January 8, 2007

Richard Karney

DOE ENERGY STAR Product Manager

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Re: Proposed Energy Star Requirements for LED Lighting Fixtures

Dear Mr. Karney,

First of all, I'd like to say that we appreciate the opportunity to comment on your proposed requirements for ENERGY STAR labeling. I am a firm believer in the importance of enabling consumers to make informed purchasing decisions, and I fully support the ENERGY STAR program's objectives.

Before I address the proposed requirements, I'd like to caveat that Gallium Lighting is a manufacturer of high output LED downlights, and my comments address only those provisions that pertain to downlighting.

As a general comment, I would like to suggest that you not set the bar too high for fixture manufacturers. From my experience as a Product Manager of Halo downlighting (the largest US downlight brand), I found that it was difficult to get senior management support to upgrade products to comply with Energy Star requirements if it entailed significant engineering resources or higher product cost. As a smaller company, we obviously have more flexibility, but my point is that the ENERGY STAR program for solid state lighting is likely to be much more effective if it is written around products available on the market at that time. I suggest surveying the market and setting the bar at a point where only the top 25% of products make the cut. I agree that the bar should be raised periodically as the performance of LEDs improves.

The ENERGY STAR flexible CCT requirement may create a problem for us. Our current LED supplier, Nichia, separates its 3500K bins into two sections. The two sections by themselves do not fall within the chromaticity tolerance; however, the average of the two sections does fall within the specified tolerance. I would recommend enlarging the chromaticity tolerances from the CFL specifications to encompass most LEDs commercially available today.

We recognize the desirability of the color spatial uniformity requirement, but we do not have enough test data to provide feedback on whether the targets are realistic. However, I can tell you that we have not seen a noticeable change in color with viewing angle with

our products, and since our design provides a 45º shielding angle, it would be difficult to see the full color variation anyway.

Similarly, we do not have enough data to comment intelligently about your proposed lifetime color shift, although we agree that this is an area worthy of further investigation to avoid potentially negative user experiences with LED lighting.

The three year warranty requirement would be problematic for us and most other fixture manufacturers. I agree in principle that three years is a reasonable expectation for consumers, but the reality is that the reliability of the components most likely to fail (i.e. the driver and LEDs) is largely out of our control, and these are also the most expensive components. Nichia (the LED supplier we use currently) provides no warranty, and Cree offers only a 90-day warranty. Fortunately, Advance's Xitanium driver has a 5 year warranty. We would have absolutely no problem providing a 3-year warranty on the fixture if we could carve out the LEDs. Down the road, when we have more negotiating leverage with Nichia and other LED manufacturers, we certainly intend to push the issue and demand a longer warranty. Having said that, our experience to date with Nichia and Advance has been excellent; we have been testing fixtures for more than six months without a single failure.

I totally agree with your proposed 'luminaire' approach to photometric testing. However, for simplicity, I would suggest combining the luminaire efficacy requirement with the zonal lumen requirement for downlights, and stipulate that the luminaire efficacy be measured in terms of 'useful' delivered lumens (i.e. only those in the 0-60º zone) divided by luminaire input wattage. I am pleased to see that three out the six variants of our GS6 product already comply with your proposed efficacy standards.

On the documentation requirement, I am not familiar with the proposed LM-80-XX LED life testing methodology, but I trust that an accelerated test methodology will be acceptable for obvious reasons.

We have a strong preference for relaxing the requirement that the LEDs and driver be tested in combination when measuring the CRI and CCT. It seems unlikely that the choice of driver would have any material affect on the CRI or CCT of the LEDs, so if the test were only LED-specific, we could reasonably expect the LED manufacturer to provide the required documentation.

I hope my comments are helpful. Please do not hesitate to contact me at geoff@galliumlighting.com if you would like to discuss the matter further.

Regards,

Geoff Ling

Gallium Lighting, LLC.