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## **TCP Response to ENERGY STAR® Program Requirements for Integral LED Lamps – Draft 2 issued on 5-19-09**

### **Introduction**

The staff at TCP appreciates the opportunity to comment on Draft #2 of the ENERGY STAR Program Requirements for Integral LED Lamps. We also appreciate and commend the DOE for all of their efforts in the advancement of solid state lighting.

We value the ENERGY STAR label and the confidence it generates in our customers. Please accept our comments below in response to both the cover letter and Draft #2.

### **Comments Pertaining to Cover Letter**

#### **Dimming:**

We agree with the DOE's current position regarding dimmable lamps. As a manufacturer of such lamps, we proactively research compatibility with various dimmers both in-house and in the field. Maintaining an updated dimmer compatibility reference guide facilitates the customer's understanding and satisfaction.

We also agree with allowing non-dimmable lamps. There are many applications where dimming may not be necessary.

Clearly marked packaging will limit customer confusion between dimmable and non-dimmable product.

#### **Non-Standard Lamps:**

Some non-standard lamps may have a niche application that only LEDs can satisfy (ex. Directional light, rough service, unique shape, etc.). These lamps may have limited LPW due to lamp design (space constraints), yet they may be an excellent energy efficient alternative as compared to an incandescent application. 55 LPW is too high for the short term. We recommend considering lowering the 55 LPW requirement to 40 LPW.



## Reliability Testing:

We agree with T<sub>j</sub> verification for all products through use of the TMP.

In addition, we agree that some level of the reliability tests (burn-in, WHTOL, elevated temperature and rapid cycling) outlined should be performed by the manufacturers. *However, we are unclear how the DOE would enforce such tests and question whether they should.* We feel manufacturers should proactively ensure their own unique product's reliability. Each manufacturer should be able to define their own reliability tests and not necessarily have to follow a standard that may not fit their needs. *We do believe a suggested standard would be beneficial for the industry* but, ultimately the manufacturer should be able to follow or modify based on their knowledge of their unique products.

## Additional Changes:

In general, the efficacy requirements should not be as high as current levels in draft #2 – specifically for both directional and decorative lamps. In these categories, LEDs can serve a very specific purpose in which there is no energy efficient alternative. Some LED applications are still competing with inefficient incandescent or tungsten halogen applications– not CFL.

Here are some specific examples:

**Directional Lamps:** LEDs can be configured to produce a very focused spot – such as a 15 degree beam angle. CFL's are not an option for this spot lighting application. Lowering efficacy requirements will allow manufacturers to provide these lamps at competitive prices while offering the consumer a significant energy savings as compared to incandescent spot lighting. LED lamps are a significant up sell right now. Lowering efficacy requirements initially will allow manufacturers to offer more attractive prices along with unique and energy efficient performance. ENERGY STAR should gradually step up efficacy performance parameters as SSL technology improves.

**Decorative Lamps:** Incandescent decorative lamps are small and do not have an attractive energy efficient option. One LED advantage is that they are small and can be configured in minimal form factors such as a B10 bulb. There are various LED decorative options on the market that would not meet the 40 LPW efficacy requirements. This is mainly due to the challenges of limited space that is available with this form factor. However, these lamps are attractive and good energy efficient options to the traditional incandescent. TCP believes the efficacy requirements should be no higher than 35 LPW for these small lamps. In addition, lowering these requirements will also allow manufacturers to be able to offer attractive prices along with the LED's unique performance. This is needed for increased market penetration.



## Additional Comments Pertaining to Draft #2

### **All lamps:**

TCP suggests a minimum CRI of 75 as an initial starting point. As stated in the LED Measurement Series: Color Rendering Index and LEDs, extensive research is currently being conducted to develop a new metric in measuring color rendering in LED's. The CRI should not solely be used to make product selections. It is well known as stated in the above DOE article that LED's who produce lower than 80 CRI can still produce visually pleasing white light. Additionally, a difference in CRI values with less than 5 points is not significant. Having a CRI of 75 or 79 is essentially the same.

TCP would like to see all chromaticity quadrangles included in the specification and not limited to the four CCT's listed in Draft 2. Incandescent lamps offer very little temperature range while the CFL specification offers 2700K through to 6500K. Educating the consumer through proper packaging communication will alleviate end-user confusion and help to ensure their satisfaction with LED lamp color appearance.

### **Omnidirectional Lamps:**

T shaped lamps were omitted from lamp types.

Additionally, luminous intensity distribution on omnidirectional lamp types is almost never done; TCP sees no value or added benefit to requiring a luminous intensity distribution requirement on omnidirectional lamp types. This requirement should be removed from the specification.

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