

Topic	Sub-Topic	Comment	EPA Response
<b>Streamlining &amp; Simplifying</b>	General	<p>Stakeholders suggested that the specification could be reorganized to be easier to follow. One stakeholder suggested that EPA structure the luminaire specification similar to the ENERGY STAR lamps specification.</p> <p>A stakeholder inquired if a luminaire could be classified as both directional and non-directional.</p>	<p>Draft 1 has been reorganized, similar to the ENERGY STAR lamps specification to increase ease of use. The specification is currently written so a luminaire type that is classified as directional will have to meet the requirements of a directional luminaire. If the luminaire is not a directional type, it falls into the non-directional category. Inseparable SSL luminaires can cause confusion because there is no way to measure the light source separately so they are measured with luminaire photometry even if they are considered non-directional. EPA welcomes suggestions on how to clarify this in future specification versions.</p>
	Allowable variations	<p>Stakeholders comments were generally supportive of the proposed expansion of allowable variations to account for similar models of varying light output levels, referred to in the discussion document as “scaling”. There was some concern raised for the applicability of scaling electrical properties. Several stakeholders suggested we format the allowable variations section as a table listing which additional tests need to be performed, as was done for the ENERGY STAR lamps specification.</p>	<p>It was evident from some commenters that exactly how this scaling proposal would work was unclear. In the specification draft, the mechanism for “scaling” or allowing an intensity distribution of one luminaire to represent related luminaires has been clarified in the allowable variations section, and each additional luminaire represented would still need a photometric integrating sphere scan and associated electrical measurements, with only the distribution being represented. Additionally EPA has included a clarified table in the allowable variation section.</p>
	Start time	<p>Stakeholder feedback generally supported eliminating the start time testing requirements from the specification, often citing that the market has moved to short start time ballasts and drivers. However, there were concerns raised by multiple stakeholders that the ENERGY STAR dataset is not necessarily representative of the full market, and there are products in the market that cannot meet the start time requirements. As start time is still a concern for consumers, some stakeholders were concerned over the risk to the market and ENERGY STAR brand if the requirement were removed.</p> <p>In addition, laboratories raised concerns over the repeatability of test results because there is no test method referenced in the current Luminaires specification.</p>	<p>To address consumer concerns, EPA is maintaining Start Time requirements in the Luminaires specification, but is proposing reducing the number of samples tested to one.</p> <p>EPA is also proposing that the Start Time Test method from the Lamps Specification be used.</p>

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	Lamp current crest factor	Stakeholders largely supported EPA's assessment that Lamp Current Crest Factor is no longer necessary to the ENERGY STAR requirements. One test lab suggested it was still important for fluorescent lamp life.	EPA has removed the requirement for Lamp Current Crest Factor from draft 1 for the reasons outlined in the discussion document.
	Zonal Lumen Density (Indoor)	<p>EPA received a variety of feedback on proposed updates to zonal lumen density requirements. Some stakeholders suggested eliminating the requirements altogether, while others supported allowing and designating alternate requirements to allow for different designs.</p> <p>At the Luminaires working session a proposal was made to allow alternate light distributions, if the distribution was communicated via some visual method on the packaging.</p> <p>Specific feedback was provided regarding the Zonal Lumen Density requirements for desk task lamps, which suggests a wider distribution may be more suitable to the market. The proposal was to reduce the lumens from 85% to 60% and widen the zone from 0-60 degrees to 0-75 degrees.</p>	<p>EPA has maintained the existing zonal lumen density requirements, and is seeking comments with specific proposals for additional zonal lumen density requirements for each of the directional categories. EPA will evaluate any proposals received, and determine if and how they may be incorporated.</p> <p>As the program is focused on residential market, EPA agrees with stakeholder suggestions that a visual depiction of the light distribution would benefit consumer understanding of a luminaire's performance. EPA has incorporated this as a packaging requirement.</p> <p>EPA seeks additional input on the proposed change to the zonal lumen density requirement for desk task lamps.</p>
	Color angular uniformity	Stakeholders widely agreed with EPA's positioning and proposal for adjusting color angular uniformity in the discussion document. They agreed that EPA should adjust the requirement to be consistent with how it is applied to ENERGY STAR directional lamps, which only focuses on the color angular uniformity of the beam angle, and allows variation up to 0.006 versus the strict 0.004 that was in place for Luminaires.	With the stakeholder support, EPA has adjusted the area of interest and requirement for Color Angular Uniformity to be consistent with that in the Lamps specification. This change addresses repeatability concerns for the low intensity levels that are likely to be found beyond the beam angle into the field angle.

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<b>Increasing Efficacy</b>		<p>Generally, stakeholders were supportive of increasing efficacy levels to reflect the technology advancements that have occurred since the original luminaires specification. Some stakeholders cautioned raising the requirements too high, over concerns that this could eliminate fixtures that were designed to reduce glare and improve quality of light.</p> <p>One stakeholder suggesting setting a threshold for an increase in efficacy for all luminaire designs.</p> <p>Some stakeholders provided suggested efficacy levels for specific luminaire types. One stakeholder suggested EPA use a fixed percentage increase for future efficacy targets.</p>	<p>In draft 1 EPA has raised efficacy for directional luminaire product types based on levels achievable to date.</p> <p>Specific future efficacy tiers have not been proposed in draft one. EPA invites stakeholders to provide input on future levels and whether they should be expressed as simple lumen per watt levels or a set percentage increase in efficacy for a given year.</p> <p>In draft 1 EPA introduced new efficacy levels for removable light sources and retrofit kits that use the fixture for diffusion and therefore do not have any secondary optics.</p> <p>EPA has confirmed that products with high CRI (90+) can and already meet the efficacy levels proposed in the first draft, but we do not have information on glare or the “smoothness” of the light from the more efficacious products. EPA encourages stakeholders to provide specific feedback and data to support any concerns over light quality impacts such as glare as a result of the proposed efficacy levels.</p>
<b>Adjusting Scope &amp; Increasing flexibility</b>	New & Expanded Product types	<p>Comments were supportive of adding additional retrofit products. Several certification bodies supported expanding the retrofit category as it is a high demand category for their customers. One suggested that many “worst case” testing conditions could be added such as defining a small list of reference fixtures for testing in to meet the requirements.</p> <p>Some very specific suggestions were provided for the two examples of retrofits that were included in the discussion document, namely citing the safety standards for these products, performance levels and installation guidelines.</p>	<p>Given the stakeholder support and data provided for the specific examples cited in the discussion document, EPA has included surface-mount retrofit kits for diffused wall sconces and ceiling mounted luminaires in draft 1.</p>
	Color Tunable & Connected Luminaires	<p>Stakeholders supported the inclusion of luminaires that could adjust color appearance and light output via external digital controls, but that a method of testing and describing these capabilities would be necessary.</p>	<p>EPA has created a new section to address testing color tunable luminaires as well as a new controls section of the specification to elaborate on fixtures with controllable or connected fixtures.</p>

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	Fixtures that ship without light sources	<p>Energy efficiency advocates supported the proposal to remove fixtures that do not ship with light sources.</p> <p>Two manufacturers were in favor of maintaining linear fluorescent fixtures that do not ship with lamps in the specification. The main reason they both cited was the challenges associated with shipping fixtures with linear fluorescent lamps related to packaging and waste for the increased likelihood of lamps to break when shipped with the fixture. The manufacturers indicated that by requiring lamps to be shipped with fixtures it would effectively remove linear fluorescent fixtures from the specification, due to the impracticality of shipping the lamps with the fixtures.</p> <p>One manufacturer suggested that consumers would suffer without an ENERGY STAR linear fluorescent fixture option which is associated with efficiency and quality. They also noted that consumers would suffer from non-ENERGY STAR products potentially lacking the packaging and marking required by ENERGY STAR to help them select the appropriate lamps.</p> <p>EPA received feedback inquiring if linear fluorescent lamps were being excluded, or only those that do not ship with lamps would be impacted.</p>	<p>As introduced in the Luminaires discussion document, EPA is removing those luminaires that do not ship with lamps.</p> <p>In response to stakeholder request for clarification EPA clarified that the proposal is to remove luminaires that do not ship with lamps, as well as removing linear fluorescent lamps as a light source option. The U.S. Department of Energy has very stringent minimum standards for these lamps and ballasts, exceeding the ENERGY STAR requirements for efficacy. The 2009 DOE rulemaking which took effect this year (2014) required that the majority of ballast types to be at efficiency levels that are considered the maximum technology, leaving little room for improvement over the mandatory federal standards. Per DOE estimates, the standard for fluorescent ballasts is anticipated to save approximately 5.6 quads of energy and result in up to \$24.1 billion in energy bill savings for products shipped from 2014-2043.</p>
	Light Source flexibility: LED light engines	<p>Efficiency advocates supported updating the definition of LED light engines as a natural progression for the specification to better reflect market trends.</p> <p>Support was provided for updating the definition using something similar to the Zhaga definition or adding additional clarity to the IES RP-16 definition of LED Light engine.</p> <p>One stakeholder suggested “LED light engine should be defined as the combination of LED modules, mounting mechanism, first heat sink layer or slug and LED driver.”</p> <p>One stakeholder cautioned EPA from referencing Zhaga for LED light engines due to the evolving nature of the standard and the industry and potential restrictions it could have that could stifle innovation.</p> <p>Comments were mixed on whether updating the definition of LED light engine would eliminate the need for inseparable luminaires.</p>	<p>Per the discussion document, EPA’s intent in revising the definition of LED light engine is to allow additional flexibility for manufacturers in designing SSL luminaires. This is reflected in the new definition for LED light engines in draft 1.</p>

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	<p>Light source Flexibility:</p> <p>Certification Pathway Utilizing ENERGY STAR Certified Lamps</p>	<p>Stakeholder feedback on the proposal to allow a pathway for luminaire certification based on including ENERGY STAR certified lamps had both support and concern.</p> <p>Some of the concerns raised by stakeholders included concerns over additional testing, costs of including lamps with fixtures, and distribution channel challenges to using only one particular brand of lamp.</p> <p>Those supporting the proposal noted the potential for better economies of scale for screw based light sources could ultimately reduce the cost to the consumer, and increase the serviceability of luminaires. Comments received suggested that screw-base luminaires give the consumer greater access, more choices, and lower prices for efficient LED or CFL replacement lamps compared to GU-24 based alternatives.</p> <p>The approach was generally supported by utility programs but expressed reservations on how they could integrate these products into their programs. The utilities that commented support the ease of lamp replacement and flexibility. One suggestion was to only allow the inclusion of 2700K – 3000K lamps to reduce the chance of consumers reverting to incandescent over color concerns.</p> <p>NEEP noted that ENERGY STAR Certified Lamps are specified to maximize consumer adoption with longer lifetimes, reducing the chance that a consumer will remove an efficient screw-based lamp from a fixture and replace it with an inefficient option. They also noted it would extend the lifetime and usefulness of the luminaire by allowing replacement of the bulb with another more efficient option in the future.</p>	<p>EPA recognizes that some of the concerns over the implementation of this pathway may originate from the limited details in the discussion document. The implementation pathway is detailed in the first draft of the specification, and should address many of the stakeholder questions and concerns.</p> <p>EPA recognizes the suggestion to require lower color temperature sources, however EPA expects luminaire manufacturers to market products that will have the widest appeal. As warmer products are more popular and widely produced, it is likely that there will be better economies of scale and luminaires will trend towards warmer white naturally.</p>
<p><b>Comments received on topics not in the discussion document</b></p>	<p>CRI</p>	<p>One manufacturer suggested raising CRI limits to 90.</p>	<p>EPA believes that the existing levels for CRI are adequate for most residential use and allows for manufacturers to differentiate in the market. EPA will continue to monitor efforts for a better color fidelity or quality metric for all lighting technologies covered by ENERGY STAR.</p>
	<p>Source photometry</p>	<p>One manufacturer suggested eliminating source photometry.</p>	<p>There are many ways to make efficient luminaires for consumer needs. Many luminaire types do not lend themselves to luminaire photometry due to the decorative nature of the glass or fixture design. For more information on the background and history behind EPA's approach to luminaires see <a href="#">Luminaires V1.0 specification development page</a>.</p>

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	Specification transition	A stakeholder asked about what happens to products certified under an old specification when a new version goes into effect.	A version 2.0 specification change would require all luminaires to be certified to the new version. Luminaires that already meet V2.0 levels will still need to be recertified prior to the effective date in order to maintain certification.
	Equivalency claims	One manufacturer suggested that EPA institute equivalency claim guidelines based on the luminaire using an incandescent source. And suggested for example equivalency guidelines for recessed downlight retrofit kits.	The light output requirements in the specification were based on incumbent technologies. Given the wide variety of fixture types, setting incandescent equivalency requirements would be impractical.
	Lifetime	EPA received comments that rated lifetime requirements should be raised to 50,000 hours for some luminaires types while other types more commonly replacing incandescent lamps to be reduced 10,000 hours.	In draft 1 EPA introduced a lower lifetime for luminaires to allow for the use of decorative ENERGY STAR certified LED lamps. EPA raised the minimum rated lifetime and lumen maintenance requirements for inseparable SSL luminaires to 50,000 hours which reflects trends already present in certified inseparable SSL luminaires and supports longer lasting luminaires that do not have serviceable parts.