That 60W-equivalent LED: What you don't know, and what no one will tell you...

Ed Rodriguez - October 30, 2013

Most readers are aware of all the recent hoopla regarding 40- and 60-watt LED versions of standard 40- and 60-watt bulbs. Prices have dropped sharply, appearances have become somewhat standardized and dimmable versions are becoming commonplace. So now most of the media and blogosphere time is spent in infinite speculation about the pros and cons and timing of when we will have such bulbs with built-in Wi-Fi, color tuning, smartphone gadgetry, retail pricing at the $1.50 level, and the pros and cons of the versions at Wal-Mart versus those at Lowe's and Home Depot.

Perhaps time for a reality check or two... meaningful for the average consumer, who has no little or no clue about CCT, CRI, or heat sinking as they buy light bulbs to simply put light when and where it's needed and doesn't need it to be iTunes compatible.

First some facts: For decades consumers have come to assume (a reasonably valid assumption) they can buy almost any CFL and screw it into any place they previously had a 40W or 60 W incandescent bulb. Maybe it would not allow dimming...maybe it was slow to warm up... maybe the color consistency was not as expected... and some "mongrel" brands have proven not to last as long as was thought. In most cases, however, CFLs have proven to be a good return on investment, lasting much longer and sharply reducing electricity costs. The hundreds of millions sold globally suggests they provided pretty much what was expected.

It follows then that consumers now have a similar expectation for LED versions, with even longer life and greater electricity savings, dimming, and even better color consistency. What's not to like as prices keep coming down?

Let's shift gears a second. Probably 95% of all UL approved recessed down-light fixtures have, for decades, incorporated simple inexpensive "thermal cutouts". Why ? Because if a consumer installed an incandescent bulb of higher wattage than recommended, "bad things" could happen in the light fixture. Fixture makers learned early on that if there is a socket, many consumers will assume it's good for any bulb, which is not expressly warned against.

Back to our story: Turns out that the consumer's assumption is not valid: that the LED bulb is just another upgrade like the CFL. As noted, folks assumed that anywhere you had the 40W or 60W incandescent, you could screw in the CFL. This is not at all the case for a 40 or 60 watt-equivalent.

Within an LED bulb the internal generation and distribution of heat is such that it "desperately" needs access to cool surrounding air. The fact that it has that metallic housing is irrelevant in restricted air.

That 60 watt Wal-Mart bulb, when operating base down in open air and not even using a

shade, has its internal LED case at 85°C, the absolute upper end of what is considered “safe” for full life expectancy. The same deal is true for competitive bulbs. Put a shade around it… and it’s a little warmer. Put it into any kind of base-up socket and it gets a lot hotter and all life expectancy numbers are off the table. Put it into any kind of porch or post light fixture, and it can fry, with its internal power supply components at the cliff edge of failure. Put the lamp in a ceiling-mounted fully enclosed fixture and set the timer for when failure will occur.

In other words, totally unlike incandescent and substantially unlike a CFL, reliability and life expectancy go down hill sharply as soon as you install it anywhere that air is restricted. Guess what? A large percentage of places for LED best value is in those place where access is difficult and air is restricted. LEDs do not target a “table-lamp-only” marketplace.

All A-19 (60 W equivalent) LED manufacturers could solve the problem immediately with a 25 cent fix—a simple “cookbook” thermistor circuit that automatically dims the light to a safe thermal equilibrium level as things are getting too hot—and protects the unknowing consumer against himself. LED luminaire makers have been doing this for some time because they concluded it would be foolhardy not to do it.

We’ve see some mighty big LED bulb recalls in last two years stemming from thermal design carelessness. Before we get too enamored with thoughts of LED lamps that double as party lights or Wi-Fi hot spots, let’s first make sure they meet fundamental expectations as a trustworthy long-life, electricity-saving source of light for basic needs. We’re not there yet because this very real issue is being ignored by every existing supplier, without exception, of 40-, 60-, and 100-watt equivalent A-19 style LED bulbs.