Energy Star Luminaires First Draft Comments

Following are my comments/concerns regarding the Eligibility Criteria for the next version Energy Star qualification of luminaires.

- In the “Scope of This Specification” section, “Outdoor…Arm-mounted luminaires” are defined as “Directional” and “Outdoor Porch” luminaires are defined as “Non-directional.” Neither are defined in the “Definitions” section. Clarification must be brought to this foundational point, as they would both appear to reference a very similar exterior lighting luminaire.

- In the “Scope of This Specification” section, residential outdoor post fixtures appears to be erroneously categorized as a directional luminaire. While commercial grade street and area lighting is very much directional in nature, especially with the increased demand for Dark Sky compliant lighting, residential post mounted luminaires are decidedly not directional. Please adjust this categorization.

- In the “Technical Notes” section, point [4], the luminaire manufacturer must ensure that the fluorescent lamp manufacturer meet a host of production quality requirements. How is this to be done? Please expand on the luminaire manufacturer’s role in another factory’s Quality Assurance efforts and what Energy Star will expect from the luminaire manufacturer.

- In the “Future Specification Revision” section, Expiration of existing Energy Star qualifications is briefly mentioned with no resolution. When can we expect information regarding the EPA’s intent and direction toward existing qualifications?

- In the “Photometric Performance Requirements” chart for “Non-directional Luminaires” it is difficult to understand how you can expect equal output and acceptable customer perceived performance when the fluorescent lamp is an omni-directional light source and the Solid State LED light engine is directional. With both technologies expected to perform in the same manor, it is easy to imagine a VERY poor performing Solid State luminaire garnering Energy Star status. On the other hand, omni-directional fluorescent lighting in a non-directional luminaire is a perfect match. A good light source is almost guaranteed. These new parameters would appear to be biased against solid state lighting and will unquestionably lead to consumer dissatisfaction, especially in the hands of non-reputable suppliers, simply seeking Energy Star qualification. The solution must be equality. Source efficacy is not a viable measuring method for solid state lighting. As an example, source efficacy for existing

incandescent and halogen directional lamps (light bulbs) is barely available, with lamp manufacturers relying instead upon directional lumen output data. If you can envision a PAR lamp inserted into a chandelier, you can imagine what an Energy Star qualified Solid State non-directional luminaire might look like. One could argue that this would result in an "ugly" product that would be undesirable to the end consumer, but the damage will already be done. The consumer will have already purchased an Energy Star qualified luminaire that is an unsatisfactory light source. There are only three viable options to resolve this issue.

1. ALL non-directional lighting should be measure for luminaire efficacy
2. Solid state non-directional luminaires are not viable for Energy Star
3. For solid state lighting, luminaire efficacy must be supplied

- The latter would be biased against solid state lighting, but at least it would provide a viable lighting product. The logic used in explanation and in defense of this direction is flawed. Today, consumers do choose decorative lighting, first and foremost based on aesthetics. They do that, because the existing omni-directional light source provides acceptable lumen output in almost every, if not, all instances. Once a directional light source is employed, a new level of complexity will be introduced to the selection process. You logic will disappear if these parameters are allowed, leaving behind disenfranchised consumers.

- In the "Photometric Performance Requirements" chart for "Non-directional Luminaires", minimum light output levels are required. Why? Especially puzzling is the "lumen per head" minimum. As solid state technology changes the design of the luminaire, multi-light designs with small amount of light would be impossible unless a customer really needed a 50 head chandelier that delivered an incredibly large 22,500 lumens. The parameters established in this chart are based on existing luminaire design and ignore the possibilities that new technology provide. As a point of reference, consider the small-watt halogen lamps introduced a decade ago and how those changed the aesthetics of a "chandelier". Broaden the scope and think about the future. It is understandable for a consumer to expect a certain amount of lumen output from a luminaire. Rather than micro-manage the individual source output, the luminaire manufacture should be required to report an accurate total luminaire light output on packaging and advertising. The consumer would then be equipped with viable information for comparative shopping and intelligent purchasing.

- In the "Photometric Performance Requirements" chart for "Non-directional Luminaires" Solid state luminaires are further penalized with the complete luminaire testing and additional sampling while fluorescent technology is only concerned with the lamp/ballast test. Again, why the bias? This

would only be viable if the EPA decided to adequately measure non-directional solid state lighting at the luminaire level, as argued above.

- In the "Luminous Efficacy Requirements" chart for "Directional Luminaires" Under Cabinet lighting Zonal Lumen Density is required to deliver 25% of the lumen output within the 60-90° range. Why? Under cabinet lighting is task lighting. Light is directed onto a work surface to provide needed light to perform task on a counter. Wasting 25% of the light in the 60-90° range is criminal. It is understood that in some applications, the 60-90° range contains aesthetic elements of the home décor that is desirous to illuminate. With that understanding, 10-15% is certainly adequate. This will go a long way to reduce the excess wattage consumption wasted on this unused and unimportant area. If this is found to be unacceptable, then a tolerance added to this percentage should be considered. With this in play, manufactures who want to make good, efficient task light can and those who want to make luminaires that create the lighting effect mandated in this requirement can also qualify products. As solid state technology matures, it is feasible to envision tightly controlled light output, directed to specific tasks, consuming only the bare minimum of power. This regulation forces wasted light and should be adjusted.

- The benefits of solid state lighting diminish with the inclusion of three new paragraphs. The customer perception of value is going to quick disappear. These points will perhaps committing LED lighting technology to a "tried and failed" concept.
    1. "Light Source Life Requirements" restrict Energy Star qualified solid state lighting to an advertised 25,000 hours or 35,000 hour for outdoor and commercial grade
    2. "Lumen Maintenance Requirements" requires that the LED Light engine undergo a 6000 hour *in situ* test to prove that lumen deterioration has not exceeded the prescribed percentages.
    3. "Ballast/Driver Replaceability:" will now require all Energy Star qualified luminaires be equipped with removable/replaceable drivers.
- These points may discontinue the viability of solid state lighting in residential applications. They may eliminate the desire for a manufacturer to seek Energy Star qualification for many/most solid state luminaires. Solid state lighting is more expensive. The consumer now expects a commensurate return for that initial investment. A 40,000 hour service level (after all of the initial hype, this number now seems to be somewhat standard) means the solid state luminaire will last four time longer than a typical fluorescent and about as long as a typical ballast. For consumers

who can afford the up-front expense, this can be rationalized as an affordable increase.

- The 6000 hour test will now add 250 days (8.3 months) to the new product development process. By the time a product is ready for introduction, the next generation of LED will have arrived. This means that a luminaire manufacturer will need to endure continuous testing of solid state products. Regardless of sales, each luminaire will have the cost burden of $10,875.00. (Based on an independent lab quote, each 8.3 month test will cost $3625. Three tests are required.) Once completed, the next generation LED will need to be tested, so the per year cost to keep a solid state luminaire in the manufacturer's line will be $15,722.89. If the manufacturer agrees to pay this amount, it is doubtful that the consumer will agree to bear even more of the cost and simply elect to purchase fluorescent or non-efficient lighting. If the added development time for a new luminaire does not stop a manufacturer from pursuing Energy Star status, then the cost will. This time and money will be difficult, if not impossible to justify.
- Finally, making the driver removable will add yet another level of assembly complexity and a cost increase. In addition, the cost borne by the consumer to pay an electrician to disassemble a complex luminaire, rewire and reassemble will likely be higher than the initial cost of the product. Requiring the manufacturer to warrant the driver to a certain level may accomplish the same goals. We are now entering into an era that could be dominated by solid state lighting and away from more primitive forms of light creation. Use more advanced industries as a guidepost for these qualification standards. How are other solid state goods measured and what are the requirements for qualification? Does an Energy Star qualified DVD player require removable circuit boards?

- In the "Photosensor Controls" section the requirement for a photosensor in outdoor application will remain a requirement. In the explanation notes against removal, a number of arguments were mentioned, most of which dealt with aesthetics, except for bullet point number two. Please review this point again, but this time against functionality and fixture type. It has been our experience that outdoor flush mount, outdoor pendant and many post applications experience "cycling" when a photosensor is installed. (The photocell is in close enough proximity to the light source so that when the light is off; the photocell activates the lamp and then detects enough light to discontinue power to the lamp.) Placement of a photosensor in these categories has essentially eliminated them as viable Energy Star outdoor lighting products. They continue however, to be requested by customers. The continued commitment to this requirement is understood, but please review again to determine if these two (flush mount outdoor and pendant outdoor) categories of exterior lighting could

be exempt from the photosensor requirement, not due to aesthetics, but viable functionality.

- There appears to be a disconnect in requirements for the LED driver replacement. In the “Ballast/Driver” Replaceability:” section, a replaceable driver is required. In the “Warranty Requirement” section, there is an exception to the requirement that implies a choice. “Luminaires employing LED light engines which can be replaced manually or with a screwdriver.” This document conflict needs to be clarified.

Please consider these comments when working to rectify the Energy Star for Luminaires program requirements.

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