

Postings: from the desk of Jim Brodrick

A number of *Postings* readers have written regarding a recent study by researchers at the University of California campuses in Irvine and Davis, which reported the presence of hazardous materials in some LED products. Some statements made by the authors have drawn a great deal of media attention, but a review of the details in the study shows that some clarifications are in order.

The researchers assumed that the products they tested were representative of LED lighting products, which in recent years have rapidly approached or exceeded the performance of other technologies like incandescent or fluorescent. In fact, the older "indicator"-type products they tested are more likely to be found in decorative light strings and inexpensive flashlights than in general illumination products specified by ENERGY STAR, the DesignLights Consortium (a consortium of electric utilities and energy efficiency organizations promoting efficient commercial lighting), or the U.S. Department of Energy's (DOE) Commercial Building Energy Alliances (DOE-organized consortia of private companies working to reduce their energy use). These programs have requirements to help weed out low-performing products such as those tested by the UC researchers.

Even if the researchers had selected LED light sources representative of general illumination products for testing, this would not have enabled comparison of LED products for general illumination with equivalent products using other light source technologies such as incandescent or compact fluorescent lamps (CFL). Consider that an incandescent light bulb would normally be

tested as a complete unit, with the light source (the tungsten filament) representing a very small fraction of the product weight. The LEDs tested by the UC researchers were not an entire replacement product, but rather just the light source(s) that might be used inside a bulb. As a result, misinterpretation of the UC study findings could lead to greatly inflated estimates of hazardous material content in efficient LED products which might one day end up in a landfill.

According to one major lamp manufacturer's Material Safety Data Sheet (MSDS) for incandescent lamps, "A Toxicity Characteristic Leaching Procedure (TCLP) test conducted on lead-solder-based lamps could cause the lamps to be classified as hazardous waste for lead." Another MSDS from a major manufacturer indicates that CFLs could fail such testing due to mercury content, and that those with screw bases and integral electronic ballasts could also fail on the basis of lead content. But bear in mind that material content is not the whole story. In a fact sheet dated November 2010, the EPA showed that the energy saved by a mercury-containing CFL can actually cut mercury emissions by two thirds relative to use of "mercury-free" incandescent lamps, because reduced energy use reduces coal combustion and the associated release into the atmosphere of mercury naturally contained in that coal. And consider how many 1,000-hour incandescent lamps would be diverted from the landfill by instead purchasing a single equivalent 36,000-hour LED product!

We clearly need to keep an eye on toxic material content in lighting products and other electronic devices such as computers and cell phones, while also enabling and encouraging recycling at end of life. But it's also important to recognize that all major light source technologies (incandescent, fluorescent, metal halide, sodium, and LED) contain toxic metals. The question of how to compare the toxic metal content of those products over their lifetimes, as well as the power plant emissions associated with their use, needs to be addressed. DOE will continue to investigate this issue.

As always, if you have questions or comments, you can reach me at postings@lightingfacts.com.

James R. Brodrick
