



January 18, 2013

Taylor Jantz-Sell
US Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: ENERGY STAR® Lamps v1.0 Specification Draft 3

Dear Ms. Jantz-Sell,

Cree has reviewed the ENERGY STAR® *Lamps v1.0 Specification Draft 3* received via email on December 21, 2012. We recognize the importance of the DOE/EPA efforts to develop and release a technology neutral ENERGY STAR specification for Lamps in an effort to promote energy efficiency within the lighting industry. CREE respectfully submits the following comments and request that each be carefully considered when revising the document.

Thank you in advance for your consideration. Please feel free contact me at 919.407.4077 with any further questions that you may have.

Sincerely,

A handwritten signature in black ink, appearing to read "JV", with a stylized flourish underneath.

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Product Qualification Program Manager

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GENERAL

Technology Neutral Specification: In previous webinars and ENERGY STAR® partner meetings, it has been stressed that the goal of the program requirements for lighting were that they be technology neutral and that they would not favor a particular technology or manufacturer. In the spirit of creating an even playing field and providing the end consumer a high quality product which represents the ENERGY STAR brand, Cree strongly recommends that the requirements in a number of areas be reviewed / modified in an effort to ensure consistency for all technologies.

For example, the Power Factor requirement captured in section 11.2 of the Electrical Performance Requirements allows for CFLs to have a Power Factor of 0.5 while solid state products must be greater than or equal to 0.7. Why should both platforms not be required to meet the same power factor levels? Additional money is spent on the LED designs to ensure these levels are met which drive additional costs in the overall design. Inherently, due to cost, this technology bias drives the consumer to a less efficient product even though they may both be ENERGY STAR qualified.

All of the areas that we believe need modification have been identified in the comments below and request that the EPA carefully consider making the specification technology neutral and less bias towards any one technology to promote innovation, faster rate of adoption of energy efficient products and an overall benefit to the consumer.

SECTION 1 – SPECIFICATION SCOPE & LAMP CLASSIFICATION

Included Products (Page 1): The current *Integral LED Lamps v1.4* and Draft 2 release of the *Lamps v1.0* specification included a category that allowed for products that did not meet the ANSI standard lamp shapes qualify through the ENERGY STAR program. This most recent release of the *Lamps v1.0* specification excluded LED products specifically from this category citing stakeholder concerns and misuse of the category as defined.

This decision limits innovation by removing the non-standard category and forcing new technology, which may be even more energy efficient, into incumbent and obsolete technology profiles. Furthermore, this draft specification allows for CFLs not conforming to a standard form factor to qualify so long as ANSI lamp type equivalency is not claimed. It is our opinion that if non-standard shapes are going to be excluded then it should be done so for both CFL and LED technologies. CFL technology has been around for over 20 years and manufacturers of these products have had sufficient time to come up with designs that are compliant with the ANSI standards that have been put in place for lighting products. The specification should not have bias towards any one technology, or manufacturer, it needs to be neutral or technology agnostic.



Cree recommends that this non-standard category be left in the specification but have some “checks” put in place to ensure that products not meeting performance requirements are not using this as a loophole. Cree would recommend that products that meet the ANSI standard shape but do not meet other performance requirements would not be able to qualify as a non-standard lamp. This would prevent products that would otherwise not qualify under an existing category from being qualified as a non-standard lamp. Another option would be to increase the efficacy limits for all technologies (CFL, LED, etc...) to help foster innovation and drive energy efficiency, as well as, help justify why a non-standard form was utilized (quid pro quo). This would help reduce or eliminate the mis-use of this category but still allow the consumer to have the option of these products as ENERGY STAR.

Cree strongly believes that fully removing the non-standard category will be penalizing high performing lighting products from reaching market even though they would be very high quality and useful to the consumer. It is our opinion that removing this requirement will only slow the overall adoption of new lighting technologies from the component level all the way through to the end product.

Who knows what the 21st century light bulb will look like and why would we constrain ourselves to what Edison thought a bulb should look like over 100 years ago?!

SECTION 2 - EFFECTIVE DATE

Effective Date (Page 2): Cree would like to understand an approximate time from when *Lamps v1.0* is released; to when products can no longer get approval under *Integral LED Lamps v1.4*, and when products would be de-listed if they are not qualified to the released *Lamps v1.0*?

Cree would like to obtain further clarification on what additional testing would be required for LED lamps that are already listed on the ENERGY STAR Qualified Product List (QPL) and are estimated to meet the new requirements based on the existing data provided from the original qualification efforts. If re-testing is required, and is extensive, there will be a large cost burden on current manufactures to maintain their products on the QPL which will effectively penalize innovative, energy efficient leaders in the lighting industry for their previous successes in driving the ENERGY STAR brand.

SECTION 7 - PRODUCT CERTIFICATION

Product Variations (Page 7): Section 7.1.2 indicates that the in-situ temperatures need to be validated on the representative model / product variant for up to five models. Who makes the determination as to how many samples need to be tested, the Certification Body or the Manufacturer? In an effort to reduce testing costs and associated testing burden, I am confident most all manufacturers would prefer to test a single sample.

Additionally, the *Integral LED Lamps v1.4* specification only required a single sample to verify the temperature differences between product variations. Is there a particular reason that five units were



selected to show temperature differences between the representative model and the product variant? One could easily argue that five samples will not provide any statistical significance and could achieve the same result by using a single data set. Cree strongly recommends that the EPA take a firm stance and identify the number of samples required in an effort to eliminate confusion down the road. It is our opinion that a single sample would be sufficient to validate the thermal differences from representative model.

Product Variations (Page 7): Cree strongly recommends that the Correlated Color Temperature (CCT) be an allowable variation for both CFL and LED technologies. By requiring that additional CCTs be tested separately, this is increasing the overall cost and time to market and is further slowing adoption of energy efficient technology. Not only should this be added back in an effort to create a technology neutral specification, there is a substantial amount of data available on the market that would support this stance. Cree would be willing to work with the EPA directly to provide requested data in support of adding this in for solid state products.

Cree would also recommend that the Allowable Variations be expanded to include the additional categories that are outlined in the *Luminaires v1.2* specification. This would include categories such as finish, diffuser, light source, CCT, etc... The same logic that was applied in the *Luminaires v1.2* specification should be leveraged in the *Lamps v1.0* specification.

SECTION 9 - PHOTOMETRIC PERFORMANCE

Luminous Efficacy Requirements (Page 10): As LED & CFL technologies continue to improve and products become more efficacious, the requirements surrounding efficacy should also continue to increase. The efficacy requirements for directional lamps have not increased from their current levels since the original release of the Integral LED Lamps specification back in 2009. Cree recommends increasing the minimum lamp efficacy requirements for directional lamps by 5 lm/W across all technologies.

Elevated Temperature Light Output Ratio (Page 13): Cree is very interested in reviewing the recently released the ENERGY STAR test method for this requirement and will provide comments once available.

Center Beam Intensity (Page 13): Values listed appear to be lumen level, not candelas as labeled.

SECTION 10 - LUMEN MAINTENANCE AND RATED LIFE

Lumen Maintenance and Rated Life (Page 19): Cree is very interested in seeing the ENERGY STAR test method for this requirement and will provide comments once available.



Under the current release of the *Integral LED Lamps v1.4*, MR-16 style lamps that are less than 10 watts would have to be tested in ambient test conditions whereas the *Lamps v1.0* specification under review would require that this product be tested in an elevated environment. Cree would like to understand why this requirement is being increased for MR style lamps at such a low wattage.

SECTION 11 - ELECTRICAL PERFORMANCE REQUIREMENTS

Power Factor Requirements (Page 22): The revised specification indicates that for residential applications that CFLs must only meet a power factor of 0.5 or greater. If this is truly intended to be a technology neutral specification, we would recommend increasing the power factor requirement to 0.7 to be consistent with solid state lighting. CFL manufacturers have the technology available and can design these products so that they meet the power factor put in place for LED technology. While there would certainly be a cost associated with meeting this increased requirement, this cost burden should not only have to be made by solid state lighting manufacturers.

Start Time (Page 23): Cree believes that it is not necessary and does not see much benefit in evaluating the Start Time requirement on 10 samples in multiple orientations. It would be our recommendation that the sample size for this be reduced down to 1 unit unless the EPA has compelling evidence which shows that there is a significant amount of variance on start times between lamps of the same sample set.

SECTION 12 - DIMMING PERFORMANCE: ALL LAMPS MARKETED AS DIMMABLE

Maximum Light Output (Page 25): “rated” should be changed to “measured” in the following requirement: “Lamp light output on a dimmer/control shall not exceed the lamp’s **rated** light output by more than 10% or fall below the maximum light output by more than 20%”. The reasoning is that one would not want the tolerance to be a part of the variation so measuring the unit under test (UUT) and then applying this requirement is appropriate.

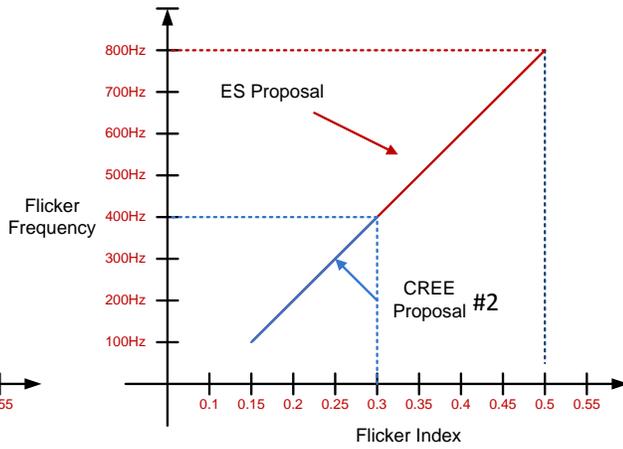
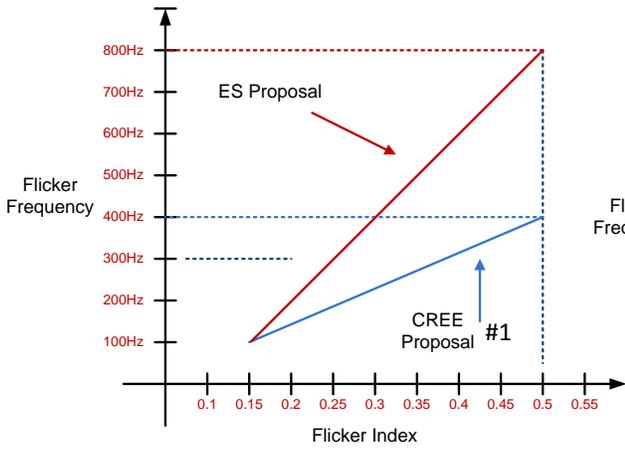
Flicker (Page 25): “Applies at full and dimmed measurement conditions.” At what conduction angle(s) will the lamp be tested at to verify this requirement?

The flicker allowable under the proposed guidelines would disallow PWM dimming below 800Hz though human perception of flicker is well below 200 Hz.

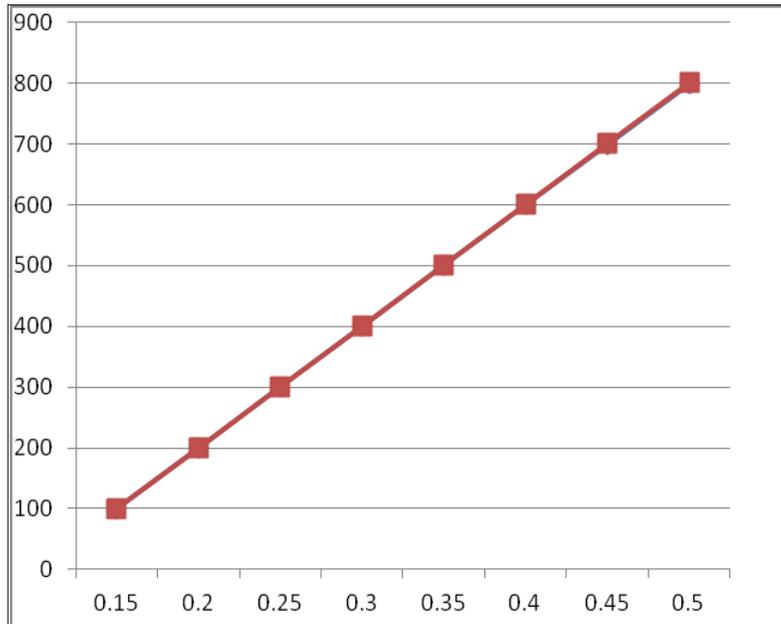
Cree suggests two alternatives:

- Option #1: Reduce the frequency of testing to 100Hz – 400Hz. A flicker index of 0.50 would be the limit at 400Hz

- Option #2: Keep the proposed slope of the original guideline, but reduce the maximum frequency of testing to 400Hz. Therefore at 400Hz, the maximum flicker index allowed is about 0.275

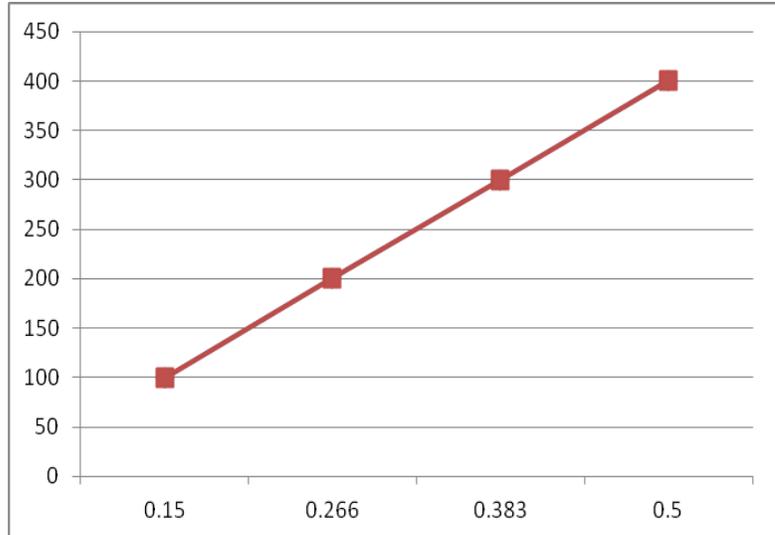


	Freq	Index
ENERGY STAR[®] Proposed	100	0.15
	200	0.2
	300	0.25
	400	0.3
	500	0.35
	600	0.4
	700	0.45
	800	0.5
Frequency		120
Index		0.160

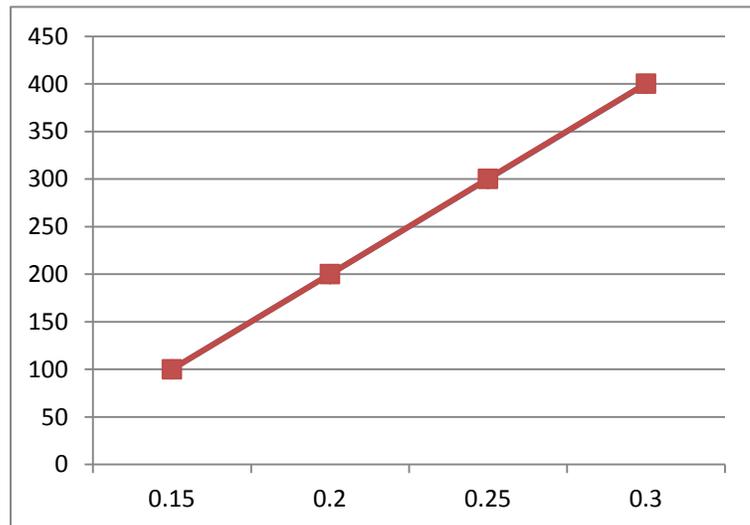




	Freq	Index
CREE Proposed - Option #1	100	0.15
	200	0.266
	300	0.383
	400	0.5
Frequency		
	120	
Index		
	0.173	



	Freq	Index
CREE Proposed - Option #2 Same as ES proposal but stops at 400Hz	100	0.15
	200	0.2
	300	0.25
	400	0.3
Frequency		
	120	
Index		
	0.160	



As the Section 12 is further developed, Cree would like to be made aware of the test methodology of the flicker and audible noise testing to help provide our guidance and impact of that methodology.

SECTION 15 - LAMP LABELING, PACKAGING & WARRANTY REQUIREMENTS

Lamp Labeling (Page 27): Cree would recommend that the EPA provide allowances for products where labeling space may not necessarily be available. While we understand and appreciate why this requirement is being included as part of the draft proposal, there are going to be certain design constraints that need to be carefully considered. For example, there is a very limited amount of space available on MR-16 style lamps and will become exceedingly difficult to find room to include this information along with all of the regulatory labeling that is required as well. A second example would



be an omni-directional style bulb in which the only available space to place the product information requested would impact the light output and distribution.

Lamp Packaging (Page 28): Under the Application Exceptions section, the revised specification indicates that the packaging must state specific applications that would potentially compromise the performance of the lamp. There are certainly an infinite number of cases that someone could argue would compromise the performance of the specification. Given that space on the exterior of the product packaging is extremely limited as is, Cree is opposed to having to detail out this information on the packaging.

Additionally, for MR style lamps the specification is requiring that a significant amount of information be captured on the exterior of the packaging. The packaging for these style lamps is already very small and including this information along with all of the required regulatory markings and product information will likely not be achieved. Cree would request that the EPA reconsider moving forward with these requirements of provide acceptable alternatives to products with dimensional limitations.

APPENDIX A – LUMINOUS INTENSITY DISTRIBUTION DIAGRAM FOR OMNIDIRECTIONAL LAMP

Omnidirectional lamp in base-up position (Page 29): The luminous intensity distribution diagram captured in Appendix A is not representative of the number of incandescent filament styles currently being manufactured today. Each of these filament styles which will provide a slightly different distribution light distribution which should be considered for LED technologies. Cree recommends adding more optional distributions or relaxing the distribution requirements to encompass more options that would currently (with incandescent product) be deemed omnidirectional.