

Dear Energy Star Lamp Team,

Thank you for providing us with the opportunity to make comments on the new draft of Lamp. After reviewing carefully the Draft 4, we have comments as follows :

### **1. Product Variations**

Most of LED Package manufacturers achieve CCT variations by altering the composition of phosphor while maintaining the phosphor material. Changing the composition does not affect on lumen maintenance. Thus, CCT variations would not make any difference in lumen maintenance of LED lamps. If this test is omitted for CCT variations, there would be a reduction in testing burden with reduced sample size and time. Also, color maintenance test is carried out with lumen maintenance test.

**Therefore, LGE suggests to conduct these two tests only for the lamp with the lowest CCT.**

### **2. Color Rendering**

In lamp draft, two CCTs, 5000K and 6500K, were added. It is well known that color rendering and luminous efficacy are generally in trade-off relationship. Choosing a lamp with high efficacy or with high CRI could be an option for the consumers.

It is more reasonable to apply different color rendering criteria for low and high CCT LED lamps so that LGE proposes as follows.

**-LED lamp with CCT  $\leq$  4000K :  $R_a \geq 80$  and  $R_9 > 0$**

**-LED lamp with CCT of 5000K and 6500K :  $R_a \geq 77$  and  $R_9 > 0$**

### **3. Color Angular Uniformity**

It is unavoidable to have increased chromaticity variation in LED lamps with high CCT. **Thus LGE urges to set the chromaticity variation limits as follows.**

#### **▪ Variation of Chromaticity**

**- CCT  $\leq$  4000K : 0.006**

**- CCT  $>$  4000K : 0.009**

#### **4. Dimming Performance**

In Draft 4, testing of dimming performance has been specified. However, we would like to suggest modifications in several requirements.

First of all, as EPA mentioned in Note, testing with 10 dimmer samples is labor intensive. **LGE propose to reduce the sample size to 5 and the type of dimmer to 2 including at least one dimmer compatible with energy efficient lighting.**

Secondly, it is not a disadvantage for the customers when the lamp's light output exceeds its rated light output. This requirement seems to be unnecessary considering tolerances between products.

LGE urges to the Program to adopt the following suggestion.

- **Maximum Light Output**

- **Lamp light output on the maximum setting of a dimmer/control shall not fall below the light output of the lamp by more than 20%.**

Lastly, there are lots of circuit topologies to operate LED lamp and these technologies make LED lamp operate without the power factor degradation. However, tight flicker requirement would limit the flexibility of design and might prevent the development of technology. Thus, LGE proposes to alleviate the requirements as follows.

- **Flicker requirement**

Light output waveform periodic frequency (in Hertz)	Flicker Index
120 - 800	0.4 - 0.8 (increasing linearly from 0.4 at 120 Hz to 0.8 at 800 Hz)
Greater than 800	Not applicable
Undefined frequencies	Percent flicker $\leq$ 30%

Thank you for your considerations of these comments.

Best regards,

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