



Luminaires V2.0 Stakeholder Meeting

April 20, 2015
1:30 pm - 4:30pm Eastern

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Today's Agenda

Introduction

- Introductions
- Goals of the meeting

Draft 2 Changes

- Definitions
- Testing
- Photometric Performance
 - Efficacy
 - Color
- Packaging

Wrap Up

- Additional Questions / Discussion



Welcome!

- Introductions
 - In Person
 - Remote / Call-In
- Format:
 - Includes:
 - Draft 2 comments received
 - Changes made in Draft 2
 - Active Discussion
 - Questions / Comments are encouraged
 - For benefit of everyone, please state name prior to a comment
 - Can ask questions via the webinar at any time



Specification Development Process Overview

- Discussion Document Oct 15, 2014
 - Half day stakeholder meeting Oct 30, 2014
- Draft 1: Released December 17, 2014
 - Stakeholder Meeting January 21, 2015
 - Comment period closed January 30, 2015
- Draft 2: Released March 6, 2015
 - Stakeholder Meeting March 17, 2015
 - Comment period closed April 3, 2015
 - April 20th stakeholder meeting
- **Next Draft:**
 - **Estimated release May 2015**
 - **comment period (est. 2 weeks)**
- **Final Specification**
 - **Estimated release May 2015**
 - **Effective 12 months later (May/June 2016)**



Section 1: Specification Scope and Luminaire Classification

- Comments Received:
 - Adjustments to Luminaire Classification – Change to the Classification of Outdoor Security from Non-Directional to Directional (Draft 1 Change)
 - A partner believes that outdoor security lights should remain in the non-directional category. Security lights are adjustable, multi-head products which can be mounted in different positions. The addition of the zonal requirements could eliminate mounting positions by restricting the adjustability of the light heads to meet the requirement, and will add complexity and testing costs.
 - EPA Clarification:
 - The intent is not to limit the availability of mounting or adjustability. Adjustable heads are measured at any adjustment point to ensure that the luminaire is capable of meeting the requirement.



Section 4: Definitions

- Clarified several definitions:
- Connected Luminaires
 - An ENERGY STAR eligible luminaire or retrofit is a luminaire or retrofit which includes **elements or instructions required** to enable communication...
 - Instead of “...all elements (hardware, software)...”
- Enclosed Luminaire
 - Luminaire which contains enclosed lamp compartment(s) where ventilation openings are less than 3 square inches per lamp in the lamp compartment or where the cross-sectional area of the opening of the lamp compartment is less than the maximum cross sectional area of the lamp compartment (adapted from UL 1598).
- LED Light Engine
 - Removed the term “custom” describing connectors based on stakeholder feedback



Section 4: Definitions

- Secondary Optics
 - Included “diffuser” in the examples of secondary optics based on stakeholder inquiry
- SSL Downlight Retrofits and SSL Surface Mount Retrofits
 - Included references to UL1598C
 - Excludes self-ballasted lamps
 - Excludes products utilizing the existing transformer or ballast



Section 5.1 Testing Color Tunable Lamps

- Testing: Align with Lamps



- When testing a color tunable lamp, all tests and evaluations shall be performed at the least efficient white light setting included in this specification (Section 9.6).
- **Watts, lumens, chromaticity, and CRI** shall be tested and reported for Default and Most Consumptive Settings (if different from least efficient white light setting).
- In order to facilitate compliance testing, the partner shall provide detailed instructions for the control settings or control signals (as applicable) for reaching the least efficient, default, and most consumptive modes as applicable.



Section 5.2: NEW Certified Lighting Subcomponent Database

- Comments Received:
 - A partner noted that allowing separate LED modules and drivers into the CSD could greatly expand choices for luminaire manufacturers, reduce their test burden, and increase time to market, and expand available consumer options.
 - Another partner proposed adding LED drivers to the CSD to assist partners in selecting drivers with certified performance information.
- EPA Response:
 - With the revised definition of an LED light engine, it may be possible to incorporate separate LED modules and drivers into the CSD to be combined to an LED Light engine.



Section 6.1: Product Families

- Comments Received
 - Please clarify the allowed wattage range of family members that are to be certified on one line on the website. Testing the highest wattage in a family will often result in the highest lumen output. Certifying a family on website online with a variance of several watts will reflect false performance results.
 - A CB suggested clarifying the test data needed for variations that currently require an integrating sphere scan. Their concern is that the test report may not provide all of the data required, and suggested specifying the additional data as detailed as the Lamps specification currently calls out.
- EPA Response
 - Products should be listed separately when there is a change in wattage
 - The additional testing requirements for product families will be more clearly laid out in the next version of the specification, and additionally EPA will make adjustments to some of the testing guidance for product families based on stakeholder feedback.



Section 6.1: Product Families

- Comments Received
 - A test laboratory requested clarification for product variations of different CCTs, an integrating sphere scan needs to be performed to confirm the impact on performance, but it is also said that the lowest CCT of SSL product is the representative model. The clarification is if these statements mean that all different CCTs need to be integrating sphere scanned, and full tests need to be done on lowest CCT for SSL product?
- EPA Response:
 - For the additional testing for CCT, the lowest CCT of SSL product (and the highest CCT of fluorescent product) is to be tested. Additional CCTs may be tested to capture the additional performance and efficiency for product listings. This will be made clear in the next draft.



Section 7: Methods of Measurement & Reference Documents

- References added to:
 - For SSL retrofits:
 - ANSI / UL 1598C: Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits
- Comments Received
 - An LED manufacturer suggested updating the EU directive to 2011/65/EU
- EPA Response
 - This update can be made to the EU directive.



Section 7: Methods of Measurement & Reference Documents

- Comments Received: IES TM-21 Addendum A
 - A stakeholder cautioned the EPA about the use of IES TM-21 Addendum A in its current version. It does not include preamble language informing the reader what exactly is intended to control: the original language with some additions, or if the Addendum is intended to replace the relevant portions of 2011 language. The partner noted that the IES Testing Procedures Committee is working on a revision
- EPA Response:
 - 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 carefully 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.



Section 8: Certification by Shipping Fixtures with ENERGY STAR Certified Lamps

Draft 2 Additions:

- Elevated temperature testing:
 - An enclosed luminaire may not ship with a lamp marked with the restriction “not for use in enclosed fixtures” or similar.
 - In situ testing of the ambient air temperature inside the fixture with the lamp(s) installed.
 - Can not exceed the lamp manufacturer’s recommended operating temperature range, and/or 45°C





Section 8: Certification by Shipping Fixtures with ENERGY STAR Certified Lamps

- Comment Received:
 - Several partners expressed support for the proposal to allow non-directional luminaire certification when shipping with ENERGY STAR certified lamps.
 - “This 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 for Home requirements of new construction. I urge you to include this proposal in the final document.”
 - A partner expressed support for thermal testing of lamps in enclosed luminaires to help insure the original lamps operate acceptably.



Section 8: Certification by Shipping Fixtures with ENERGY STAR Certified Lamps

- Comments Received:
 - One partner expressed concern over the use of ENERGY STAR® lamps in downlights while another suggested that downlights shipped with ENERGY STAR reflector lamps should be able to achieve ENERGY STAR® certifications.
- EPA Response:
 - EPA is not proposing to fundamentally change the approach to certifying Directional fixtures such as recessed downlights at this time.



Section 8: Certification by Shipping Fixtures with ENERGY STAR Certified Lamps

- Several partners suggested that integrated products offer most reliable and predictable results and noted areas where utilizing an ENERGY STAR lamp is not the ideal situation:
 - Replacement lamps may cause more hot spots and dark spots than using hardwired flat engines mounted to the pan of the fixture.
 - Horizontal A-lamps screwed into fixtures are less efficient at getting light out of the fixture than a flat LED engine hardwired to the pan of the luminaire.
 - LED screw-based lamps are less able to dissipate heat than LED engines thermally-mounted to a luminaire. Utilizing the thermal mass of the luminaire housing is an important strategy to improve LED performance in fixtures.
 - The proposal may reduce utility motivation to promote ENERGY STAR Luminaires due to the perceived increased chance the bulbs could be replaced.
 - This option could force manufacturers of more efficient light engines to switch to lower cost lamps to compete, limiting the performance options of a luminaire.
 - Retailers consider it a problem, as it contributes to shrink and damaged goods.
 - The requirements do not address the lamps replaced after initial purchase.



Section 8: Certification by Shipping Fixtures with ENERGY STAR Certified Lamps

- EPA Response:
 - Shipping with ENERGY STAR lamps is only option for non-directional, decorative light fixtures which are purchased for the way they look and have always been allowed to ship with integrated bulbs-we are just eliminating the requirement for a GU24 base.
 - EPA has a robust Lamps specification, certifying lamps without any pairing to a fixture, this option helps the consumer by pairing the bulbs with the right fixture, removing the confusing bulb purchasing decision.
 - EPA believes partners will use smart business sense to determine which products this option makes sense for and which products to take a different design approach.



Section 9.1 Luminous Efficacy

- Future Tier proposed:
 - **+20%** 2 years after the effective date of the specification
 - 2018
 - Rate based off of DOE R&D on SSL product development
 - Levels based off current product capabilities





Section 9.2: Luminous Efficacy and Output: Directional

- Comment Received:
 - A utility organization commented that for undercabinet, SSL downlight retrofits, and accent lighting, the Draft 2 proposed decreases in efficiency will mean a very large portion of the market will qualify for the ENERGY STAR Specification, and the vast majority of existing products would remain in the program and misses an energy saving opportunity. They understand that the products that meet the higher efficacy levels may be the more expensive products, but when products achieve ENERGY STAR qualification with higher efficacy levels, efficiency programs are able to put forward larger incentives to help offset the cost of those products to consumers.



Section 9: Luminous Efficacy and Output: Non-Directional Luminaires

- Comment Received:
 - A partner expressed concerned with the minimum light output levels in the “lumen per head” section. Traditional arm-type chandeliers have been popular in the past, but future designs may employ many smaller light sources that will result in a cumulative greater output. That means luminaires that stretch existing aesthetic boundaries will likely be ineligible for certification. The partner suggested include certification for new multi-head designs that employ multiple sources of light in an effort to certify a wider variety of luminaire designs.
- EPA response:
 - EPA is considering adding an exemption for fixtures with >5 heads from per head lumen minimum requirement, but instead the luminaire would have to meet a minimum cumulative output of 800 lumens. EPA seeks feedback on this approach.



Section 9.1: Luminous Efficacy and Output: Future Tiers

- Comments Received:
 - Several partners opposed the future tiers on the basis 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.
 - Another manufacturer said that it places a burden on luminaire manufacturers to redesign products every two years and recertify. They suggested that it would be better for EPA to monitor the landscape and determine if efficacy increases are needed.
 - One manufacturer is 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. Additionally that automatic increases across the board will stifle addition of features that could drive adoption.
- EPA response:
 - EPA has set future efficacy tiers based on a projection rate established by extensive R&D research performed by the U.S. Department of Energy. EPA has not aligned with the projections only the rate of increase projected. It should be noted that there are products certified today that already meet some of the proposed tiers. If products can meet the tiers today in 2015, then in 2018 should be achievable at lower costs and without negative consequences since partners will have several years to plan for these levels before they become the new minimum.



Section 9: Luminous Efficacy and Output: Other Comments

- Comment received:
 - A partner requested that EPA consider returning all outdoor “post” lighting to non-directional classification. The partner suggested that the lack of post lights certified to date (3 or less) is due to the distribution requirements to limit uplight.
 - Residential post lights are not a significant contributor to a phenomenon referred to as “light pollution”.
 - Areas of the US that are considered the worst offenders are major cities where single-family housing is largely not present.
 - Residential consumers want decorative outdoor lighting that fits a certain aesthetic and they need more energy efficient options. Uplight requirements are prohibiting manufacturers from offering ENERGY STAR post top options to residential consumers.



Section 9.2 Efficacy: Directional Cove & Undercabinet

- Draft 2 change: Additional guidance regarding beam pattern evaluation provided:
 - When evaluating an asymmetrical distribution, the luminous intensity distribution from the goniophotometer scan is to be used in determining if the luminaire meets the requirement, as the Zonal Lumen Density chart is not typically sufficient to determine compliance of asymmetrical patterns.
- Comments received
 - A manufacturer urged EPA to lower efficacy levels to 50 lumens per watt to allow new light technologies which are in demand to be used at a reasonable cost.
 - A laboratory and certification body suggested that the required light in the 60-90 degree zone is not necessary, decorative and subjective and should be eliminated.
 - A partner notes that the existing minimum light output requirement for cove lighting is not appropriate for residential cove lighting. They suggest EPA consider a decorative cove with no minimum light output.

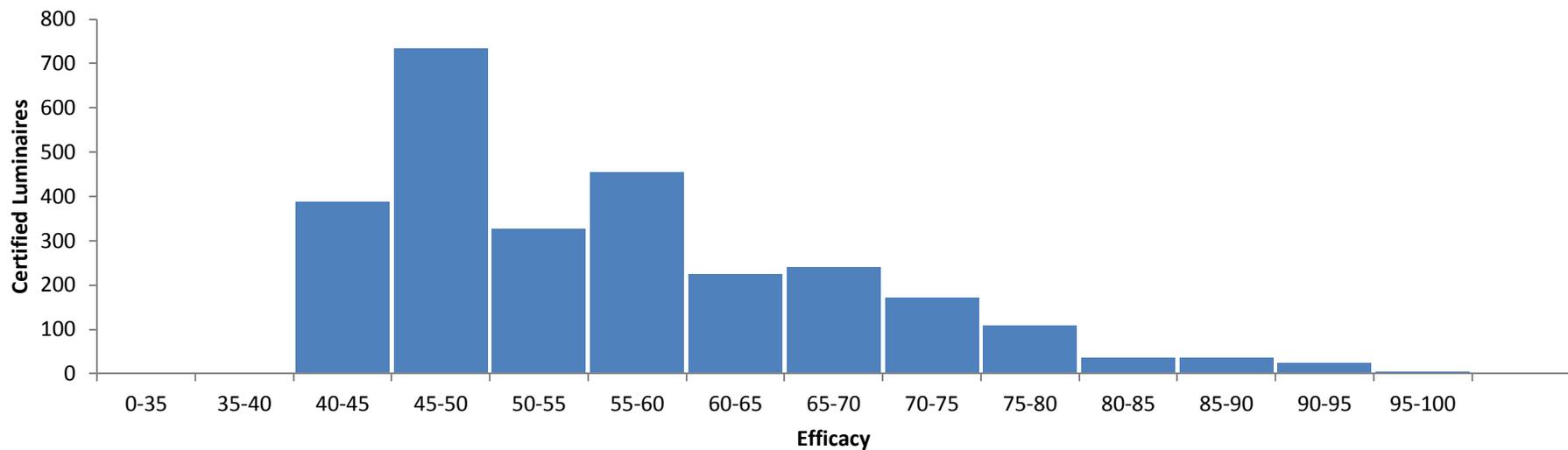


Section 9.2 Efficacy: Downlights

- Largest category of certified products
- Maintained 60 lm/W level from Draft 1
 - Future tier level 72 lm/W - 2 years after effective date



Downlight Efficacy





Section 9 : Luminous Efficacy and Output: Downlights

- Comment Received
 - A partner supports raising efficacy requirements to match current technology, but 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. Considering only efficacy will encourage less desirable lighting solutions as there is a tradeoff between quality of light (including aesthetics) and efficacy. The partner recommended that the Luminaire efficacy for the Downlight luminaire type by reduced from 60lm/W to 50 lm/W.



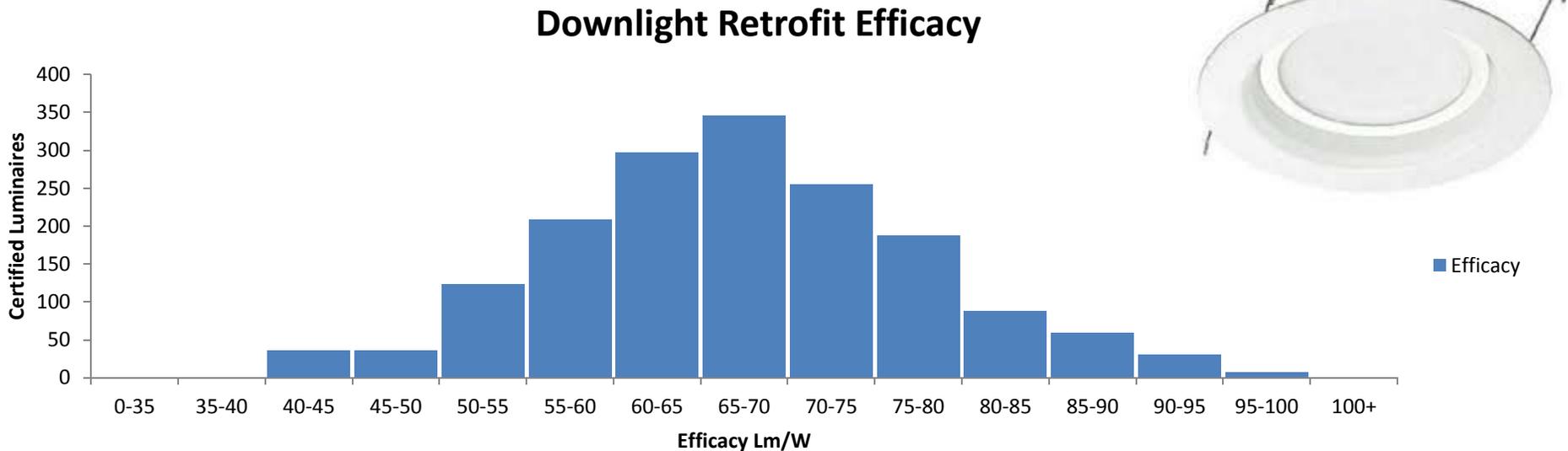
Section 9.2: Luminous Efficacy and Output: Directional Luminaires

- Comment received:
 - A partner suggested that ENERGY STAR® should reconsider the Luminaire Zonal Lumen Density Requirement for Downlights with wall-wash optics. The requirement of greater than or equal to 75% in 0-60 degree zone prevents a recessed downlight with a wall-wash trim from meeting the requirements as an integrated solution.
- EPA response:
 - 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.



Section 9.2 Efficacy: Downlight Retrofits

- Adjusted to 65 lm/W from Draft 1 level of 70 lm/W
- Comments received
 - A partner suggested that the levels were still set too high for popular low cost retrofit models.





Section 9.2: Luminous Efficacy and Output: Directional Luminaires

- Comment Received:
 - A certification body and testing laboratory commented that supplemental testing guidance section for the SSL Downlight Retrofits needs a clearer method for testing the retrofits for performance requirements in a manner that is consistent across all laboratories.
 - A partner suggested that ANSI/UL 1598C sufficiently addresses the worst case thermal can scenario, and to leverage ANSI/UL 1598C for photometric testing as well.
- EPA response:
 - EPA is considering clarifying this requirement with the following language and requests stakeholder feedback: *For SSL downlight retrofits: the retrofit product shall be installed in a can size within the dimensions and limitations prescribed in the ANSI\UL 1598C safety listing. The LM-79 report shall note the can model tested.*

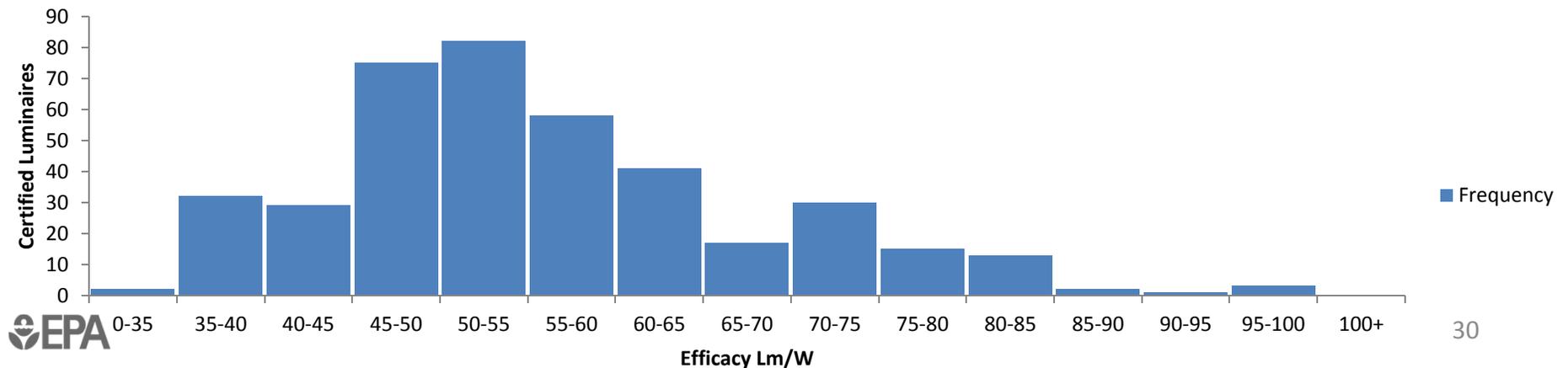


Section 9.2 Efficacy: Accent Lights

- Adjusted efficacy to 55 lm/W from Draft 1 level of 60 lm/W
 - 66 lm/W efficacy 2 years from effective date
- Comments received:
 - EPA should consider adjusting the zone to 0-60 degrees to allow for the inclusion of the most popular lighting effects used by designers.
 - Another manufacturer suggested that EPA align efficacy levels for accent lights with those of the Design Lights Consortium since this is an overlapping category and aligning the levels could reduce redundancy and eliminate testing and reporting burden.



Accent Light Efficacy





9.3 Correlated Color Temperature (CCT): All Indoor Luminaires (Exemption: Outdoor Luminaires)

- **Comment Received Regarding 2200K and 2500K:**
 - Several partners urged EPA to add 2200K and 2500K CCT bins once the ANSI standard is final.
 - One partner noted that while it is difficult to quantify the savings of future products related to additional CCTs, LED luminaires will likely save an even greater percentage of energy at sub-2700 K CCTs as because more of a dimmed incandescent lamp's output is invisible IR, which further reduces its efficacy.
 - An efficiency organization would be supportive of including 2200K and 2500K lamps for ambient lighting products that may be used in a restaurant / hospitality setting or are more similar to candlelight. However, it may not actually make sense to allow this lower CCT since this specification applies to residential products. Perhaps it would be appropriate just for the for categories that include ambient or decorative lighting.



9.3 Correlated Color Temperature (CCT): All Indoor Luminaires (Exemption: Outdoor Luminaires)

- Other Comments Received on CCT:
 - An LED manufacturer noted the current CCTs in the standard (2700K, 3000K, 3500K, 4000K and 5000K) do not include all of the CCTs in ANSI C78.377-2008 and recommended EPA add 5700K and 6500K. They cited the popularity of 5700K in medical, entertainment, outdoor and high bay applications and 6500K is being used in outdoor and cold storage in supermarkets.
 - A partner expressed concern over the inclusion of 4000/4100K and 5000K CCT products based on research that shows the impact blue light has on the Circadian Rhythm of plants, animals and humans. They suggested EPA try to find consensus for eliminating the 4000/4100K and 5000K, and that at minimum the 5000K option must be removed.
 - A partner inquired about the origins of the minimum and maximum CCT temperatures. They suggested limiting the consumers choice of color temperatures lacks a positive advantage, as it hinders the consumer's option to choose higher temperature light engines for certain task lighting applications. The partner noted higher CCTs are favorable to the aging baby boomer demographic, and suggested reconsidering the high end of limit up to 6500K.



9.4 Color Rendering Index: All Indoor Luminaires (Exemption: Outdoor Luminaires)

- Comment received:
 - A manufacturer supported the 80 CRI minimums, but in the future urged the EPA to raise that number, ultimately aligning with the California Energy Commissions' move toward 90 CRI minimums. A national standard and a state standard that are different introduce challenges to manufacturing and customer order satisfaction. A unified level is most desirable.
- EPA response:
 - While EPA is aware of California's move towards 90 CRI, and the ENERGY STAR requirement does not conflict with California's requirement. EPA believes that partners will ultimately decide on the appropriate color rendering for their product mix and the markets they serve, and can provide a higher CRI for ENERGY STAR products if desired.



9.5 Color Angular Uniformity: Directional Solid State Indoor Luminaires Only (Exemption: Outdoor Luminaires)

- Comments Received:
 - A manufacturer of LEDs stated that the color angular uniformity (CAU) specification does not accurately portray a luminaire's CAU in various applications. They performed this test on track fixtures that are available on the market, while they meet the CAU specification, when placed in a wall wash application the uniformity and aesthetics associated with the metric were very poor.
 - The manufacturer recommended that this requirement either be removed from the specification until a better test methodology is developed or require that this information is tested and provided to the customer in a format similar to the Lighting Facts label.
 - A partner suggested that the CAU requirement needed to be revised to 0.006 (DUV). (This level was introduced in Draft 1 and did not change in Draft 2)



Section 10: Lumen and Color Maintenance

- Lumen Maintenance
 - Added TM-21 Calculator as a reference.
- Color Maintenance
 - Change in evaluation, not in testing
 - Evaluating all measured points for color maintenance, not just the 6,000 hour point
 - Shifting color beyond 0.007 is just as bad if it comes before or after 6,000 hours





10.3 Color Maintenance: Solid State Indoor Luminaires Only (Exemption: Outdoor Luminaires)

- Comments received:
 - The change in the 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 certification body and luminaire manufacturer will have to bear the cost. The partner proposed maintaining the existing evaluation method for determining compliance with the color maintenance requirement.
 - An LED manufacturer noted that a standard is lacking for color maintenance of an end product as neither LM-84 or LM-82 have a model. It is suggested that a TM document be developed to project/predict color maintenance.
 - An efficiency organization supports changes assuming that it is not too much of a testing burden. It is important for consumers that lighting does not change color over time and can match in color other luminaires within a home, so we support additional reasonable requirements to help ensure color is maintained.



11.1 Source Start Time: All Luminaires (Exemption: Outdoor Luminaires)

- Comment Received
 - A manufacturer expressed the undue stress on drivers to start in .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
 - A laboratory opposes the start time of 500 milliseconds for luminaires as unnecessarily restrictive as it can create more inrush current to reach the light source, and believes that some of the complaints about start time may instead refer to run up time, a problem with some CFLs.
 - A partner suggested start time be adjusted to 750ms from application of power. This provides 25% reduction in the requirement but still allows for some design innovations which may increase customer functionality and/or allow better performance in other areas but may be near the proposed 500ms requirement.
 - Another manufacturer pointed out that luminaires that dim or have other control strategies require more than 500ms to turn on, and that the new test method would require retesting of all products.
 - A manufacturer noted wirelessly-controlled luminaires need to find and join a network, or create one, in order to operate. This may take longer than 0.5 seconds after initial power-up or if the network configuration changes (e.g., if one network controller is swapped for another). After this configuration or reconfiguration, which occurs rarely, starting time typically goes down.
- EPA Response:
 - In consideration of information provided by stakeholders, EPA intends to adjust 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.



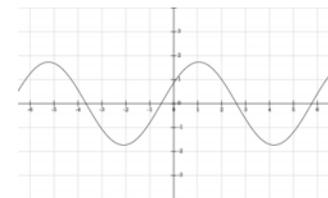
11.5: Standby power consumption

- Comments Received:
 - An efficiency organization supported limiting the standby power of luminaires, and proposed that 0.5 watts is the maximum allowance that should be considered.
 - Several stakeholders suggested that the 0.5W limit for both connected (network) and controls (standalone sensors, etc.) may stifle innovation and limit options.
 - They suggested that there be separate power consumption requirements from standalone occupancy sensors and light sensors (from the connected functionality).
 - Standby allowance should be additive based on the number of sensors or features present as more integrated controls allow the overall standby power consumption in the space to reduce as individual sensors embedded on a single power supply.
 - Several partners suggested allowing 1W in standby mode for this version of the specification, and reducing this in a future revision.
 - A partner commented that the specification does not adequately define standby mode.
 - It is not clear how the integration of radios, sensors, networking and data hosting devices into a luminaire will be evaluated.



Section 11.6: Operating Frequency

- Added guidance for measuring frequency, including photodetector, measurement interval, and measurement length.
- Added IEEE PAR1789 as a reference document
- Comments received:
 - Two partners cited potential issues with the validity of the conservative requirements for flicker in the draft of IEEE PAR1789 and recommended removing it as a reference document.
- EPA Response:
 - The reference to PAR1789 was intended to be useful to partners for evaluating their waveforms and determining the frequency components of the waveforms for meeting the specification. The reference document is not a requirement for flicker performance.





12.1 Light Source Replaceability: Directional and Non-Directional Luminaires

- Comments Received:
 - Several partners noted that wire nuts are a frequently used and safe method of attaching luminaires and luminaire components to incoming line voltage. It was noted that many luminaires have components that are intended to be replaced by an electrician, and wire nuts are often used with other consumer installed products such as switches and dimmers.
- EPA Response:
 - In the current specification and drafts, the wire nut restriction only applies to LED light engines, as the intent was to have replacing an LED light engine as simple as replacing any other lamp. Having reviewed the comments, and having additional discussions with manufacturers, EPA intends to remove the restriction against wire nuts in the next draft of the specification and seeks stakeholder feedback on this approach.



13.1 Maximum Measured Ballast or Driver Case Temperature: All Luminaires

- Comment Received:
 - Several stakeholders noted that the second column of the third row mentions TMP_d and asked if it should be TMP_c or if it was something else it should be defined for clarification.
- EPA response:
 - EPA appreciates the comment, this was unintentional, and TMP_c is the appropriate designation and will be reflected correctly in the next draft.



15.1 Dimming: All Luminaires Marketed as Dimmable (Exemption: Non-Dimmable Luminaires)

- Comment received:
 - A certification body suggested requiring noise test only at the dimmed state, and sample size for both Fluorescent and Solid State would be clearer if it required “1 complete luminaire” rather the current wording, which could be interpreted that a complete luminaire is not required. Noise is impacted by mechanical interfaces and shapes so a complete luminaire should be tested.
 - A partner requested clarification on what level noise should be tested for dimmable luminaires, at 100%, 20% or lowest dimming setting or all points.
- EPA response:
 - Sample size can be made clearer in the next draft. EPA requests stakeholder input on this requirement.

Section 15.2: Connected Luminaires

- Updates will be consistent with Lamps





15.2.2 Open-standards & Open-access

- Comments Received:
 - A manufacturer of lighting components requested clarifications on the definition of what interoperable / open-standards are, if using proprietary communication protocols make a product ineligible.
 - A manufacturer partner stated that it is not always practical to have an API in a luminaire. If an API exists, it typically exists in the gateway or network controller. Many systems do not have a network controller; they use a simple remote, smartphone, or wireless wall switch to control one or a few luminaires. In this case, there would be no need, or place, for an API. In other cases, a homeowner may not want external access to their lighting system.
 - Using open standards such as ZigBee will enable connectivity.
 - A manufacturer partner suggested removing the criteria, as existing standards, testing procedures, and certifications exist for various open protocols (DALI, ZigBee, EnOcean, WiFi and Bluetooth for example). They also suggest proprietary protocols should be allowed, as open standards do not ensure interoperability. For example; ZigBee (HA profile), Z-Wave are open protocols but do not guarantee interoperability.



15.2.3 Energy Consumption Reporting

- Comments Received
 - A partner stated that energy consumption reporting (to calculate, store, and report) will add considerable cost and development time which would adversely affect energy efficient lighting, and energy management and reporting has limited value in the residential lighting market.
 - Another partner commented that measuring energy consumption requires measuring voltage and current and integrating their product (i.e., power) over time. To do this accurately, especially over a dimming range, would require costly circuitry and software in every luminaire. If the control device knows what it has commanded a luminaire to do, it can keep track of the time the luminaire spends in each state and estimate the energy consumption accordingly.
- EPA Response
 - The requirement is to report data representative of its interval energy consumption – which can be based off of settings and does not need to be a direct measurement of exact power use.



15.2.4 Operating Status Reporting

- Comments Received:
 - A partner stated that status reporting is necessary to include on the luminaire, as the control device will often know when it has commanded a luminaire to turn on/off, dim or change color and can keep track of these states.
 - Another partner proposed that on/off should be the only minimum required operational status reported. Others such as luminous flux and color will add cost, potential system latency, and potential increases in standby power for the additional communication.
 - An efficiency organization believes operational status reporting on the energy drawn by the luminaire, on/off status, lumen levels, and color temperature (as applicable) are key pieces of information for consumers. Specifically, if a luminaire is dimmable and is connected, the light level needs to be relayed to the consumer in some way.



15.2.5: Products with Connected Functionality – Remote Management

- Comment Received:
 - A utility organization commented that remote management is very important for connected lighting products and we feel the requirements set out in section 15.2.5 are appropriate. Enabling third party remote management is currently available in several connected lighting products on the market, which have Home Energy Management Systems (HEMS) that they integrate with directly. A more thorough analysis of the data currently being provided to HEMS might be helpful, and suggested connected-bulb manufacturers could comment on information capable of being reported. Examples provided were GE's smart bulb with the Wink system and Osram's Lightify system with the WeMo.



16 Product Labeling & Packaging Requirements

- **Comment Received:**

- Partners raised concerns over the additional marketing costs and relabeling of products to meet the CCT nomenclature requirements, including:

- The Lighting Facts labels and manufacturer kelvin scales are more helpful to users, and many luminaire purchasing decisions are not off the shelf decisions.
- That the color proposals are not consistent with traditional industry terms that refer to incandescent and fluorescent sources, and could add confusion.
- The nomenclature is too prescriptive and manufacturers market and sell products based on their own consumer research.
- Non-ENERGY STAR labeled products will carry different descriptors, adding further confusion.
- Soft and warm white have been used interchangeably for 2700K and referring to 3000K as either would cause confusion.
- An efficiency organization supported the initiative, but suggested making the nomenclature a recommendation rather than requirement.

- **EPA Response:**

- Consistent with Lamps, In response to stakeholder feedback EPA will present slight revisions to the nomenclature and made it a recommendation instead of a requirement. EPA will also clarify that use of the DOE LED Lighting Facts label as appropriate may fulfill color labeling requirements.



16 Product Labeling & Packaging Requirements

- Comment Received:
 - A partner noted that different dimmers perform differently with the same luminaires, and suggested eliminating the dimming range requirement on the packaging, but maintain the URL or QR code for full details on the dimming range for each dimmer tested with their luminaire.
- EPA Response:
 - 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.
- Comment Received:
 - One manufacturer partner suggested that the light distribution depiction of directional luminaries needs to be described in more detail. The partner noted that 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, and a drawing or diagram on the carton would only be visible after purchase for many luminaires. Additionally the partner noted that consumers and installers may not understand or find value in this information. EPA should consider how to make this more relevant to the application designer, installer and user.
- EPA Response:
 - EPA seeks stakeholder feedback on the depictions of light distribution – a suggestion that came out of the Oct 30th meeting.

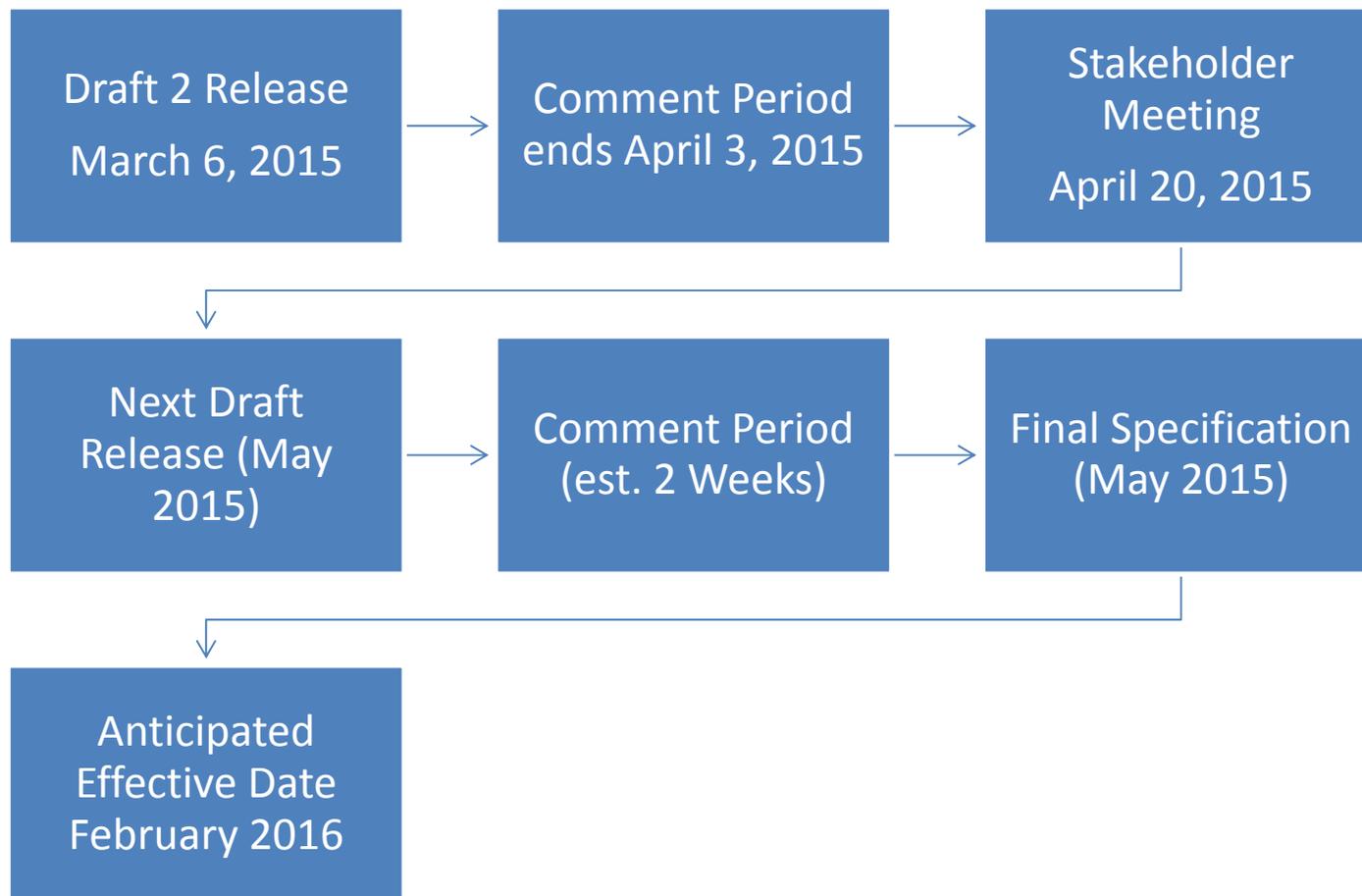


Other Comments:

- Comment received:
 - The International Dark-Sky Association recommends the following requirements for outdoor luminaires:
 - 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.



Planned Timeline





Discussion time

- Questions?
- Send comments and questions after the meeting to:
lighting@energystar.gov