbox"/> 8750	<input checked="" type="checkbox"/>	/1000	<input type="text"/>	<input checked="" type="checkbox"/>	=	<input type="text"/>
Electroluminescent	0.8 to 1.0	0.9	<input checked="" type="checkbox"/> 8750	<input checked="" type="checkbox"/>	/1000	<input type="text"/>	<input checked="" type="checkbox"/>	=	<input type="text"/>
LED	1.0 to 3.0	3	<input checked="" type="checkbox"/> 8750	<input checked="" type="checkbox"/>	/1000	<input type="text"/>	<input checked="" type="checkbox"/>	=	<input type="text"/>
Tritium	0	0	<input checked="" type="checkbox"/> 8750	<input checked="" type="checkbox"/>	0	0	<input checked="" type="checkbox"/>	=	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 \$.064/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: www.energystar.gov - Products - Exit Signs;
3. Lighting Research Center NLRIP on Exit Signs-1994, www.lrc.rpi.edu/programs/lightingTransformation/
4. Purchasing for Pollution Prevention, Environmentally Preferable LED Exit signs, INFORM, 2004, www.informinc.org/fact_p3exit_signs.php

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