From: Keith Scott [mailto:keithscott@bridgelux.com]
Sent: Monday, March 02, 2009 10:26 AM
To: SSL
Subject: Comments on Draft Criteria for LED lamps

Hello Richard,
I apologize for this being a little late but did want to forward you a set of comments. I have worked with incandescent, halogen, CFL, linear fluorescent, HID and high power LEDs in engineering, manufacturing, product management and marketing with OSRAM, OSRAM Sylvania (14 years), Philips Lumileds (7 years) and now with Bridgelux. I also worked on some of the early LM-80 and ANSI color space documents.

In the draft criteria, the Color Spatial Uniformity and Color Maintenance look to be aspirations for most manufacturers current technology except for Lumiramics on the Philips Lumileds products. My understanding is that some of the delays in finalizing LM-80 and in the current TR-21 (?) sub-committee is extrapolating data from 6000 hours to the 25,000 hours designated here. Since all manufacturers' technology is changing rapidly, and all of these products are going to be operated under maximum operating conditions (conforming to ANSI bulb shapes will minimize heat sink sizes), I don't know that anyone can legitimately claim such tight tolerances over time. The premise of high-quality light underlying Energy Star's mission could backfire badly if hot lamps begin to color shift 10,000-20,000 hours later. In the eyes of the public, I believe the value of the Energy-Star label could be significantly reduced; certainly you can void the product from the certified list but the damage to credibility of the program will linger indefinitely. I recommend that the Energy Star label not be tied too tightly to the unknown vagaries of possible color shift for the LED lamps. The .005 and .007 specs should be put in a "part B", to be implemented later. Some less stringent values should be assigned for now. I will gladly help develop these with you.

I notice for the warm color temperatures there are a set of requirements for A lamps to be 55 LPW. While most of the technology is reasonably close to this today at Tj=25C, typical thermal, driver and optical losses will require LEDs to be at 75+LPW. Although the upper ends of most manufacturers flux distributions are there, I expect it to be 12-24 months at least before this moves more into the mainstream. In the mean time, the only available lamps with an Energy Star label will be extremely expensive because of the high premium placed on these high flux bins. A quick check on costs for these products today puts the cost of the semi-conductor material (LEDs) in the $20 dollar range. Adding the cost of the lamp and then 1 – 2 levels of distribution quickly get us to a $60 - $80 light bulb. I predict that the market will not wait for technology (LED efficacy) and price at the performance levels stipulated in the current draft criteria. We know of Asian manufacturers with contracts for millions of LED lamps to be sold in North America and Europe in 2009. They will not be 55 LPW, but they will be 2x-3x more efficient than their incandescent and halogen counterparts, which is more than enough to drive a 2 year return on investment in the commercial space. My recommendation is to start at 40LPW for all of the replacement lamps listed and move to a "Part B" that gets to the 45 LPW and 55 LPW levels at a later time. Additionally, I know that there are currently EU directives underway for performance of LED lamps. It would be good for the LED lamp manufacturers and the acceleration of LED lamp adoption if North America and Europe could work together and prescribe common requirements, or at least parts of the requirements being the same? Is anyone looking into this?
Again, I will be glad to work with you to revise details of LPW specifications.

Thanks and BNest Regards,
Keith Scott

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