

HeathCo LLC

Feedback to ENERGY STAR® Program Requirements for Luminaires

Eligibility Criteria – Version 1.0, FINAL DRAFT

Bill Ott
1/10/2011

Alex Baker
Lighting Program Manager, ENERGY STAR
U.S. Environmental Protection Agency

Dear Mr. Baker,

Included in the table below is the feedback from HeathCo, LLC on the latest version of the ENERGY STAR® Program Requirements for Luminaires. HeathCo, LLC designs and manufactures outdoor motion sensing lighting for the DIY market primary sold through large retail stores. We have been an active participant in offering ENERGY STAR® qualified products through the RLF, V4.3 standard and most recently through the DOE SSL 1.2 standards.

The comments below are aligned with the quality standards expected by the ENERGY STAR® program but also to ensure ENERGY STAR® qualified luminaires are available at a reasonable price point for the DIY market. Although I believe all of my recommendations below are of value and should be considered there are two that I would like to bring to the forefront. These include:

- The addition of an option under Non-Directional Residential Luminaires for Solid State LED Light Engines where qualification can occur from improved operating efficiency through minimized operating time. The combination of an LED Light Engine with an integral in-line motion sensing device would provide a system solution with an unmatched efficiency and convenience that is worthy of Energy Star® qualification.
- The allowance of an option for dimming of a Halogen Incandescent source type. Utilization of on board solid state dimming componentry like a triac provide dimming capability without sacrificing efficiency as with magnetic based dimming techniques. When dimmed Halogen Incandescent luminaires with a triac can save over 50% of the energy consumption of the bulb at full bright. Utilizing dimming in combination with an integral in-line motion sensing device provides the consumer a full on mode when needed but will reduce the energy consumption of the luminaire when less light is required.

I believe these proposals are well aligned with the overall goals of the Luminaire standard and would greatly appreciate giving consideration to these for your next revision.

Sincerely,

Bill Ott
VP Engineering
HeathCo LLC

Page	Section	Parameter	Source/Luminaire Type	Current Proposal	Recommended Change	Reason for Change
1	Specification Scope & Luminaire Classification	Directional and Non-Directional applications.	All	Luminaire types are categorized as either Directional or Non-Directional.	Do not define luminaire types into Directional or Non-Directional applications and rely on the definition of Direct Lighting and the LM-79 test data.	Since a definition of Directional Luminaires and Direct Lighting is included on Page 4 categorization of Luminaire types into these applications is not necessary in this section. Let the data from LM-79 testing drive the category. For instance we have developed an outdoor security luminaire that has 95% of the light directed at the surface to be illuminated and in this section it is categorized as Non-Directional, however, based on the definition it is considered Directional.
1	Specification Scope & Luminaire Classification	Directional and Non-Directional applications.	All	Luminaire types are categorized as either Directional or Non-Directional.	Move outdoor post-mounted luminaires from Directional to Non-Directional and move Outdoor ceiling and close to ceiling and security from Non-Directional to Directional	Based on the definition of Directional Luminaires and Direct Lighting included on Page 4 "outdoor post-mounted luminaires" would not meet the 90-100% of the emitted light in the general direction of the surface to be illuminated since its purpose is to be an area light and not light a specific surface. Conversely, the "outdoor ceiling and close to ceiling" and "security" lights are designed to illuminate a specific surface and therefore would meet the definition of Direct Lighting.
11	Photometric Performance Requirements	Source Efficacy: Non-Directional Residential Luminaires	Solid State: LED Light Engine	≥65 LPW per LED light engine	≥40 LPW per LED light engine	Based on the definition of "Light Engine" the validation of this parameter would have to be done with the optics installed. Since LEDs are very directional a diffusing optics design is required to achieve a non-directional effect as desired with outdoor porch lights. These types of optics are very inefficient and in combination with the output loss of the LED in steady state conditions and efficiency of the power supply a specification of 40 LPW is realistic using current high-output LEDs and robust switcher power supplies.
11	Photometric Performance Requirements	Source Efficacy: Non-Directional Residential Luminaires	Solid State: LED Light Engine	No proposal for Solid State: LED Light Engine that also includes an integral in-line motion sensor device.	Add a provision for Solid State: LED Light Engine(s) (outdoor only) that allows qualification based on minimized operating time as with Halogen Incandescent (outdoor only) as outlined on Page 12 without an efficacy requirement.	It is still desired by end consumers to have integral in-line motion sensor devices even with solid state lighting due to the added convenience and security feature. However, the use of the motion sensor improves energy consumption above outdoor devices without the sensor and therefore should be desired by the EPA. Since there is a provision for luminaire qualification with a much less efficient lighting technology light Halogen Incandescent it is justified to allow Solid State lighting to be qualified by the same criteria.

12	Photometric Performance Requirements	Source Efficacy: Non-Directional Residential Luminaires	Halogen Incandescent (outdoor only)	has an indicator that visibly or audibly informs the device operator that the motion sensor is operating properly, or that it has failed or malfunctioned	has an indicator that visibly or audibly informs the device operator that the motion sensor is operating properly	Since a malfunction or failure is an unpredictable event it would be very difficult to implement an approach that will work for all failure modes. If anything I would suggest that this could be implied if the visible or audible indication that is sensing motion stops indicating. It will also be a difficult parameter to validate during testing since you would have to simulate all potential failure modes to ensure the failure notification works in all cases.
17	Photometric Performance Requirements	Light Source Life Requirements: All Luminaires	Halogen Incandescent (outdoor only)	Lamps shipped with luminaires shall feature a rated life of $\geq 3,000$ hours.	Lamps shipped with luminaires shall feature a rated life of $\geq 2,500$ hours.	The marketplace standard is 2,500 hours and going to 3,000 hours increases the cost of the lamp significantly and gives preferential treatment to certain suppliers. A 2,500 hour lamp combined with a motion sensor provides almost 2 years of life assuming 3-4 hours of on-time daily.
14	Photometric Performance Requirements	Luminous Efficacy, Output and Zonal Lumen Density Requirements: Directional Residential Luminaires	Inseperable SSL Luminaire	70 LPW	35 LPW	Most luminaires purchased at retail are purchased as a retrofit and installed by a Do-it-Yourselfer (DIY). The DIY has limited technical knowledge and would not be comfortable or qualified to perform a retrofit or upgrade upon product failure. They would most likely replace the complete luminaire with a new model. In addition, the initial failure mechanism on these types of luminaires will be the finishes and the coatings and with these types of failures a total unit replacement is required. These products also have an aesthetic element and are replaced in many cases prior to product failure to upgrade the styling for improved curb appeal. Therefore, the need for separable designs is really needed in the commercial market but not in the retail channels and therefore imposing a luminaire efficacy of 70 LPW would severely stall the propagation of solid state technology to the masses. A luminaire efficacy of 35 LPW is feasible (but challenging) with today's technology, will still require high quality LEDs but enable a price point that can be offered at retail.
26	Electrical Performance Requirements	Source Replaceability Requirements: Directional and Non_directional Luminaires	Solid State: Non-Directional	LED light engines shall make use of electrical interconnects which allow for consumer replacement of the engine without the cutting of wires or the use of solder.	Make residential Solid State: Non-Directional "Exempt"	Most luminaires purchased at retail are purchased as a retrofit and installed by a Do-it-Yourselfer (DIY). The DIY has limited technical knowledge and would not be comfortable or qualified to perform a retrofit or upgrade upon product failure. They would most likely replace the complete luminaire with a new model. In

						<p>addition, the initial failure mechanism on these types of luminaires will be the finishes and the coatings and with these types of failures a total unit replacement is required. These products also have an aesthetic element and are replaced in many cases prior to product failure to upgrade the styling for improved curb appeal. Therefore, the need for separable designs is really needed in the commercial market but not in the retail channels and therefore imposing requirement for replaceability would severely stall the propagation of solid state technology to the masses. The segmentation between residential versus commercial lighting is defined by price point and expected life where a commercial fixture is typically much more expensive and has a longer life expectation where irreplaceability makes sense. Additionally, I would question why this parameter applies only to Non-Directional Solid State lighting and not Directional? Why is there a difference?</p>
27	Electrical Performance Requirements	Dimming Requirements: All Luminaires Marketed as Dimmable	Solid State	Step dimming, if employed, shall provide at least two discrete light output levels $\geq 35\%$ of total light output and not including 100%.	Step dimming, if employed, shall provide at least one discrete light output levels $\geq 35\%$ of total light output and not including 100%.	<p>There is no basis for requiring at least two discrete dimming steps and for solid state lighting. Limiting the lowest amount makes sense to ensure the luminaire still produces usable light levels while dimming but if a non-dimming luminaire can be acceptable for Energy Star qualification then putting a constraint on the dimming steps is not aligned with this logic. Requiring multiple steps increases the cost of the luminaire and creates consumer confusion.</p>
27	Electrical Performance Requirements	Dimming Requirements: All Luminaires Marketed as Dimmable	Halogen Incandescent (outdoor only)	May not feature dimming	Require usage of an integrated solid state dimming circuit that reduces power consumption as the light dims.	<p>Luminaires that self-dim provide reduced energy consumption when a lower light level is acceptable. Not allowing this capability requires that the light always be utilized in a higher energy using mode when the full bright light level may not be required. If the specification was changed to require a solid state dimming circuit it would eliminate usage of inefficient magnetic dimming that I believe was the basis for this initial ruling. Triac based circuits maintain constant efficient throughout the dimming cycle and there is no reason these should not be accepted.</p>
32	Electrical Performance Requirements	Energy Star requirements - Operational	Solid State	≥ 120 Hz	Output content < 120 Hz is <8% of average	<p>Switcher power supplies are utilized extensively for power high quality solid state lighting based</p>

		Frequency: Directional and Non-Directional Luminaires				luminaires. Most have operational frequency outputs of greater than 50kHz, however, there will always be some remnants of the original 60Hz AC frequency on the signature. To avoid the confusion we have seen in labs measuring this parameter it is recommended that we allow a small (<8%) percentage of the content to be below 120Hz to eliminate this measurement confusion since it will not have an impact on the visible flicker.
44	Warranty Requirements: Directional and Non- Directional Luminaires	Warranty Requirements: Directional and Non-Directional Luminaires	Halogen Incandescent (outdoor only)	minimum of 3 year warranty	Minimum of a 2 Year Warranty	The RLF, V4.2 - Annex A, Tables 2A and 2B outline the warranty requirements as 2 years for either Efficient light Source or Reduced Operating Time. We have Energy Star warranty documented on the product packaging and Installation Manuals for over 140 SKUs based on this standard. It would be time consuming and expensive to change these to the 3 year warranty as defined by this standard.