Draft 1 Version 1.0 ENERGY STAR® Luminaires Specification Comment Summary
June 21, 2010

This document is intended to summarize comments submitted by stakeholders in response to the Draft 1 Version 1.0 ENERGY STAR Luminaires specification and includes an EPA response to each comment. Please note: this summary includes only those comments that EPA received permission to make public.

Topic	Comment	EPA Response
Specification Scope/Luminaire Classification	Stakeholder comments reflected general support for evaluation of luminaires either as directional or non-directional, and employing luminaire photometry or source photometry, respectively. Some parties stated a preference for luminaire photometry for all types, including those of a highly decorative nature. The definition of inseparable luminaires and the application of testing requirements were questioned by some partners. Several luminaire types to be added to the specification were entered for consideration, including low voltage landscape lighting.	Several luminaire types have been added to the directional category, including SSL recessed downlight retrofits, line voltage directional track lights and directional ceiling fan light kits. However, due to technical complexities discovered with qualification under the existing specification, and the high reliance on user/installer behavior to achieve specification-compliant energy savings (namely selecting the correct transformer size for the installation), EPA has opted not to add low voltage landscape lighting in Draft 2.
	Stakeholders requested clarification of each luminaire type, especially in instances where the definition would determine how a given luminaire is tested (e.g. decorative glass pendant versus a pendant mounted downlight).	The Agency has posted a definition of each luminaire type in the Definitions section. While the cover page offers examples of non-directional luminaires, it is important to understand that only directional luminaire types are specifically detailed; all types not specified as directional default to non-directional categorization and testing requirements. "Surface mount with directional heads" have been renamed "accent lights". "Outdoor post- or arm-mounted luminaires" has been limited to post-mount only, to eliminate confusion with arm-mounted area and roadway types to be covered under a forthcoming specification. Several partners noted that post-mounted luminaires are not necessarily directional, however EPA seeks to limit application of the ENERGY STAR to those post-mounted products which direct light downward only, minimizing light – and energy – wasted into the sky.
Correlated Color Temperature	Some stakeholders requested expansion of the upper limit of allowable CCT values. Support was also received for an upper limit of 4100K.	The Agency has examined the issue and determined that expansion is appropriate for commercial luminaire types. The second draft reflects the inclusion of 5000K for commercial applications.
	Some stakeholders referenced the ANSI C78.377 allowance of any CCT between 2700 and 6500 Kelvin in 100 Kelvin increments.	EPA does not feel this is appropriate for ENERGY STAR specifications as more often than not, qualified products will be installed in spaces which also feature other lighting products. Allowing a flexible CCT system permitting any CCT at 100K increments between 2700 and 6500 Kelvin will likely complicate purchasing decisions for consumers and end users, and make it difficult to ensure the uniform application of one color temperature within a space, leading to consumer dissatisfaction.
Luminous Efficacy	Some partners expressed concern that a 70 lm/W source efficacy requirement would be too restrictive in the short term, but felt that for the longer term this is a realistic goal.	The Agency has in this draft proposed a phased approach to increasing source efficacy requirements, beginning with 65 lm/W when the specification becomes effective, followed by an increase to 70 lm/W two years later. EPA believes this is consistent with our goal of designating top performers while ensuring adequate selection and cost effectiveness. With this proposal, to maintain qualification status of products initially qualified at 65 lm/W, partners would be required to demonstrate those products' compliance with the higher performance level, once effective in 2013.
	Some stakeholders suggested that the 70 lm/W requirement was too low.	The efficacy levels in the second draft of the Luminaires specification represent performance increases of 30 to 40% (65 to 70 lm/W) over the nominal 50 lm/W requirement in the current Residential Light Fixture v4.2 specification, and also represent what is both cost effective and broadly accessible. Further data is provided in the June 8 webinar posted at www.energystar.gov/luminaires

	Some stakeholders expressed concern that the 70 lm/W is too high for inseparable LED luminaires.	This requirement is in alignment with the intended progression to Category B in the SSL v1.1 specification: luminaire efficacy of 70 lm/W, no zonal lumen density requirements, and is generally more stringent because unlike incumbent technologies, inseparable SSL luminaires offer no pathway for the consumer/end user to replace or upgrade the enclosed light source; the entire luminaire must be replaced.
	A few stakeholders suggested that the specification require different luminous efficacy requirements for SSL and fluorescent for both directional and non-directional applications.	The ENERGY STAR Luminaires specification is being developed to establish a technology-neutral platform for qualification of luminaires. Luminaires are evaluated on a level playing field, and ENERGY STAR means the same thing in terms of energy performance, regardless of technology.
Color Rendering Index	Comments were received both in support of and against the inclusion of a positive R_9 value.	EPA is seeking a color rendering metric that is a better indicator of a light source's naturalness, vividness, and color discrimination properties than the Color Rendering Index (CRI). After Draft 1 was released, EPA learned of data that raised questions about the incremental value of using the R_9 criterion in addition to general CRI. These data show that sources with high R_9 values are no better for color discrimination on the Farnsworth-Munsell 100 Hue test than sources with low values. Also, R_9 was shown to be sometimes more, but sometimes less, predictive than general CRI of a light source's ability to render objects naturally and vividly; the predictive value depended on the color of the object being illuminated. For these reasons, in Draft 2 EPA has reverted to a general CRI requirement alone, and proposes to revisit the topic of color rendering performance requirements as industry continues development of a successor to the CRI.
Photosensor	Comments were received both in support of and against the removal of the photosensor requirement for outdoor luminaires.	The photocell requirement has been revised to be required of halogen incandescent outdoor luminaires only. As detailed in Draft 1, the Agency seeks to address a wide variety of partner concerns by removing this requirement for all luminaires except halogen incandescent, which derive the bulk of their savings potential from luminaire time-limiting devices.
Power Factor	Some comments were received regarding the different power factor requirement for fluorescent and SSL products. These stakeholders felt the requirement should be equal for both technologies. Several stakeholders suggested a higher power factor requirement. Concern was raised regarding low power factor and the ability of the electrical power grid to handle low power factor.	EPA does not propose to raise the minimum requirement of 0.5 for residential fluorescent luminaires. EPA has reviewed a summary of the laboratory and field studies regarding electric grid performance issues related to compact fluorescent lamp use around the world, including issues related to power factor. Overall, this body of work failed to find detrimental effects resulting from the use of low power factor (i.e. 0.5 pf) CFLs. In addition, high power factor has not proven to provide significant benefit to consumers or the electrical power grid, and partner feedback has indicated that a high power factor requirement would increase ballast form factor, impairing luminaire design, and would increase the initial cost to the consumer or end user, already a known barrier for efficient consumer lighting products. The Agency does not believe considerable benefit will result from a higher power factor requirement for linear and circline fluorescent luminaires.
Ballast/Driver Replaceability	Some stakeholders disagreed with the ballast/driver replaceability requirement, particularly for SSL luminaires.	The requirement has been revised from Draft 1. For non-directional SSL luminaires, source replaceability requirements were added in place of the ballast/drive replaceability.
	Suggestion was received to exempt GU24 integrated lamps from this requirement.	Luminaires employing self-ballasted GU24 lamps are exempt from the ballast/driver replaceability requirement, because the ballast is built into the lamp.
Warranty	Numerous stakeholders were supportive of the 3 year warranty requirement.	No response required.
	Concern was expressed about the term "unconditional" in the warranty requirements.	The term "unconditional" was removed in Draft 2.
	Several stakeholders noted that there should be no exceptions to the warranty requirement.	Exceptions for luminaires employing GU24 based integrated lamps and LED light engines was removed in Draft 2 of the specification.
SSL Lifetime Claims	Some stakeholders expressed concern with limitations to SSL lifetime claims. Some felt it would put ENERGY STAR products at a disadvantage in the marketplace.	In response to partner concerns about limitations to lifetime claims outlined in draft 1, EPA has revised the solid state life claim requirements to allow exceeding the above specification requirements so long as those claims can be substantiated through test data (i.e. LM-80) and projections governed by IES TM-21-11 (currently in draft).

Minimum Lumen Output Requirements	Stakeholders suggested that the 850 lumens requirement was too high. Concern was expressed that this value could lead to over-lighting in some instances and limit application design.	The Agency has revised this value to 800 lumens. The 800 lumen value is roughly equivalent to the light output of a 60 watt A-19 incandescent lamp. The luminaire types denoted as non-directional generally employ omnidirectional sources such as a 60 watt A-19 lamp, to illuminate elements of the luminaire (e.g. decorative glass) while also distributing light into the space. EPA notes that generally, these are not the types of luminaires which would benefit from the directionality of LED packages, rather, luminaire manufacturers (and LED light engine developers) will employ various methods to distribute LED output in a variety of directions.
	A few stakeholders noted particular problems with the lumen per head requirement.	EPA adjusted the multi-head luminaire allowance to 'more than 3 heads', expanding the same to include bath vanity luminaires.
SSL Lumen Maintenance Options	Stakeholders expressed concern with the exclusion of option 1 for LM80 testing. Many stakeholders recommended keeping both options, particularly due to the requirement of 6,000 hour testing in option 2 would delay product introductions into the marketplace and increase the cost of qualifying products.	EPA has elected to keep both options in place until industry standards for whole-luminaire measurement and projection can be completed, and until industry gains more experience evaluating luminaire lumen maintenance in this manner. Once this specification is finalized, in a future revision the Agency will revisit the viability of employing whole-luminaire testing, or LED light engine testing as the approach to evaluating lumen maintenance.
Zonal Lumen Density Requirement	Stakeholders noted several issues with the zonal lumen density requirements particularly for undercabinet applications. Some felt the requirements may lead to wasted light output and limit design.	In response to feedback from fluorescent luminaire manufacturers that the under cabinet zonal lumen density requirements were unclear and/or too restrictive, EPA revisited these requirements by conducting photometric testing on (12) ENERGY STAR qualified fluorescent under cabinet luminaires marketed for consumer use. Eleven models were found to meet the above zonal lumen density requirements; one unit failed the 0-60° zone requirement. Out of the (12) units tested, one model did not meet the efficacy requirement. In total, (10) out of (12) under cabinet fluorescent models passed both requirements; the Agency has therefore concluded that the proposed requirements are appropriate.
Outdoor Post or Arm-mounted Luminaires	Stakeholders raised concern with the inclusion of arm-mounted luminaires as it could cause confusion as to what would be defined as an "arm mounted luminaire". Some wall-mounted luminaires could be considered to be "arm mounted" and then classified as a directional rather than non-directional.	In the second draft, outdoor 'arm-mounted' luminaires have been removed to minimize confusion between residential outdoor luminaires and area and roadway luminaires.
	Several stakeholders expressed concern over the "full cutoff" requirement for post-mounted luminaires, recommending that these applications not be considered directional and therefore should not be subject to zonal lumen density requirements.	EPA seeks to limit application of the ENERGY STAR to those post-mounted products which direct light only downward, minimizing light – and energy – wasted into the sky.
Inseparable Luminaires	Some stakeholders requested clarification of an "inseparable luminaire", and to which luminaires these requirements would be applicable.	Further clarification of this luminaire type is included in the second draft, in the Definitions section as well as in the requirements, to clarify that the requirements are applicable to those SSL luminaires which do not feature a user-replaceable LED light engine, and are not otherwise covered among the directional luminaire types.
Lamp Shipment Requirement	Several stakeholders suggested that the lamp shipment requirement be removed from the specification.	The lamp employed in the luminaire is critical to meeting several of the performance requirements in the specification. If the lamp is not included, EPA cannot be confident that performance requirements are met when the luminaire is installed.
	One stakeholder asked for clarification on the exceptions for the lamp shipment requirement, questioned whether it referred to LED lamps.	The second draft clarifies that solid state luminaires must be shipped with all light source components included. The specification does not allow for qualification of luminaires employing screwbase LED lamps. In the forthcoming ENERGY STAR Lamps specification, scope will include GU24 based integrated LED lamps.
	One stakeholder asked for clarification as to why recessed downlights are now required to ship with lamps.	The lamp shipment requirement is now extended to fluorescent recessed luminaires to ensure that those luminaires provide the same performance as tested and certified.

Color Maintenance	Comments were received related to concerns with color maintenance and LM80 testing at 6,000 hour. Concern was raised that results at 6,000 hour may not accurately predict color shift over the life of a product.	Draft 1 required that chromaticity shift not exceed 0.007 over the life of the product. Recognizing that full life testing (i.e. 25,000 hours or 35,000 hours) is not required for ENERGY STAR qualification, the requirement has been adjusted to apply to the minimum required testing duration detailed in IES LM-80 (6,000 hours). EPA has reviewed all LM-80 test reports received to date by the ENERGY STAR program, to understand what chromaticity shifting trends can be found among the existing data. During this review it was noted that for some LED packages or modules, comparing like drive currents, high temperature operation (e.g. Ts = 105°C) lead to greater chromaticity shifting, however in other instances greater shifting was found at lower Ts values.
Off-State Power Consumption	Stakeholders expressed concern with the off state power consumption requirements. Some felt that it might not be achievable.	The first off-state power consumption requirement exception has been revised to 1 watt.
Start-up Time	Several stakeholders raised questions as to why there were exemptions to the start up time requirement. Many felt there there should not be any exemptions to this requirement.	The Source Start Time Requirement language has been modified to clarify the requirement, and to apply the same requirement to all technologies employed for qualification of indoor luminaires.
Testing	EPA received many comments related to the changes in testing and accreditation requirements. Many stakeholders expressed their desire to continue to be able to utilize in-house testing laboratories for testing.	Since the release of Draft 1, EPA has developed Enhanced Testing and Verification requirements for all product categories labeled by the ENERGY STAR program. Included in these enhancements is the requirement – as of December 31, 2010 – that all labeled products must be tested at an EPA-recognized laboratory, and that the resulting test data must be certified by an EPA-recognized certification body. More information is available at www.energystar.gov/testingandverification.