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The GREEN ISSUE





Effectively DIMMING CFLs and LEDs

A look at common
issues with dimming
these bulbs –
and solutions for
dimming them well

By Matt Donati

You're probably aware of the energy-saving benefits afforded by screw-in compact fluorescent lamps (CFLs) and screw-in light emitting diode bulbs (LEDs), making them a good alternative to incandescent and halogen light sources. With legislation in place to begin phasing out certain incandescents in California in 2011 and then nationwide in 2012, the market share of CFLs and LEDs will continue to grow (see "Billions of Lamps Sold").

While homeowners embracing the change to CFLs and LEDs may notice a difference in their utility bill, they may also notice that dimming these bulbs can be difficult. Being able to dim any bulb, though, adds additional energy savings, while at the same time improving ambiance in a room.

So here's a look at the challenges that come with dimming CFLs and LEDs – as well as some cost-effective solutions.

Challenges of Dimming CFLs and LEDs with Standard Dimmers

Although energy-saving CFLs have been in the marketplace for many years, historically they haven't been dimmable. Recently, a broad range of dimmable CFL bulbs has become available. Dimmable versions of LEDs are also becoming available.

However, these dimmable bulbs, especially CFLs, have traditionally presented problems when used on standard incandescent dimmers. Common issues include:

Reduced dimming range: Incandescent/halogen bulbs will typically dim to below one percent measured light, which is a much lower dimming level than CFL or LED bulbs can reach. Most dimmable CFLs will dim down to 10 to 30 percent measured light output. This equates to approximately 30 to 50 percent perceived light – which is what the eye will see.

Early versions of dimmable LEDs on the market have the ability to dim lower than CFLs and can reach levels as low as five to 15 percent measured light (or 20 to 40 percent perceived light). The actual dimming range is dictated by the bulb's circuitry.

Lights dropping out: As CFL or LED bulbs are dimmed, they will sometimes turn off before the slider reaches the bottom. This is referred to as "drop out," this makes it extremely difficult to set the dimmer at the right level without bulbs turning off. This is typically caused by the bulbs not receiving enough voltage to stay on.

Lights not turning on: After being dimmed to a low light level and then switched off, sometimes CFL or LED bulbs will not turn on until the dimmer's slider is moved up. This is referred to as "pop-on," which is especially challenging in three-way situations where lights can be turned on/off from different locations, not just using the dimmer. Similar to drop-out, pop-on can be caused by the bulb not receiving enough voltage.

Lights turning off unexpectedly: Dimmable CFL and LED bulbs can be influenced by line voltage fluctuations. As your incandescent bulbs will sometimes dim or flicker when a device, such as when air conditioning or a hair dryer is used, a dimmed CFL or LED can actually turn off or flicker excessively in those situations.

Cost-Effective Solutions

To help combat these issues, a few companies are manufacturing dimmers specifically for dimmable CFLs. Lutron® has developed a family of C-L™ dimmers that control dimmable CFL and LED bulbs, as well as standard incandescent and halogen bulbs. (C-L dimmers can also control a mixed load of light sources, such as LED and halogen or CFLs on the same circuit.)

These dimmers improve the dimming performance of dimmable CFLs and LEDs compared to standard dimmers by:

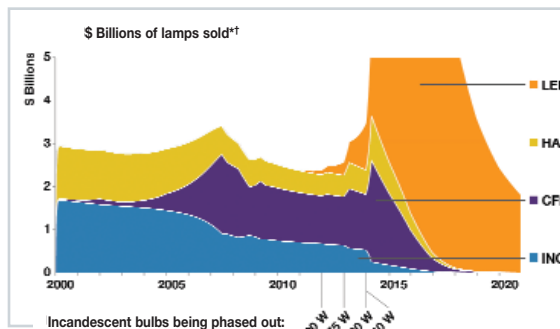
- Keeping the lights on as they are dimmed.
- Making sure the lights turn on at all light levels.
- Eliminating/reducing excessive flicker.
- Keeping the lights on even with line voltage fluctuations.

C-L dimmers are able to control this wide range of lamps because of the proprietary power circuitry, voltage compensation circuitry and an adjustment dial. Because performance is so varied from bulb to bulb or manufacturer to manufacturer, the adjustment dial helps set the bottom of the dimming range for your particular bulbs.

As required by UL, Lutron must test each bulb to ensure its compatibility with our C-L dimmers. For a complete list of compatible bulbs, please visit www.lutron.com/dimcflled. And for more information regarding C-L dimmers and how they can enhance your business, please visit www.lutron.com/dimcflled.

IN-SIGHTS

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Credenza® C-L™ Dimmer



Skylark Contour™ C-L™ Dimmer



Diva® C-L™ Dimmer



Luméa® C-L™ Dimmer

C-L™ dimmers from Lutron® are UL listed for controlling a variety of dimmable CFLs and LEDs, as well as an incandescent and halogen bulbs.