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Comments ENERGY STAR Lamps V1.0
Specification Draft 1

Date: December 8, 2011

Dear Alex Baker:

Philips appreciates the opportunity to provide comments on the Energy Star Lamps V1.0 Specification Draft 1. We believe in promoting energy efficient products and feel that the Energy Star program serves as a vehicle for achieving this.

As a company, we have reviewed each section of the draft thoroughly. You will find our comments below.

General Comments

As proposed, the new Energy Star Product Specification for Lamps, Version 1.0 Draft specifications presents a barrier for the progression and adoption of energy saving light sources. It substantially raises the bar for CFL-I, which is a mature technology. This draft will eliminate most of the CFL-Is and exclude the HID lamp technology from the Energy Star program. For the few products that can comply with the specification, it will increase the cost of the products at the expense of the consumer with little or no added value.

If HID and CFL-I are ruled out by the standard, the standard cannot claim to be technology neutral.

Although it is understandable that Energy Star wants to avoid a repetition of the slow adoption of energy-saving CFL lamps, the attempt to control the lamp specifications has overreached, in our opinion. We do not think that Energy Star is responsible for setting standards for non-energy related parameters including life time, reliability and quality of light sources. We do not believe that the customer or Energy Star partners are well served by these requirements.

Specification Scope & Lamp Classification

- The non-standard category has been defined only to include self-ballasted fluorescent lamps. It should include other non-standard shapes in all technologies.
- MR16s are now out of scope, along with other low voltage lamps. MR16s should be included in the scope of this specification.
- GU10 bases should also be included in the scope of this specification. The ANSI outline is under development. Energy Star should include the GU10 base and reference outline once completed.

Future Specification Revisions

- Products that have been tested and approved according to the existing Energy Star specification at the time of manufacture should not be immediately disqualified as an Energy Star product once a new specification is enacted. Energy Star partners expend capital for high speed manufacturing capabilities to produce products. Immediately eliminating an Energy Star rating can have drastic impact on payback. Therefore, we recommend a grandfather period of two years to phase out existing Energy Star product.
- The Energy Star document states that, "EPA may amend the program requirements by adding additional requirements, method of measurement and reference documents."
 - This opens the door to methods of measurement that are not generally accepted in industry. Any changes should not be added without following a process that allows review and comments by the partners.

Product Qualification

- Product family considerations – allowable variations
 - Color point (and therefore color temperature)
 - CRI
 - Beam spread, i.e., spot, flood, etc.
 - Some base variations (identical product with different bases)
 - Ballast/driver suppliers
 - LED suppliers
- It is recommended that the EPA harmonize with DOE CFR 430 Appendix R in regards to setting guidelines for significant digits and rounding.

Photometric Performance Requirements

- Seasoning should be addressed for all applicable technologies.
- Light Output Requirement Table
 - Performance values should not be tied to incandescent technology since the baseline is changing with the legislation. It is better to define lumens.
- The new specification is substantially raising the bar for CFL bare products on the 10 – 14W range. Since there are many products in this category, we believe that it would be good to set the 60 lm/W requirement for lamps $\geq 15W$ lamp, instead of $\geq 10W$. It should be noted that for CFL-Is, the smaller the lamp the lower its efficacy.
- The efficacy bar is also substantially raised for Directional (Reflector) CFL-I's. Since there are no CFL-I Reflectors with power $\leq 10W$, in practice this new specification is raising the efficacy bar for Reflectors with a power of $< 20W$ from 33 to 45 lm/W! A more reasonable efficacy requirement would be 45 lm/W for lamps $\geq 20W$ and 35 lm/W for lamps $\geq 10W$.
- BR and R lamps should have a minimum beam angle of e.g. 60 degrees to avoid overlap with the PAR and other categories.

Correlated Color Temperature (CCT) Requirements: All Lamps

- The change for the CCT of CFL-Is from a 7-step MacAdam ellipse to a 4-step MacAdam ellipse would be approximately 5 to 10% of the cost of the CFL lamp, due to the control cost increase during lamp production.
- For Solid State product, it is expected to significantly increase the cost of LED products if a 4-step Quadrangle is required. ANSI C78.377 was originally formulated with 7-step quadrangles to provide a reasonable color basis while maintaining cost effectiveness for LED manufacturers. Tightening this specification may have significant cost and availability impact.

Color Rendering Requirements

- Referencing LM-9 is not the appropriate reference for this section because it pertains to tubular fluorescent lamps. A more appropriate reference should be identified.
- Ra limits will have an effect on available energy efficient products. Higher Ra will detrimentally affect energy efficiency (in general, higher CRI, Lower LPW). The proposal to increase the R9 content of the lamp will result in a price increase for CFL-Is by approximately 2% of the cost of the lamp.

Color Maintenance Requirement

The requirement of $\Delta u'v'$ 0.004, for color maintenance over 6,000 hours is very tight. This reduces the selection flexibility of the LED chip, which will increase the cost. Also, this requirement is only for solid state lamps, therefore not making the specification truly technology neutral.

Color Angular Uniformity Requirements: Solid State Directional Only

There are no referenced measurement standards for color uniformity measurements. This would require a goniophotometer equipped with a spectrometer (or X-Y photocell). Such devices are limited in availability and could not be accredited until sufficient measurement standards exist. Recommend removing this requirement at this time.

Lumen Maintenance Requirements: All Lamps

- Since this is a technology neutral document, Early Interim Qualification should be allowed for technologies other than Solid State.
- The difference in lumen maintenance is not significant for lamps operated with the elevated temperature test versus the standard open burn. The requirement to test the lamps with the elevated temperature test will increase the testing costs.
- Since most elevated temperature set ups for CFLs are made with Halo H7UICAT down light housings, additional guidance is required on how to test the base down lamps.
- The requirement for all lamps to be tested in the elevated temperature test should be modified to apply only to lamps used in recessed cans. This should be a requirement for those lamps used in specific applications.
- Testing time should be reduced proportionally to the 25000 hour point, e.g. 6000 hours for 25000 hour life claim. $6000 * 10000 / 25000 = 2400$ hours for 10,000 hour life. Allow for 6x extrapolation, as suggested by TM-21.

Reliability Requirements: All Lamps

- By increasing the rated life to 10,000 hours for CFL-I lamps, these lamps must be tested to a minimum of 4000 hours prior to market introduction. This puts the CFL technology at a disadvantage to Solid State which need only test to 3000 hours prior to market introduction. CFL-I lamps with longer life, for example 20,000 hours, will be required to be tested to 8000 hours. CFL-I technology will be at a significant marketing disadvantage. This is not technology neutral.
- CFL-I technology must be tested to rated life. Solid State technology need only be tested to 6000 hours of life. This is another example of the specification not being technology neutral.

Rapid Cycle Stress Test

- This new technology neutral specification requiring 1-cycle for every 1-hour of rated life will result in 2x and 5x (CFL/LED) testing capacity required.
- IES LM-65 and C78.5 do not cover rapid cycle testing. An appropriate reference must be identified or test method provided.
- The increase in the switching requirement is in conflict with the requirement to reduce the starting time for CFL-Is. In order for the CFL-Is to increase the switching performance, the lamps require pre-heat, which take 500 – 1000 msec.
- The increase of sample size from 6 to 10 units will increase the testing cost of the products. We recommend that the sample size requirement be maintained at 6 units.
- HID lamps cannot meet the 5 min on/5 min off test, or the run up specs. This is another example of the specification not being technology neutral.

Dimming

For dimming requirements, refer to NEMA SSL-6 and SSL-7.

Luminous Intensity Distribution and Center Beam Candle Power Requirements

- All technologies are not created equal. Incandescent and CFL-I reflector lamps produce well defined CBCP and Luminous Intensity Distributions. These values can be matched by Solid State Lighting. But, Solid State Lighting can have very sharp cut-offs which can lead to a series of dark and light areas in applications. Therefore, we recommend that the requirement be to specify beam width and CBCP.
- CBCP should be defined for all lamps.
- All is "TBD" in intensity distribution. Why are intensity distributions not required for bare CFLs and decorative lamps? What is the rationale for imposing intensity distribution requirements for LED and not for bare CFLs and decorative lamps? More work is required on this specification.
- For directional lamps, specs should include beam angle (with a tolerance of $\pm 3^\circ$), center-beam candle power and equivalent wattage. We suggest that Energy Star allow only a few discrete beam angles, eliminate the calculation tool and use a simple table for the directional specifications. Defer to further discussion on LRC NEMA working group.

Electrical Safety Requirements

- UL, ETL, CSA, TUV, etc. follow well established and documented testing protocols. Sample sizes are defined by the testing protocol. It would be better to define, "Tested by an NRTL ..." "See the certification section of this Energy Star Draft Specification for wording.

Power Factor

- There is no evidence that requiring a high power factor from energy saving lamps benefits the grid. Energy Star should provide evidence to justify this change.
- The increase from 0.5 to 0.7 for CFL may have a significant impact on availability and cost.
- The addition of circuitry to bring the power factor from 0.5 (normal power factor) to 0.7 power factor for CFL-Is, consumes a small amount of additional power and generates a small amount of heat. Both of these factors will affect adversely the life and efficacy of CFL-Is. The addition of this extra circuitry to increase the PF will increase the size of the CFL-I and the cost of a CFL-I by 15 – 25%. The size and price are both dissatisfiers that would be impacted.
- [For more details on this subject, see report: “Power Factor: Policy Implications for the Scale-Up of CFL Programs”].
- We recommend that the power factor requirements be maintained at the existing level of 0.5 for CFL, and 0.7 for LED, or make them both 0.5 for consistency.

Operating Frequency

- Recommend that Energy Star not put limits on the operating frequency (other than limiting frequencies below 120 Hz for visible flicker).

Starting Time

- Starting time changes from 1.0 sec to 0.5 sec may have an impact on availability and cost for CFL-I and HID products.
- The starting time requirement of 0.5 sec. represents a problem for CFL-Is, when combined with the increase in switching requirement (rapid cycle stress test). Energy Star is requiring CFL-Is to be Instant Start, affecting significantly the switching performance of the lamps, while increasing the switching requirements for the lamps!

Run-ups

- CFL-I and HID lamps will have serious issues with these requirements.
- The run-up time requirements are excessive for a mature technology like CFL.
- The EPA discussed in the draft percentages of lamps meeting certain run-up time, yet it’s imposing some other requirements; 50% of stabilized light output \leq 30 sec. and full stabilized light output \leq 60 sec.
- If the EPA wants to raise the bar for the run-up, we recommend to keep only a run-up time (80% of stabilized light output) \leq 90 seconds for Covered products and a run-up (80% of stabilized light output) \leq 45 seconds for all other (bare) lamps.
- The full stabilized light output requirement in 60 or 90 sec. is an unnecessary requirement for CFL-Is. Our own internal studies have shown that people are already satisfied if they can get 60% of the stabilized light output fast enough.
- Energy Star should define stabilization and add a tolerance.

Noise Requirement

- We would like to suggest that Energy Star does not create a specification for this due to the fact that this is not a major issue for consumers.

Date: 12/8/11

Page: 6

Lamp Toxics Reduction Requirements

- EPA should defer to RoHS restrictions and remove other requirements from the specification.
- P.25. Note is incomplete.

Dimensional Requirements

The EPA has worked against CFL-I miniaturization by pushing consistently for an excessive increase of the efficacy level of the lamps and now by imposing unnecessary requirements for high power factor, which needs additional circuitry to be accomplished.

We would like to propose that lamp dimensions described in the IEC documents are considered.

Labeling

- Energy Star labeling requirements must take into consideration FTC regulations and UL standard labeling requirements.
- P.27. There is a typo in the "Restricted Position" row of the table. "indicated" should be "indicate".
- Packaging can include inserts to satisfy Energy Star labeling requirements.
- The use of 3 "names" (Warm white, Neutral White and Cool White) to cover 5 CCT ranges (2700, 3000, 3500, 4000/4100 and 5000K) can only create confusion. Use only the CCTs to reduce consumer confusion.
- Labeling in regards to color should be left to the manufacturer or partner discretion.