



January 18, 2012

Environmental Protection Agency
 Energy Star Program
 Ms. Taylor Jantz-Sell
 Lighting Program Manager, Energy Star
 1200 Penn Avenue NW 6202J
 Washington, D.C/ 20160

Subject: ENERGY STAR Program Requirements Product Specification for Lamps (Light Bulbs)
 Eligibility Criteria Version 1.0 Draft 3

Related documents: SORAA support for high CRI LED lamps for Energy Star 130118.pdf

Dear Ms. Jantz-Sell,

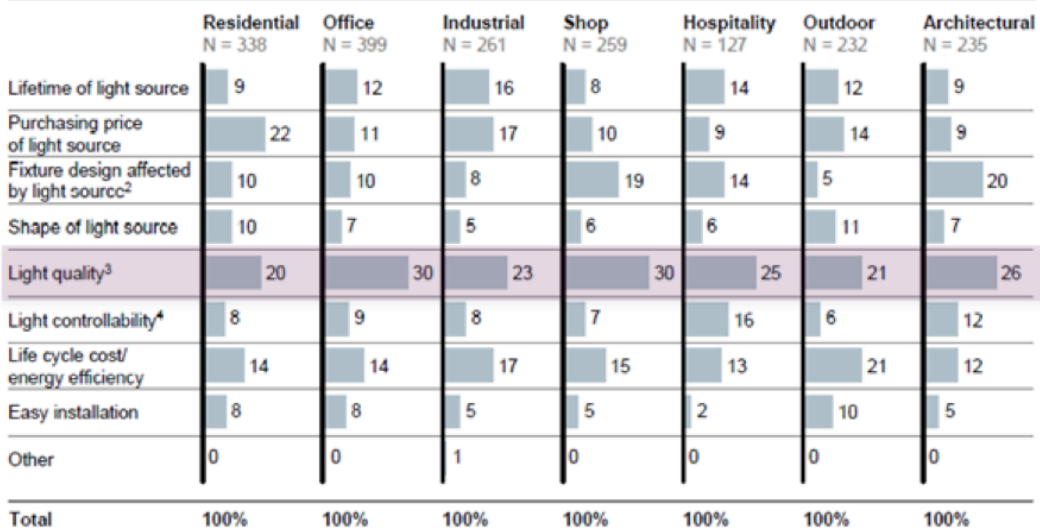
It is with great appreciation for EPA's efforts to advance energy savings through the adoption of energy efficient lamps, that we offer our comments on Draft 3 of the ENERGY STAR specification for Lamps.

- Section 3.1.4 - Color Quality and Section 9.1 Luminous Efficacy: All Lamps
 Draft 3 states that "... EPA sees color quality as a potential barrier to broader consumer adoption of energy efficient lighting".

It has been well documented that Light Quality is of most interest to consumers as well as commercial users (Mc Kinsey, Lighting the Way, 2011). In that sense, it is a *lack of* color quality that has the potential to be a barrier to broader adoption of energy efficient lighting.

Decision criteria for fixture installation in new buildings/structures

What are the most important criteria when deciding on the type of light source technology in a new fixture installation?
 Percent; No. of respondents¹ who selected this response as their 1st decision criterion

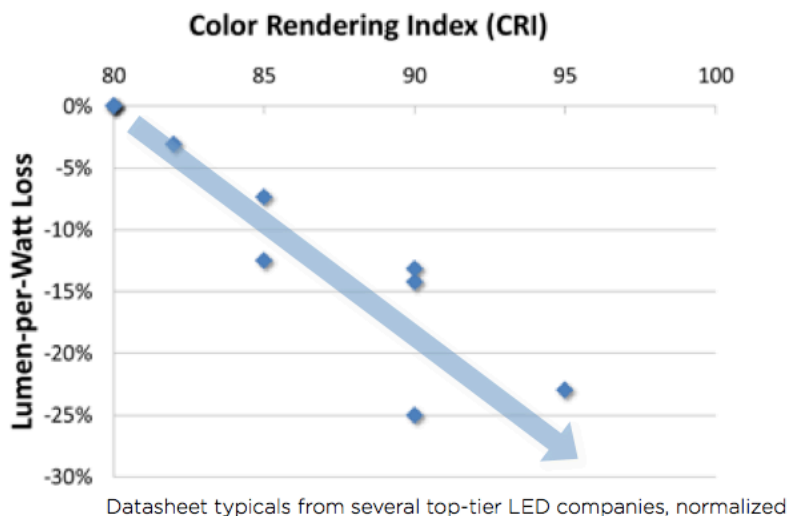


¹ 1 respondent could answer up to 3 applications in the survey
² Incl. design flexibility
³ CRI, color temperature, color consistency, and light distribution
⁴ Dimmability, color controllability, etc.

As part of the feedback on Draft 2, EPA received proposals to create a specific tier for lamps with a color rendering index (CRI) higher than 90 with the objective that these lamp can be offered at a cost - competitive price relative to lamps with a CRI below 90 and above 80. It is unfortunate that these proposals were not included in Draft 3 because with the omission an opportunity to get stakeholder feedback on this topic was missed. From discussions that Soraa has had with multiple stakeholders - from energy conservation side, energy supply side, lighting specifiers and commercial and residential end users - we conclude that the correlation between light quality and adoption of energy efficient lighting has broad interest. Inclusion into the ENERGY STAR specification of concrete proposals that create a level playing field for differentiated light quality is therefore needed.

Soraa strongly recommends that for a CRI higher than 90, a lower efficacy tier is created. The intent is that >90CRI will become available to the market as an alternative to lamps with a minimum CRI of 80. In the absence of a lower efficacy tier, >90CRI lamps have a fundamental cost dis-advantage and will not have a fair chance to compete in the market.

For phosphor based white LEDs, an increased CRI from 80 to 90 is achieved by increased spectral emission across a broader wavelength range. This results in a reduction of luminous efficacy of approximately 20% on average for leading LED manufacturers. A lamp specification that allows for a corresponding lower lamp efficacy, will limit the cost increase of higher CRI lamps and allows manufacturers to offer them at competing prices. In other words: it will level the playing field between lamps of different CRI and allows consumers and commercial users to make a balanced choice when they try to find alternatives to replace halogen and incandescent lamps.

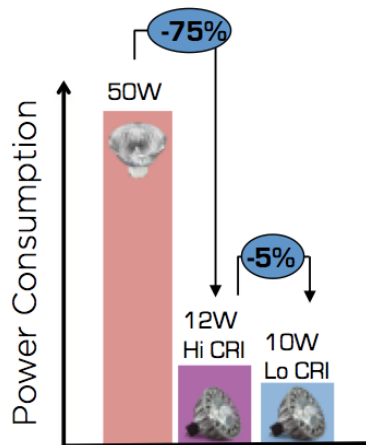


The benefit on overall energy savings of a separate lm/W requirement for >90CRI lamps is that it will help create ENERGY STAR compliant lamps that are cost competitive alternatives for users that cannot compromise on light quality when replacing current halogen and incandescent sources. Thus, the adoption of energy efficient lighting will be further advanced with the availability of price competitive >90CRI lamps. We stress that the >90CRI tier should be included as an alternative to minimum 80CRI. It is by no means the intent that >90CRI replaces min 80CRI.



Simply Perfect.™

It is our observation that many customers have been holding on to energy inefficient halogen and incandescent lamps because 80 CRI products do not meet their standards for quality of light and - for commercial users - because switching to lower quality light can have a material impact on their financial bottom line. >90CRI lamps have the potential to take these concerns away and save in the order of 75% in every socket where they replace a halogen or incandescent lamp.



For more information on this comment, we include the presentation SORAA support for high CRI LED lamps for Energy Star 130118.pdf, available for public viewing.

Related to the specification, Soraa proposes to add a column for lamps with a CRI greater than 90 in section 9.1.

DRAFT 3

	Lamp Rated Wattage (Watts)	Minimum Lamp Efficacy (initial lm/W)
Omnidirectional	<15	55
	≥15	65
Directional	<20	40
	≥20	50
Decorative	<15	45
	15 ≤ W < 25	50
	≥25	60

PROPOSAL

	Lamp Rated Wattage (Watts)	Minimum Lamp Efficacy (initial lm/W)	
		80 ≤ CRI < 90	CRI > 90
Omnidirectional	<15	55	45
	≥15	65	55
Directional	<20	40	35
	≥20	50	40
Decorative	<15	45	35
	15 ≤ W < 25	50	40
	≥25	60	50

2. Section 12 DIMMING PERFORMANCE: ALL LAMPS MARKETED AS DIMMABLE

Soraa proposes that lamps that operate with an external transformer be excluded. The transformer has great influence on lamp behavior especially under dimming. We propose that manufacturers that market non-self-ballasted lamps as dimmable, provide information - with the



lamp or online - on compatibility with different transformer / dimmer combinations.

3. Section 12.2 Minimum Light Output and 12.3 Flicker

It is very hard to understand the implications of the requirements on flicker and minimum light output without the test method being specified. Soraa is concerned that if modifications to internal lamp electronics are required, the time required for design and for lifetime qualification is not aligned with the intended date of effect of the ENERGY STAR lamp specification. Clarity on the Dimming Range and Flicker Test Method is essential and urgent.

Separate definitions are required to describe effects that can occur when controlling energy efficient lamps with dimmers. Flicker is typically described as observable light modulation and is often associated with lamps operating at low dimming levels. To avoid these effects Soraa supports a minimum dominant frequency of 60Hz over the entire dimming range. At this frequency level, consumers will perceive a constant light output and no detrimental health effects have been reported at frequencies equal or higher than 60Hz.

Stroboscopic effects can be observed at higher frequencies as well (for example 100Hz and higher) when objects move quickly under the light source. These effects also depend on the depth of modulation, also described as Flicker Index or Percent Flicker. Soraa proposes that stroboscopic effects are not included in the ENERGY STAR Lamp Specification and that Flicker Index is not part of it. SSL lamps are offered on the market today that do not meet the proposed specification of <0.15 Flicker Index at 100Hz and there is no report of a lack of customer satisfaction.

Compliance to the specifications proposed in draft 3 complicates electronic lamp driver design and has an impact on cost, performance and life time of smaller sized lamps like mains voltage MR16 and candelabra lamps. With that, it will result in lower output higher cost lamps which has a negative impact on adoption of energy saving lamps.

4. Section 15.1 Lamp Labeling: All Lamps

Soraa supports the level of information that is described in this section. Given the small size and limited space available for labels and text on smaller size lamp, we request to option to make the information available on the box. Examples of smaller size lamps are MR16, MR11, small capsule lamps and candelabra lamps. Soraa is willing to make a proposal to specifically define a minimum label size beyond which printing information on the lamp box becomes optional.

We thank you for the opportunity to present our ideas and comments and look forward to provide further clarification depending on your needs.

Sincerely,

Mike Krames
CTO