

Topic	Sub-Topic	Comment	EPA Response
Certified Lighting Subcomponent Database	Adding Drivers and Modules	A stakeholder noted that a large number of separate drivers and modules do not qualify for the CSD because they are not integrated. This stakeholder mentioned that allowing separate LED modules and drivers into the CSD would greatly expand choices for luminaire manufacturers while reducing testing burden, decreasing time to market, and expanding consumer options.	Based on the revised definition of an LED light engine, it may be possible to incorporate separate LED modules and drivers into the CSD to generate an LED Light engine. EPA is monitoring the ANSI driver standard development process, and will consider the addition of LED drivers to the CSD once the ANSI effort is complete. Similarly, when the LED driver standard is complete, EPA will evaluate whether adding separate LED modules is appropriate, and seek feedback on applicable test standards and data to be included in the CSD.
Color	Color Rendering Index	One manufacturer partner expressed support for the 80 CRI minimum, but urged EPA to consider moving towards 90 CRI in the future and ultimately to align with California Energy Commission's levels because having two different standards is challenging for manufacturers.	EPA's position is that the 80 CRI level is acceptable for the majority of uses, and the specification does not prevent a partner from offering higher CRI products.
Color	Color Angular Uniformity	A stakeholder noted that the color angular uniformity requirement does not accurately portray luminaires' color angular uniformity in various applications. The stakeholder recommended that the requirement be removed until a better test methodology is developed or require that this information be tested and provided to the customer in a format similar to the Lighting Facts label.	To address the challenges of measuring color angular uniformity at low intensities and focus on the area that will contain the most usable light, EPA has adjusted the requirement so the evaluation is restricted to the luminaire beam angle.
Color	Color Tunable Testing	One manufacturer recommended that color tunable testing specify that testing be performed at the least efficient setting within ANSI white light CCT ranges of 2700K or greater." The reason being that "ANSI C78.377 is being revised to define nominal 2200K and 2500K ranges. Operation at these ranges may be less efficient than at 2700K, but a residential tunable luminaire will likely use these ranges only a small portion of the time." One stakeholder requested to remove the repetition of the definition from Section 4 and remove the requirement for the default setting	EPA has proposed that all tests and evaluations for color tunable products shall be performed at the least efficient white light setting included in the specification. Watts, lumens, chromaticity, and CRI shall be tested and reported for Default and Most Consumptive Settings (if different from least efficient white light setting).

Topic	Sub-Topic	Comment	EPA Response
		<p>testing. This stakeholder also noted that as long as manufacturers provide a justification for the least efficacious CCT setting, it should be satisfactory to CBs to ensure compliance with that requirement.</p>	
Color Maintenance		<p>A stakeholder noted that a standard is lacking for color maintenance and recommended that a TM document be developed to predict color maintenance.</p> <p>A stakeholder expressed support for the changes to section 10 regarding tracking of color maintenance during lumen maintenance testing, assuming that it is not too much of a testing burden.</p> <p>Another stakeholder noted that the change in evaluation of color maintenance will now require all chromaticity test points in the LM-80 data set for LED chips, modules, and arrays to be re-checked by the 3rd-party CB's and the manufacturer will bear the cost. The stakeholder recommended maintaining the existing evaluation method for determining compliance with the color maintenance requirement or providing a data-supported rationale for including a reevaluation.</p>	<p>EPA maintains that color maintenance is an important factor in customer satisfaction, and while there is no predictive projection method available, LM-80 reports typically include chromaticity at each measurement point which can be evaluated without additional testing. While each LED package, array, or module will have to be verified to meet the requirement, an LED is typically used in a large number of luminaires, which means it would not need to be individually reviewed for each luminaire which in turn, should reduce the cost of review.</p> <p>EPA recommends interested stakeholders review DOE's SSL product color maintenance data which shows problems with color maintenance after 6,000 hour test points. EPA has also observed products failing color maintenance in verification testing and believes taking this extra step should help reduce cases of noncompliance.</p>
Connected Criteria: Optional		<p>A stakeholder requested clarification on the definition of interoperable/open.</p> <p>A stakeholder supports EPA's effort to introduce connected luminaires, but expressed concern that the specification is based on the performance of connected lamps and not luminaires. The stakeholder requested the requirement for power in standby mode be increased to 1.5W to reflect the needs of this emerging technological application.</p> <p>A stakeholder expressed that the operational status reporting on the energy drawn by the luminaire, on/off status, lumen levels, and color temperature (if color tunable) would be key pieces of information for</p>	<p>EPA has updated the language to clarify the requirements to be considered a connected luminaire based on the targeted stakeholder discussion held in April 2015 and to be consistent with the Lamps V2.0 Draft 2 language.</p> <p>Additionally, EPA has removed the need for operational status reporting to include luminous intensity and color data and has updated the definition for increased clarity and consistency with the ENERGY STAR Lamps specification. EPA has adjusted the open access requirements in</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>consumers. The stakeholder supports the requirements for remote management and suggested a more thorough analysis of third party remote management as several connected lighting products have Home Management Systems (HEMS) that they integrate with directly. The stakeholder also recommended asking manufacturers of connected-bulbs what information is currently being reported.</p> <p>A stakeholder requests that EPA remove the repetition of the definition of connected product criteria from Section 4. The stakeholder also believes that a connected luminaire should be held to the same photometry, electrical and mechanical specifications as a standard SSL luminaire. The stakeholder also noted that energy consumption reporting would add considerable cost and development time, which would adversely affect energy efficient lighting and does not recommend including this requirement.</p> <p>A stakeholder recommends using open standards such as ZigBee and suggests deleting references to API due to its impracticality. Stakeholders suggested removing section 15.2.2. as existing standards, testing procedures, and certifications exist for various open protocols (DALI, ZigBee, EnOcean, Wi-Fi and Bluetooth). The stakeholder suggested that proprietary protocols be allowed and not be governed by the EPA and noted that open standards do not equal interoperability.</p> <p>A stakeholder suggested removing energy consumption reporting from the requirements because it provides little value with respect to residential lighting. The stakeholder also commented on Note box 17 stating that the specification should drive a simplistic approach and allow consumers to select the winning features vs. cost and that by requiring a basic suite of criteria, the specification will allow for broader innovation.</p>	<p>recognition of the unique challenges of using non-proprietary protocols for lighting, and in acknowledgement that the market is already driving robust interoperability for lighting.</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>A stakeholder noted that on/off should be the only minimum required for operational status reported. Luminous flux and color will add cost, potential system latency, and potentially increases in standby power.</p> <p>A manufacturer suggested removing the open standards and open access requirement and suggested that EPA should not govern or prevent the use of proprietary protocols-further suggesting that open standards do not equal interoperability.</p>	
Correlated Color Temperature (CCT)	Additional CCTs	<p>A stakeholder requested including 5700K and 6500K CCTs as defined by ANSI C78.377-2008 to allow the ENERGY STAR specification to cover luminaires that use these CCTs stating that 5700K is very popular in medical, entertainment, outdoor and high bay applications and 6500K is being used in outdoor and cold storage in supermarkets. Additionally, another stakeholder requested EPA to include 2200K and 2500K as defined in the forthcoming ANSI/ANSI C78.377-2015.</p> <p>Two stakeholders requested that EPA to add 2200K and 2500K CCT bins, while one stakeholder noted that because the specification applies to residential products; it may not make sense to allow the lower CCT provision. They recommended that EPA examine the categories to determine what would classify as ambient or decorative lighting.</p> <p>One stakeholder commented on Note box 10 stated that it is difficult to quantify savings of future products, but that LED luminaires will save a greater percentage of energy at sub-2700K CCTs than at 2700K because at the lower CCTs more of the dimmed incandescent output is invisible IR, which further reduces efficacy.</p> <p>A stakeholder inquired about the reasoning behind the minimum and maximum CCT temperatures specified in 9.3 as they do not relate to the efficacy and the consumer does not understand the concept of light "color." The stakeholder also noted that limiting consumers' choice of color temperatures hinders the consumer's option to choose</p>	<p>EPA is aware that IES is in the process of updating ANSI C78.376-2001 and C78.377-2011 to include CCT bins for 2200K and 2500K, and will consider these CCTs for a future specification revision once the update is published.</p> <p>EPA is also aware of the 5700K and 6500K CCT bin ranges, but acknowledges that these CCTs are typically used in specialized applications, often commercial, which are not within the scope of the ENERGY STAR Luminaires specification.</p>

Topic	Sub-Topic	Comment	EPA Response
		higher temperature light engines and noted that reconsidering the high end of the limit to 6500K would be reasonable.	
Correlated Color Temperature (CCT)	High CCT Products	One stakeholder expressed concern over the inclusion of 4000K/4100K and 5000K CCT lamps due to the negative impact on the circadian rhythm of plants, animals and humans and noted that blue light is historically perceived as unacceptable in the low-light levels generally found in residential homes. The stakeholder urged EPA to remove the 5000K option. The stakeholder also referred to a study that found that consumers could not relate color temperature of lighting to a descriptor and stated that adding a descriptor will add another level of complexity.	EPA is monitoring on-going research on the impact of blue light on health. While the higher CCTs may or may not be appropriate for all situations, there are situations where the higher CCTs are acceptable and useful, and EPA wants to ensure there are high quality, energy efficient options available at these CCTs as well.
Definitions	ceiling/close-to-ceiling mount luminaires	A stakeholder stated that the definition for ceiling/close-to-ceiling mount luminaires incorrectly describes these fixtures as providing "less than 90% of light downward" and noted that there is no definition for "separable."	The definition of close-to-ceiling mount is unchanged from Luminaires V1.0, and is not an error; a fixture providing more than 90% of light downward is likely to be considered a directional downlight. By defining an inseparable SSL luminaire explicitly, EPA believes that a definition of a separable luminaire is inferred to be a luminaire that does not fit the definition of inseparable and therefore does not need a separate definition.
Definitions	Color Tunable	A stakeholder proposed a new definition for color tunable luminaire to clarify the color change to be controlled and cannot be achieved simply by dimming the product, and to qualify a comment "along the blackbody curve."	EPA's testing of the color tunable requirements is not intended to address products that change color when dimmed, unless they can be color tuned at full brightness as well. While an individual product could incorporate both features, EPA has introduced a separate definition for products that only change color when dimmed in order to clarify the difference.
Dimming	Testing	A manufacturer suggests that this dimming requirement will add a cost burden and does not guarantee dimming performance or compatibility. The manufacturer further states that while many dimmable luminaires may be capable of dimming to 20%, many were not initially tested at this level and will require retesting to recertify.	EPA has clarified dimming testing and requirements per stakeholder feedback. Dimming range may be tested as relative or absolute levels, and the test should be performed at the lowest dimming level recommended by the

Topic	Sub-Topic	Comment	EPA Response
		<p>The partner suggests that EPA postpone changing dimming requirements until an industry test method is created and instead only require manufacturers to clearly communicate dimming type and known compatibility.</p> <p>A manufacturer requested clarification on what level noise should be tested for dimmable luminaires, at 100%, 20% or lowest dimming setting, or all? The manufacturer also recommended EPA remove all references to noise emission from the specification.</p> <p>A stakeholder highlighted that section 15.1 suggests requiring noise tests only at the dimmed state and that the sample size would be clearer if it required one complete luminaire since it does not appear that one complete luminaire is required.</p>	<p>partner that meets the 20% requirement. EPA has also included a reference to the industry developed dimming test method NEMA SSL 7A for applicable products.</p>
Efficacy	Future Tiers	<p>One manufacturer partner opposed future tiers without “factual data and cost implications supporting the increase.” The manufacturer cited that the proposed tiers are believed to come from projections which are not guaranteed, and that if they remain, should also apply to bulbs shipped with fixtures.</p> <p>Another manufacturer believes that the proposed rate of increase may not be appropriate because it is based on assumptions that may not come true or may come true with accompanying negative factors, like high cost or poor color maintenance. They suggest that automatic increases based on future assumed performance improvements should not be made.</p> <p>Another manufacturer said that it places a burden on luminaire manufacturers to redesign products every two years and recertify them. They suggested that it would be better for EPA to monitor the landscape and determine if efficacy increases are needed.</p> <p>One manufacturer was supportive of the initial efficacy requirements, but believes there will be a need for a true specification revision before 2018 and efficacy increases can be discussed at that time.</p>	<p>EPA proposed future efficacy tiers based on a projection rate established by extensive R&D research performed by the U.S. DOE. EPA did not align with the projections only the rate of increase projected. There are products certified today that already meet some of the proposed tiers.</p> <p>Based on concern from multiple stakeholder groups, EPA has removed the proposal for future tiers. The stakeholder feedback was consistent in expressing concern that the projections could be too conservative and not capture future performance improvements, or too aggressive and inadvertently remove high performing products. With this removal, capturing efficacy gains in the future will be a consideration for future specifications with the proposed tiers as a starting point.</p>

Topic	Sub-Topic	Comment	EPA Response
		Additionally, this manufacturer believes that automatic increases would stifle the addition of features that could drive adoption.	
Efficacy	Recessed Downlights	A manufacturer supports raising efficacy requirements to match current technology, but suggests consideration should be given to support designs for quality of light, such as, but not limited to, high CRI and cut off angle provided by optical control and source regression. Citing the tradeoff between quality of light and efficacy the manufacturer suggests that the efficacy be lowered to 50 lumens per watt for downlights.	Downlight efficacy has been adjusted to 50 lumens per watt. Considerations behind this change include maintaining a broad selection of qualified products, conversations with partners about ensuring product affordability, and the challenges faced by partners trying to meet California Title 24 requirements.
Efficacy	Accent Lighting	A manufacturer suggested that EPA align efficacy levels for accent lights with those of the DesignLights Consortium™ since this is an overlapping category and aligning levels could reduce redundancy and eliminate the testing and reporting burden.	EPA and DLC have different revision timelines so it may not be appropriate to align levels at this time.
Fixtures Shipping with ENERGY STAR Bulbs		<p>Stakeholders continued to express both support and opposition for the certification pathway for fixtures to ship with ENERGY STAR certified lamps.</p> <p>One stakeholder cited that the certification pathway would immediately open a wide variety of additional designs to the consumer seeking energy efficient lighting, as well as the builder who needs ENERGY STAR qualified lighting to meet the ENERGY STAR Homes requirement for new construction.</p> <p>One manufacturer while supporting this certification pathway, expressed concern that someone would replace an expensive LED lamp with an incandescent as a “remote” concern – certainly not large enough to require a different base type.</p> <p>Several manufacturers expressed their objection to this certification pathway, suggesting that integrated products offer the most reliable and predictable results.</p> <p>One stakeholder cited that LED lamp manufacturers are not open to sharing critical information relative to acceptable Tc point limits and locations with luminaire manufacturers. One of the largest LED lamp</p>	<p>Shipping with ENERGY STAR certified lamps is only one option for non-directional, decorative light fixtures which are largely purchased for the way they look and have always been allowed to ship with integrated bulbs. The change proposed is to eliminate the requirement for a GU24 base to allow for greater flexibility and light source options.</p> <p>EPA has a robust Lamps specification, certifying lamps without any pairing to a fixture; this option helps the consumer by pairing bulbs with the right fixture, thus removing the confusing bulb purchasing decision. The additional thermal testing for enclosed fixtures should provide for safe and reliable performance in these more heat sensitive environments.</p> <p>EPA believes partners will use smart business sense to determine which products this option makes sense for and with which products to take a different design approach.</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>manufacturers commented that they do make this information available to luminaire manufacturers.</p> <p>One manufacturer who does not support this certification pathway was concerned that the pathway would allow legacy light sources of lower efficacy or inferior thermal performance to be used as replacements. Further, this manufacturer expressed that while EPA has partially addressed some concerns to help ensure a lamp shipped in the fixture operates acceptably, it suggested that consumers may be unhappy with a color temperature of the bulb that comes with the fixture and there is no guarantee they will replace it with an acceptable efficient lamp. The same partner supported the additional thermal testing for shipping bulbs with enclosed fixtures.</p> <p>One manufacturer believes that simply by having this certification pathway available it will “force” luminaire manufacturers to maintain multiple listings for the same fixture when using ENERGY STAR certified lamps with different colors. They said this is unnecessary since consumers can readily purchase any ENERGY STAR certified lamp. They also said there is a potential for poor lighting distribution, such as hot spots and shadows, depending on the lamp used. The same partner pointed out the ease for lamp replaceability as a concern citing that the luminaire could be relamped with inefficient lamps and still be listed on the ENERGY STAR web site.</p> <p>One manufacturer specifically did not support allowing certification of enclosed fixtures with ENERGY STAR lamps. The partner pointed to the stricter requirements placed on integrated fixtures and suggested that preferential treatment was being given to the lamp industry. They also cited that UL has not addressed the conditions of suitability of ENERGY STAR lamps in luminaires and that their own internal testing has shown that conditions of suitability are not being met. They pose that ENERGY STAR is setting the stage for unsafe conditions, and no assurance for when a lamp replacement is used.</p>	

Topic	Sub-Topic	Comment	EPA Response
		One manufacturer suggested that EPA further examine lessons learned from the state of California rule that requires portable light fixtures to ship with efficient screw-based light bulbs. It was suggested that this configuration is less desirable for retailers, due to the high percent (roughly 35%) of loss due to lamp breakage, theft, and returns of fixtures without bulbs.	
Lighting Toxics Reduction Requirements		<p>A stakeholder noted that the hyperlink to RoHS needs to be updated to the latest Directive 2011.</p> <p>A stakeholder asked why EPA is relying on a European standard and why it references a 12 year old standard that is not in effect in Europe. The stakeholder suggested that if there is no equivalent requirement in the U.S., it should be eliminated.</p> <p>Another stakeholder suggested that EPA update the EU Directive.</p>	<p>EPA addresses toxics because it wants efficient products to be broadly acceptable and consumers have an expectation that the products they use in their homes are safe. The RoHS requirements are referenced to maintain a minimal environmental impact for efficient lighting.</p> <p>EPA has referenced an older EU Directive intentionally, as this is the version EPA feels is most appropriate for this category and market.</p>
Methods of Measurement and Reference Documents	Lumen Maintenance Projection	A stakeholder cautioned against using IES TM-21 Addendum A as it does not include preamble language informing the reader what it is intended to control and recommends that EPA contact NIST.	EPA is in communication with the IES, and currently accounts for products that meet the addendum, and those that do not. Currently, no ENERGY STAR specification cites the addendum. EPA is proceeding cautiously and will cite the appropriate document when the test procedures committee intent is clear and EPA has had a chance to evaluate any potential impacts to the program and partners.
Operating Frequency/ Flicker	IEEE PAR1789	Two stakeholders noted that the IEEE PAR1789 has not yet been published and noted "major issues" with the draft including that the draft has set a low-risk level while acknowledging the lack of data available. These stakeholders recommend that it be removed from the list of references due to its lack of data and limitations on products.	EPA included IEEE PAR1789 as a helpful reference document when considering multiple frequency components of an SSL product, but does not require a product to follow the test methods or meet the performance requirements set forth in the document.
Packaging	Use of Consistent	Several stakeholders disapprove of the proposal to add a CCT descriptor. One stakeholder noted that describing 2700K, 3000K, and 5000K as the terms Soft White, Warm White, and Daylight would not	EPA recognizes that the market is already utilizing descriptive terms for color temperatures to assist consumers in making the appropriate selections

Topic	Sub-Topic	Comment	EPA Response
	CCT Nomenclature	<p>be consistent with the traditional industry use of these terms and if implemented would cause significant market confusion. One stakeholder supports NEMA’s position to not include a mandatory requirement for color names.</p> <p>Some stakeholders support EPA’s decision to standardize the verbiage used to describe the color of light, but recognize the concerns from manufacturers regarding packaging changes and legacy use of terminology. One stakeholder suggested that EPA develop "recommended" terminology for color temperatures.</p> <p>One stakeholder also proposed the following standard terms:</p> <ul style="list-style-type: none"> • 2200K & 2500K (if added) = Candlelight • 2700K = Warm White • 3000K = Bright White • 3500K = Neutral White • 4000K = Cool White • 5000K = Daylight <p>A stakeholder suggested amending the verbiage in the following statement to align with commentary from the webinar that indicated this requirement is meant to be optional, “Packaging shall clearly describe the nominal color designation of the lamp in units of Kelvin (e.g. 2700K, 3000K) and the corresponding nomenclature as outlined below.”</p>	<p>for their needs. As this is already common practice, EPA is not asking for additional labeling, rather is seeking to harmonize the terms for a more consistent consumer message.</p> <p>In response to stakeholder feedback, EPA has made slight revisions to the nomenclature and made it a recommendation instead of a requirement. EPA has also clarified that use of the DOE LED Lighting Facts label as appropriate may fulfill the color labeling requirements.</p>
Packaging	Zonal Lumen Density Depictions	<p>One manufacturer partner suggested that the light distribution depiction of directional luminaires needs to be further fleshed out to be relevant. Because light distribution is much more important during the specification and design process, these distribution sheets should be available on the manufacturer’s website or in printed catalogs. Having the drawing or diagram on the carton is too late in the process to be meaningful. Lumen distribution is often part of third party testing and because of its complexity is usually only understood by a lighting professional. Consumers and installers will typically find no</p>	<p>EPA has made the light distribution graphic requirement more flexible so that information can be presented to the designer or end user earlier in the purchasing process.</p>

Topic	Sub-Topic	Comment	EPA Response
		value in this information. EPA should consider how to make this more relevant to the application designer, installer and user.	
Photometric Requirements	Testing SSL Downlight Retrofits	Two certification bodies suggested that guidance on the photometric testing of SSL downlight retrofits is unclear leading to inconsistent testing and requests EPA to clarify testing in section 9.2. Specifically they requested EPA clarify whether or not downlight retrofits are required to be tested in the worst case that the product is rated for. A lab cited a variance of 5-30% in light output based on measurements in different cans.	After careful consideration, EPA has included a testing clarification for SSL downlight retrofits, noting that they need to be tested in a recessed can environment consistent with their ANSI/UL 1598C safety rating and installation instructions which should represent the worst case environment that they have been safety rated for and ensure consistent testing for these products.
Photometric Requirements	Light Output Minimums	One stakeholder expressed concern with the minimum light output levels citing that some minimums are fine for traditional designs but may not accommodate future designs that are likely to have many small heads and low light per head for a cumulative amount of suitable light.	Based on stakeholder discussions on luminaire use and a desire to allow novel and innovative luminaire design, EPA has revised the minimum light output requirements for non-directional fluorescent and LED light engines to include a more flexible cumulative minimum light output requirement.
Photometric Requirements	Under-cabinet and Cove Light	<p>One stakeholder suggested that the efficacy for under-cabinet lights and accent lights should be 50 lm/W and not 55 lm/W to allow for new light technologies to be utilized at a reasonable cost and high efficiencies.</p> <p>A laboratory and certification body suggested that the required light in the 60-90 degree zone is not necessary, and should be eliminated.</p> <p>One stakeholder expressed concern with the lumen output of 200 per foot for cove lighting, stating it is substantially higher than necessary and found it difficult to visualize where this high lumen demand would be applicable in a residence. This stakeholder also suggested switching the luminous efficacy requirements to 0-60 degrees to include popular lighting effects used by designers vs. the 0-40 degree range.</p> <p>Another CB requested EPA establish a method to test retrofits performance requirements in a manner that is consistent across all laboratories and noted that the supplemental testing guidance for</p>	EPA has reviewed under-cabinet lights, as well as cove lighting, and these categories have been combined into a single category based on the similarity of the products with a 50 lumen per watt efficacy requirement and minimum light output requirement of 125 lumens per lineal foot. The requirement for asymmetrical distributions has been removed to simplify the specification, and to allow for more flexibility for different product designs.

Topic	Sub-Topic	Comment	EPA Response
		luminaires with an asymmetrical distribution pattern should also apply to the under-cabinet luminaire type.	
Power Factor		A stakeholder noted that in Clause 11.3 there is no power factor limit for commercial products.	As noted in a previous draft of the specification, there is no longer a distinction between luminaires that are sold into residential or commercial markets, and therefore there are no longer separate requirements for products sold into commercial markets. EPA expects that manufacturers targeting commercial markets will have higher power factor in order to compete in that market.
Product Families		<p>A CB requested clarification on the allowed wattage range of family members that may be certified and listed on one line on the QPL.</p> <p>A partner requested clarification on Table 1 of section 6.1 in regards to the sphere scan that must be performed on product families with different CCTs and the full tests required for the lowest CCT for SSL products.</p> <p>A stakeholder shared that while consistent CB interpretation is desired by EPA and manufacturers alike, it cannot be avoided by the changes set forth in the “Additional Test Data Required for Each Variant” column revisions in Draft 2. They further suggested that if interpretation is not allowed, then all product families of this type will inherently be required to have a multiple number of new tests before recertification. Since interpretation cannot be completely eliminated, they recommended EPA revert back to the original verbiage as Test “Guidance”, and add “may be required” to allow for some interpretation.</p>	<p>A footnote was added to clarify each wattage variant should be listed separately to accurately represent the requirements for energy consumption reporting.</p> <p>EPA has clarified the intent that when considering CCT allowable variations, the lowest CCT of SSL product (and the highest CCT of fluorescent product) is to be tested, and other CCTs may be listed without additional testing. If the partner desires, additional CCTs may be tested to capture the additional performance and efficiency for product listings.</p> <p>EPA has updated the required information for variations to allow for CCT variations without additional testing as has been common practice, clarified testing for the reflector and trim variations, and specified the required performance that is evaluated for wattage variations.</p>

Topic	Sub-Topic	Comment	EPA Response
Product Labeling	Dimming	A stakeholder suggested that EPA eliminate the dimming range on the packaging and maintain the URL link for full details since different dimmers may perform differently on the same luminaire.	It is EPA's intent that the dimming range listed on the package does not have to represent all possible dimming ranges observed for all possible dimmer combinations. It is merely meant to be an estimate based on typical performance of the product on most dimmers to help the end user's purchasing decision.
Recertification		<p>A manufacturer requested that EPA provide a testing and recertification guide for partners and CB's. The partner expressed that current quotes based on Draft 2 proposals vary greatly among CB's.</p> <p>One manufacturer suggested the effective date for V2.0 should only be set after manufacturers have been given sufficient time to evaluate the complexity and extent of the design changes needed to meet the new requirements per the final draft and have received adequate feedback from the CB's on the timeframe to review and recertify existing products for each manufacturer. They also suggested an 18 month transition period based on the last major version revision.</p> <p>Another stakeholder proposed a 9 month grace period for products certified to Luminaires V1.2 from the date of release of Luminaires V2.0.</p>	EPA will provide 12 months for transition and recertification guidance.
Serviceability / Replaceability		A stakeholder noted that many luminaires have components that are intended to be replaced by an electrician, not a homeowner, and in these situations wire nuts are not a safety concern.	Based on stakeholder discussions and comments, EPA has adjusted the specification to remove the restriction against utilizing wire nuts as an electrical connection method.
Shipping with ENERGY STAR Bulbs	Directional Fixtures	One partner applauded EPA's inclusion of screw-based lamps in luminaires and the elimination of the GU24 base requirement and encourages ENERGY STAR to also allow screw based directional lamps in directional luminaires. Another partner expressed concern over the use of ENERGY STAR lamps in downlights.	<p>EPA is not proposing to fundamentally change the approach to certifying directional fixtures such as recessed downlights at this time.</p> <p>Small diameter recessed downlight retrofit kits are not excluded from the specification.</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>A manufacturer is strongly opposed to allowing bulbs to ship with recessed luminaires, but suggested that EPA consider adding MR16 retrofit kits and allow for the use of GU10 based sockets and that the efficacy level for these kits should be 50 lumens per watt.</p> <p>A manufacturer suggested that EPA reconsider allowing for use of directional lamps in directional fixtures for the luminaires specification due to the many suitable lamps with excellent thermal performance. This manufacturer cited lamps that have thermal sensing and reduce power automatically if the temperature becomes too high to protect the lamp, making them suitable for difficult thermal situations, even when the user disregards instructions.</p> <p>A manufacturing partner who has been designing and selling recessed down lights with ENERGY STAR lamps suggested that EPA reconsider allowing a certification pathway for directional luminaires to ship with ENERGY STAR certified lamps. This manufacturer proposed to have photometry for PAR lamps used to support certification of the luminaire citing that internal tests show photometric data of lamps to not have been affected by fixture geometry. They suggest that life would be comparable to an integrated LED solution and risks of modifying the performance of fixtures are limited.</p> <p>Further, the partner suggests that the efficiency of incentive programs has been diminished because recessed fixtures including ENERGY STAR bulbs have not been eligible for rebates. Excluding these products undermines the objective of the program since the ratio of recessed fixtures in a typical residence versus non directional luminaires is about 5 to 1. The partner also cited consumer confusion over why ENERGY STAR certified bulbs sold with recessed fixtures do not come with rebates.</p>	<p>Utility programs decide which products to rebate, whether it is bulbs or fixtures or both. Manufacturing partners should contact utility programs or regional or national utility groups to discuss these concerns.</p>
Standby Power		<p>A stakeholder noted ambiguity between the definition of "connected" in sections 15.2.1 and 11.5 and requested that EPA define "connected" in one section or include it in section 4. The stakeholder also requested clarification in section 11.5 on what "off state" is when multiple</p>	<p>EPA has made clarifications in the specification and included a definition of standby mode to help address ambiguity.</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>luminaires are connected to one power supply and if the 1.5W off state power consumption requirement is in addition to the 0.5W per fixture requirement. The stakeholder stated that sections 11.5 and 15.2 seem to be enforcing the same standard and that it should be removed from 15.2.</p> <p>Several manufacturers requested EPA consider an allowance of 1 - 1.5W in standby mode for connected luminaires.</p> <p>A stakeholder supports EPA's inclusion of the criteria for connected luminaires and reiterates their request in Draft 1 to limit standby power draw to 0.5W or less.</p> <p>One manufacturer acknowledged that while efforts are underway to reduce standby power, many protocols are not there yet. They suggest that the current proposal of 0.5W would restrict design options and reduce creativity.</p> <p>Another manufacturer said that for luminaires with integral motion sensors, photosensors or connected functionality to operate with 0.5W would require luminaire designs to be extremely efficient and will limit consumer choice of smart fixtures.</p> <p>Some controls that currently reside outside of luminaires and draw their own standby power are now being integrated into luminaires for an overall power savings, but still may need more power when combined.</p> <p>A manufacturer suggested that the specification does not adequately define standby mode and it is not clear how the integration of radios, sensor, networking and data hosting devices in a luminaire will be evaluated. The company recommended that EPA establish a definition of standby mode power consumption that recognizes the functionality of the next generation of smart luminaires which may contain many forms of sensors, power supplies, and control end points. Secondly,</p>	<p>EPA appreciates the additional feedback regarding the challenges of incorporating intelligent features into a luminaire, but consistent with the goals and priorities of the ENERGY STAR program, EPA will focus on efficiency and tightly limiting the power consumed while a product is not actively producing light.</p> <p>EPA has updated the method of measurement from the not yet final U.S. DOE test method for LED lamp standby power with the actual test method referenced by U.S. DOE in the SNOPR, IEC 62301 ED.2.0 B-2011 Household Electrical Appliances - Measurement of Standby Power. EPA has also revised the exceptions for standby power, based on the combined benefit of fully integrating energy saving features such as occupancy and motion sensors into a luminaire in addition to connected functionality. EPA will be monitoring standby power and features as products are certified to better understand the market and hopes to further lower the standby limit in a future revision.</p>

Topic	Sub-Topic	Comment	EPA Response
		<p>they recommended increasing the power consumption budget for luminaires and incorporating these accessories in order to encourage overall energy savings in the space since combining sensors and peripherals into a single device will improve overall power consumption. A power consumption budget should be additive, so if a luminaire incorporates an integral motion sensor, a photosensor, and has connected functionality, the maximum standby power should be in the range of 1.5W to 2.5W. The standby power consumption of a photocell alone can be 0.6W to 0.7W.</p>	
Start Time		<p>A manufacturer expressed the undue stress on drivers to start in 0.5 seconds, lack of evidence that users find 1 second unacceptable, and the negative cost impact on electromagnetic interference and compromised life of electrolytic capacitors and suggested going back to allowing 1 second for start time.</p> <p>Another manufacturer pointed out that luminaires that dim or have other control strategies require more than 500 ms to turn on.</p> <p>Another manufacturer suggested a start time of 750 ms since that will reduce the start time but also allow for better performance in other areas than a 500 ms start time.</p> <p>Several stakeholders requested to increase the source start time from 500 milliseconds to 1 second. One noted that wirelessly-controlled luminaires may take longer than 0.5 seconds after initial power-up to find and join a network and recommends that the requirement include a clarification or test condition to wait up to 1 second to allow a connected luminaire to join a network before measuring how long it takes to respond to a command to turn on.</p> <p>A lab suggested that 500 ms is overly restrictive for luminaires.</p> <p>It was also requested that luminaires certified to the current specification not be required to retest start time based on the new test method.</p>	<p>In consideration of information provided by stakeholders, EPA adjusted the start time requirements to align with Lamps V2.0 Draft 2, allowing 750 milliseconds for luminaires that do not meet the connected criteria, and 1000 milliseconds for luminaires that do.</p> <p>To ensure all products are evaluated fairly and consistently all products will need to be retested using the ENERGY STAR test method for start time.</p>

Topic	Sub-Topic	Comment	EPA Response
Testing	LM-82 Testing	A stakeholder asked for clarification for how to perform LM-82 testing on SSL light engines that rely on the fixture for heat sinking.	EPA has included a new section to give direction on how to test LED light engines that do not have integral heat sinks but rely on the luminaire for thermal management.
Zonal Lumen Density	Accent Lights	A stakeholder suggested that EPA consider adjusting the zone to 0-60 degrees to allow for the inclusion of the most popular lighting effects used by designers.	The zone for accent light beam distribution has been adjusted from 0-40 to 0-60° to account for popular wide flood distributions.
Zonal Lumen Density	Wall Wash Downlights	One manufacturer said EPA should reconsider the zonal lumen density requirement for downlights because it prevents a wall wash from meeting the requirements.	In previous drafts of the specification, EPA has requested alternate beam requirements, and has not received any specific feedback that could be integrated into the specification. EPA also notes that DLC has a wall wash category and requests stakeholder input on the importance of adding this option for residential luminaires.
Zonal Lumen Density	Outdoor Lights	<p>A partner expressed concern over the applicability of zonal lumen density requirements to adjustable multi-head security lights with multiple mountings, e.g. wall mounting and eve mounting. The partner suggests no limits should be placed on zonal lumen density for security lights, and that requirements limit the fixture's ability to be used in both configurations and does not properly account for adjustments the end user could make, thus making them irrelevant. The partner suggested instead to simply make the requirement less than 5% uplight after mounting.</p> <p>A stakeholder asked EPA to consider returning all outdoor "post" lighting to the non-directional classification stating that they are not a significant contributor to "light pollution" and the worst offenders are found in major cities where single-family homes are not present. The stakeholder also identified a possible pathway that certifies fixtures as non-directional if they are not designed/marketed for installation on posts that are above 8 feet.</p> <p>A stakeholder recommended the following requirements for outdoor luminaires:</p>	<p>EPA's intent is not to limit the availability of mounting options or adjustability. Adjustable heads are measured at any adjustment point to ensure that the luminaire is capable of meeting the requirement. EPA recognizes that there are situations where limiting light spill is important, and has a pathway for luminaires to be certified that will limit uplight to a small fraction (0.5%) that is reasonable when considering incidental reflections in measurement. However, there are also situations where an outdoor luminaire may not need to limit uplight (such as applications under awnings or porches) and also allows a non-directional pathway to certification. EPA has included outdoor luminaires in the non-directional classification as well, to reflect a need for efficient lighting with the desired aesthetics.</p> <p>EPA has added an additional directional evaluation for outdoor luminaires that allows these luminaires to be exempt from the zonal</p>

Topic	Sub-Topic	Comment	EPA Response
		<ul style="list-style-type: none">- Fixture must emit no light above 90 degrees (with the exclusion of incidental light reflecting from fixture housing, mounts, and pole), no vertical glass or drop lens is permitted- The fixture must have a listed CCT configuration of 3000K or below (3220K actual measured value per ANSI C78.377). Compliant configuration must consist of a lamp rated at 3000K CCT or below if lamp is sold separately.	lumen density requirements if they have been approved by the International Dark Sky Association.