

CFL Retrofits in Commercial Lighting

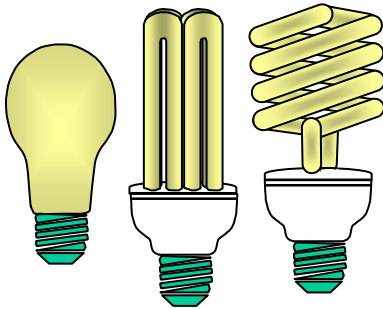
ENERGY SAVING – FACT SHEET

New Technology – Compact Fluorescent Lamps (CFL)

High efficiency screw-in compact fluorescent lamps are an important cost saving technology that can be retrofitted in a number of commercial lighting applications.

Fluorescent lamp technology made a big advancement when “rare earth” phosphors, introduced in the 1980s, made it possible to provide color effects with fluorescent lamps that are very close to those of incandescents.

New narrower lamp tube diameters and high frequency electronic control gear (“ballasts”) also increase efficacy, or lumens per watt. In addition, the ability to bend tubes into “compact” shapes and the small size of the ballast produce a lamp that takes up the same spatial volume as the incandescent lamp it replaces.



Compact fluorescent lamps (CFLs) typically have an efficacy in a range of 60-65 lumens per watt. This gives the consumer a chance to cut power use per lamp by two-thirds as compared to incandescent lamps.

A typical vendor’s catalog may have as many as 100 compact fluorescent lamp types.

Generally, half of these are engineered for dedicated “permanent” lamp holders and have ballasts integral to the lighting fixture. The rest are provided with a ballast that is discarded when the lamp fails, but can be screwed into a conventional socket like an incandescent. Certain of the permanent ballast CFL lamps can be plugged into ballast modules that are configured for “screw-in” sockets, and thus the ballast remains after the lamp fails.

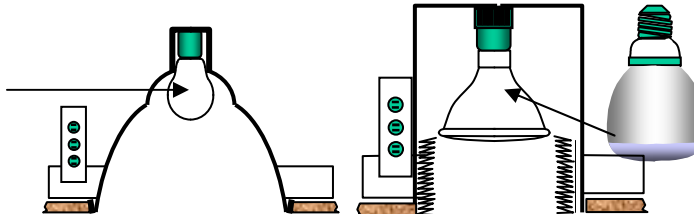
Like any other electronic ballast, those used with CFLs can produce “harmonic noise” on a power supply. This could affect other electronic equipment. In those situations, it is important to choose CFL modules that have low or acceptable total harmonic distortion (THD).

Not all CFL products can be dimmed or operated in 3-way sockets. Choose lamps that are rated for these kinds of operations. Thirty degrees Fahrenheit is the lowest practical ambient temperature for a CFL unless it is protected by a lighting fixture enclosure. Even then, full light output won’t occur for several minutes.

While CFLs have been commonly used in a residential setting such as table lamps, they can conserve considerable energy in commercial applications such as down lights. The wide variety of styles, configurations, and wattages available can support many commercial retrofits.

Application Tips

Existing recessed incandescent down light designed for standard incandescent lamp.



Lighting: The Big Picture

Electric lighting accounts for 20 to 25 percent of all energy used in buildings and about 5 percent of all energy used in the U.S. In buildings lighting has a secondary impact on cooling and indirectly accounts for some portion of building heating requirements.

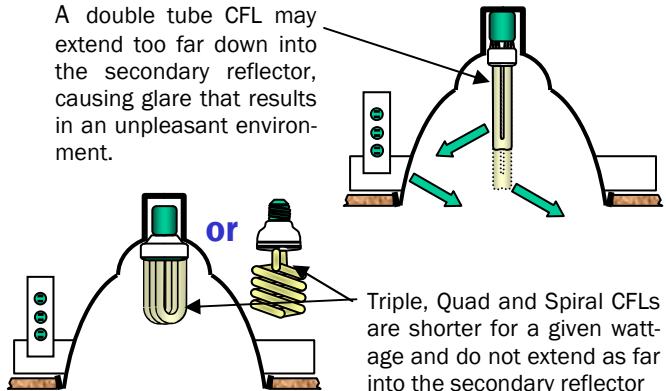
Incandescent Issues

Only 10 percent of the output of the typical incandescent lamp is visually useable energy. Most is radiant energy that directly produces a sensible heat gain in a building. Incandescent lamps last a short time compared with other types of lamps, such as CFLs. CFL’s last ten times as long as an ordinary incandescent.

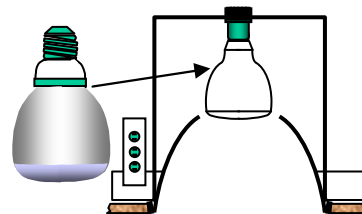
Trends

Screw-in compact fluorescent lamps are now available in most places where light bulbs are for sale. The range of choices for the consumer starts with low wattage decorative types suitable for use in chandeliers and other decorative fixtures and extends to reflectorized types that can direct light toward a specific target or area.

A double tube CFL may extend too far down into the secondary reflector, causing glare that results in an unpleasant environment.



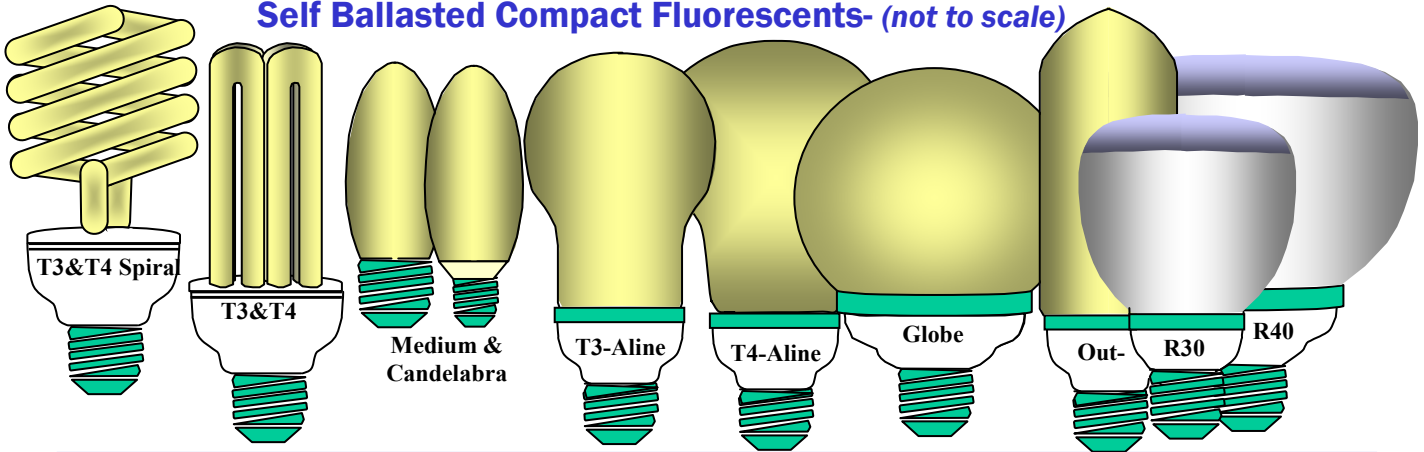
Triple, Quad and Spiral CFLs are shorter for a given wattage and do not extend as far into the secondary reflector



Recessed or “can type” down light with Reflector, “R” or Ellipsoidal Reflector, “ER” Incandescents; replace with R-30 or R-40 CFLs, depending on wattage

Recessed or “can type” down light with “stacked” or “grooved” baffles. This fixture is originally designed for Parabolic Aluminized Reflector, “PAR” lamps which have narrower light distributions than “R” lamps – expect less light with an “R” CFL conversion.

Self Ballasted Compact Fluorescents- (not to scale)



Calculate Your Potential Savings

Conversions for the Same Light Output				Your			NC	Number		Watts		Estimated
Application Type	Inc. Watts	CFL Watts	CFL Type	Watts Saved	Operating Hours/yr	Typical Power \$/kwh	0.086	of Lamps	to killowatts Constant	= \$	Annual Savings	
Decorative	15	5	Candle	10	x		x		x	0.001	= \$	
Decorative	40	9	Candle	31	x		x		x	0.001	= \$	
Standard "A"	40	12	Note a)	28	x		x		x	0.001	= \$	
Standard "A"	40	10	T3-Spiral	30	x		x		x	0.001	= \$	
Indoor Flood	50R20	11	R20	39	x		x		x	0.001	= \$	
Indoor Flood	50R30	15	R30	35	x		x		x	0.001	= \$	
Standard "A"	60	15	Note b)	45	x		x		x	0.001	= \$	
G30 White	60	15	Globe	45	x		x		x	0.001	= \$	
Indoor Flood	65R30	15	R30*	50	x		x		x	0.001	= \$	
Standard "A"	75	20	Note c)	55	x		x		x	0.001	= \$	
Standard "A"	75	22	"2-D"	53	x		x		x	0.001	= \$	
Indoor Flood	90	23	R40	67	x		x		x	0.001	= \$	
Indoor Flood	90	26	R40*	64	x		x		x	0.001	= \$	
Standard "A"	100	26	T3-Spiral	74	x		x		x	0.001	= \$	
Standard "A"	100	28	T4-Triple	72	x		x		x	0.001	= \$	
Std. "A" 3-way	100*	29*	T4-Quad	71	x		x		x	0.001	= \$	
Standard "A"	100	29	T4-Quad*	71	x		x		x	0.001	= \$	
Std. "A", "PS"	150	42	T4-Spiral	108	x		x		x	0.001	= \$	
Std. "A", "PS"	200	55	Spiral	145	x		x		x	0.001	= \$	
Standard "PS"	300	65	Spiral	235	x		x		x	0.001	= \$	

* Dimmable, a) Either T-3Aline or T-3 Triple, b) T3,T4 Triple or T3 Spiral, c) T-4 Aline, T-3 Triple, T3-Spiral

Payback Periods

Typical simple paybacks for CFL upgrades in commerical settings range from 0.5 - 3.3 years.

References & Resources

- General Electric Lighting, www.ge.com/lighting
- Osram Sylvania, www.sylvania.com
- Phillips Lighting, www.advance.phillips.com/default.aspx

Revised by Waste Reduction Partners— 03/2010



Sponsored by the State Energy Office, N.C. Department of Administration and the U.S. Department of Energy, with State Energy Program funds, in cooperation with the Land-of-Sky Regional Council (Waste Reduction Partners) and the NCDPPEA. However, any opinion, findings, conclusions, or recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of either the N.C. Department of Administration or the U.S. Department of Energy.