

| Topic                                     | Subtopic | Comment  | EPA Response  |
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| <b>Allowable Product Variations</b>       |          | <p>In Draft 3, EPA added a column to the Allowable Variations table to identify tests that would need to be performed for individual models among allowable variations and proposed CCT as an allowable variation for full life testing of compact fluorescent lamps</p> <p>The updated Allowable Product Variations section was generally well received by partners although stakeholders continued to request additional variant categories such as heat sink material, LED light source, CCT for LED lamps, sharing the rapid cycle stress testing data for CCT variations, and all variants outlined in the Luminaires V1.2 specification.</p> | <p>In an effort to reduce testing burden EPA considered each request for allowable variations where technical justification was provided.</p> <p>In Draft 4 EPA expanded the proposed CCT allowable variation to include the sharing of safety, electrical, and dimming performance test data. The list of additional tests required for each variant for CCT has been updated to provide guidance on the applicable tests. This includes allowance of sharing electrical testing and rapid cycle stress test for CCT for CFLs and LED lamps.</p> |
| <b>Center Beam Intensity</b>              |          | <p>Based on analyses of GU10-base line-voltage halogen MR-16 lamps available in the market, in Draft 2, EPA proposed minimum center beam intensity values as a function of the referenced lamp's rated lamp wattage for line-voltage MR-16 lamps.</p> <p>Some stakeholders commented that the values for the center beam intensity for line voltage MR lamps should be beam angle and wattage dependent, and recommended utilizing the existing calculator with parameters inserted for PAR16 lamps in order to calculate equivalencies for line-voltage MR16 lamps.</p>   | <p>Due to the fact that this product type is not eligible to earn the ENERGY STAR until an ANSI maximum overall length has been determined time allows for EPA and DOE to continue to explore approaches for benchmarking these products in a future revision. At this time EPA proposes removing the pathway for certifying line voltage MR-16 lamps with GU-10 bases until the MOL issue has been concluded.</p>  |
| <b>Correlated Color Temperature (CCT)</b> |          | <p>Draft 1 proposed a color requirement for lamps to fall within a 4-step MacAdam ellipse or ANSI quadrangle of the targeted CCT. Draft 2 reverted back to 7 steps but proposed that 10 out of 10 products met the requirement.</p> <p>Stakeholders commented that the requirement to have all lamps fall within 7 steps is too strict, when taking into account normal production variances.</p>  | <p>In response to stakeholder comments on manufacturing variance in Draft 4 the passing requirement for CCT was updated to be consistent with the existing CFL 4.3 and ILL 1.4 passing requirements for 9 of 10 samples to fall within 7-steps.</p>   |
| <b>Color Angular Uniformity</b>           |          | <p>In Draft 3, EPA introduced proposed scanning angles of 1° for beam angles less than 10° and 2° for beam angles 10° or greater. Some stakeholders commented that the scanning resolution was too fine, and significantly increased the length of time to conduct the test. One stakeholder commented that lamps with wide beam angle will require a large number of measurements which will increase the time and effort needed to verify the color angular uniformity performance and suggested alternative scanning resolution, to reduce the number of measurement needed.</p>  | <p>In order reduce testing burden and to harmonize with guidance provided in IES LM-79-08, the Agency has increased the scanning resolution to 2° for beam angles less than 15° and 5° for beam angles 15° or greater.</p>  |

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| <b>Color Rendering</b> | <b>R<sub>9</sub></b> | <p>The proposed requirement of <math>R_9 &gt; 0</math> for all lamps in Draft 3 was carried forward from the Integral LED Lamps V1.4 specification. The majority of comments received indicated that costly redesign would be necessary for warm white CFLs to meet an <math>R_9 &gt; 0</math>. One stakeholder provided research showing there is no perceptible difference between products with an <math>R_9</math> 10 and <math>R_9</math> -4.3. In addition, manufacturing stakeholders shared that this requirement would decrease efficacy by up to 10 LPW and add significant cost to warm white CFLs.</p>   | <p>After careful consideration the Agency decided that a positive R9 requirement for compact fluorescent technology was not worth the increase in cost to the consumer and reduction in efficacy. This decision is further supported by current market conditions where investments in energy efficient lighting are focused on advancing SSL technology that will eventually eclipse compact fluorescent in efficiency and overall product quality. EPA maintains that the positive R9 requirement that has been in place for integral LED lamps from the beginning remains important for the advancement and adoption of this technology. EPA intends to collect R9 data for all lamps going forward to better understand the impacts to efficacy and cost in fluorescent warm white products.</p>  |
| <b>Dimming</b>         |                      | <p>Establishing dimming requirements for ENERGY STAR bulbs is important in order to maintain consumer satisfaction. However, determining the requirements is a challenge since there are currently no industry testing, performance standards or laboratory methods to use as a reference. In Draft 3, EPA introduced a limited set of dimming performance requirements including levels for flicker, audible noise and minimum light output on a dimmer. In order to inform the final test methods and requirements such as sample size and passing criteria, round robin testing was initiated.</p> <p>In general stakeholders supported the establishment of dimming requirements and test methods, including the labeling of non-dimmable lamps as non-dimmable. Additional comments on this topic were dominated by cost concerns, and came both from laboratories and manufacturers who were concerned about the time and amount of effort proposed.</p> | <p>EPA believes that testing both 1 and 4 lamps on a single dimmer remains important due to variations in performance for one lamp versus four lamps on a given control; however EPA recognizes that using 10 dimmer samples is labor intensive, and therefore requests comments from stakeholders on the number of dimmer samples required for testing to maintain an accurate representation of lamp performance with dimmers available on the market.</p> <p>Furthermore EPA has made it clear in Draft 4 that dimming performance testing would initially not be required to be performed by a third party laboratory, but would involve reporting of performance to an EPA recognized certification body.</p> <p>EPA is continuously monitoring progress that industry and others are making towards the measurement of dimming, flicker, and audible noise and beyond, and may refine the methods and requirements in the future as research and additional data becomes available.</p> |

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|       | <b>Minimum and Maximum Light Output</b> | <p>In Draft 3, EPA proposed a minimum dimmed level of 20% of initial light output, and a maximum light output range of no more than 10% over and no less than 20% below the lamp's rated light output when connected to a dimmer.</p> <p>A manufacturer organization suggested a clarification regarding the requirement to pass the dimming tests at the lowest advertised setting and 20% of light output.</p> <p>An energy efficiency stakeholder suggested the inclusion of a pop-on requirement for in the specification.</p> <p>Some stakeholders acknowledged confusion over the wording of the way the maximum light output on a dimmer is described in the specification, specifically the use of "rated" vs. "measured", and suggested clarifying language for inclusion in the specification.</p>   | <p>In Draft 4 the Agency has clarified that the tested minimum light level on dimmers or controls shall be the minimum light level claimed by the manufacturer (or 20% if no minimum is claimed), and the lamp shall meet flicker and audible noise requirements at this level. Clarification was also added to the maximum light output on a dimmer/control to indicate that the intended measurement is at the maximum setting of the control, not the maximum or rated light output and that this measurement is compared to the light output of the same sample measured without a dimmer.</p> <p>The Agency also maintained further exploration of dimming requirements in the considerations for future revisions, which could include looking at pop-on.</p> |
|       | <b>Noise Testing</b>                    | <p>In Draft 3, EPA proposed a maximum 24dBA noise level for dimmable lamps and provided supplement testing guidance on suggested test equipment.</p> <p>One stakeholder raised concerns about the specified chamber type, stating that the specific type of acoustical chamber could increase the cost of acoustical testing for manufacturers by a factor of 400% without significant benefit to consumers.</p> <p>Another stakeholder expressed concerns with the size of an acoustical chamber to accommodate six microphones and suggested allowing a chamber that would have one microphone and allow the sample to be rotated and measured at six different angles by the single microphone.</p> <p>A stakeholder group suggested that the noise test should be application dependent; stating that noise levels could be substantially different at 1 foot vs. 1 meter vs. 2 meters for a fixture in a ceiling.</p> | <p>Updates to noise testing and requirements made in Draft 4 included allowance for flexibility in testing environment and methodology in response to stakeholders comments,</p> <p>Draft 3 indicated both distances of 1 foot and 1 meter were being considered and tested through round robin testing. Application dependent testing has merit but is difficult to predict. EPA is proposing testing noise at a distance of one meter for all dimmable lamps and invites stakeholders to further comment on this approach.</p>  |

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|       | <b>Dimmer Type</b> | <p>In Draft 3, EPA proposed conditions for selecting dimmer types for testing, including guidance for phase cut and non-phase cut dimmers, and an exception for lamps with declared limited compatibility.</p> <p>A few stakeholders requested clarification on the requirements for lamps with compatibility with a set of “Limited Controls”, and suggested that limited controls and procedures for non-phase cut dimmers should be more explicitly defined. One manufacturer stakeholder suggested allowing a statement about certain dimmer types or categories to be listed, rather than specific models to reduce packaging updates as dimmer models change.</p> <p>Several stakeholders requested clarification on the dimmer types used in the testing. One manufacturing stakeholder commented that it was difficult to determine the dimmer type and difficult to obtain this information from the dimmer manufacturer. Another stakeholder requested that EPA provide a list of dimmers for dimming performance testing and specify that the minimum number of dimmers from the list that the lamp must pass with in order to be considered dimmable.</p> <p>A few stakeholders requested guidance on the dimmer and transformer selections for dimming performance testing of low voltage lamps. One stakeholder suggested that low voltage lamps should be exempted from dimming testing.</p> | <p>In response to comments received, EPA updated the guidance for dimmer selection in Draft 4 to the following.</p> <p>If lamp is designed for phase cut dimming operation (alterations to the line voltage to the lamp), select 10 dimmers for testing. The 10 dimmers shall meet the following conditions:</p> <ol style="list-style-type: none"> <li>1. From at least 2 different manufacturers</li> <li>2. At least one must be specified as compatible with energy efficient lighting such as CFL or LED lamps.</li> <li>3. At least one dimmer must be of the following types: Single (Forward) Phase Shift, Double Phase Shift, or Electronic Low Voltage / Reverse Phase.</li> <li>4. At least one dimmer must have one of the following features: Microprocessor with Power Supply, Voltage Compensation, or Pre-set levels.</li> </ol> <p>If lamp is compatible with a non-phase cut control device (dimmers that do not alter the line voltage to the lamp), the controls must be listed on the packaging and be tested with the lamp against all dimming performance requirements. An asterisk next to “dimmable” on lamp packaging/online product listing marketing materials must be included and point to an “only compatible with ...” statement.</p> <p>Manufacturers of low voltage products may specify the transformer to be used for dimming testing.</p> <p>The requirement for dimmers from different manufacturers was reduced from three to two due to the limited number of residential dimmer manufacturers present in today’s market. EPA invites stakeholders to provide further suggestions to help identify dimmer types for testing.</p> |

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|                       | <b>Flicker</b>   | <p>In Draft 3, EPA introduced a range of flicker index values for lamps with fundamental frequency of light output from 100 to 800 Hz.</p> <p>Several stakeholders suggested revisions to the referenced flicker definition, including a mention of non-visual flicker.</p> <p>One stakeholder commented that there is no visual flicker over 200Hz, while another suggested that the frequency limit for flicker index be reduced from 800 to 400 Hz, as 400Hz-800Hz impacts PWM dimming. Another stakeholder suggested that the frequency requirement be above 100Hz with no flicker index or percent, and suggested that language clarify that flicker is measured at a stabilized condition.</p> | <p>In Draft 4 EPA replaced the definition of flicker with a CIE definition recommended by the American Lighting Association.</p> <p>The frequency area of interest for flicker was set based on the latest industry research. Research shows that flicker can be perceptible at higher frequencies, i.e. greater than 400Hz, through stroboscopic or phantom array effects, and flicker that is sensed, but not perceptible, or "not-visual" can still lead to adverse health effects. The area of interest for periodic frequency may be re-evaluated at a later date.</p> <p>The recommended practice for measuring flicker includes guidance for measuring at a stabilized condition.</p> |
| <b>Effective Date</b> | <p>In Draft 3, EPA signaled that the ENERGY STAR Lamps Version 1.0 specification will take effect in early 2014. Several stakeholders commented that the proposed effective date is insufficient and suggested an effective date of one year or 18 months after publication in order to accommodate redesigning, testing, and certification efforts.</p> | <p>As stated in the Draft 3, the Agency is considering an effective date in early 2014, a note box in Draft 4 clarifies that this means 12 months from intended date of publication, and takes into consideration product development cycles and new testing requirements, as applicable to each product category. EPA has further clarified in Draft 4 the complete timeline for stakeholders in an effort to allow for a smooth transition between specifications while more immediately rewarding more efficient, higher quality designs.</p>   |  |

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| Efficacy | Covered CFLs | <p>In Draft 3, EPA aligned the lamp wattage bins with the DOE CFR and adjusted the efficacy level by wattage for omnidirectional lamps <math>\geq 15W</math>, directional lamps <math>\geq 20W</math>, and decorative lamps <math>\geq 25W</math>.directional, to address certain barriers to wider adoption of ENERGY STAR lamps.</p> <p>The proposed efficacy levels were generally well received, with comments centered on covered and dimmable CFLs.</p> <p>Stakeholders stated that the inclusion of covered CFLs in the specification is important for consumer adoption of energy efficient products, and including A-lamps and bare spirals in the same efficacy bracket sets an unachievable level for covered products. One stakeholder remarked that if covered A-lamps are unable to meet achieve ENERGY STAR certification, utility incentives for specialty CFLs will largely disappear and overall energy consumption will increase from a drop in CFL sales.</p> | <p>In Draft 4 EPA adjusted the specification so that covered A-line CFLs could be certified as omnidirectional or as decorative with lower efficacy levels, due to the popular decorative nature and efficacy challenges for this product.</p> <p>Using a cover over a spiral CFL reduces efficacy making it difficult for these lamp types to compete with lamps without covers. EPA acknowledges that aesthetic features that cover the bare spiral are popular for consumers and a new focus for many utility programs that can increase adoption of energy efficient lamps.</p> |
|          | High CRI     | <p>Several stakeholders suggested that LED lighting will not be successful in commercial applications without a higher CRI rating. One manufacturing stakeholder submitted comments suggesting a lower efficacy tier for products with a CRI value of 90 or higher specifically the addition of a 20% efficacy discount tier for lamps with a CRI value <math>\geq 90</math>, stating that the inclusion of these high CRI lamps with lower efficacy levels would encourage adoption of energy efficient lighting products and make available ENERGY STAR certified products that are cost competitive advantages to traditional light sources.</p>   | <p>The agency believes that the existing color requirement adequately addressed color quality while balancing considerations such as: product cost and energy savings. Further, trading off efficiency to accommodate lamps with higher color rendering is not supported by EPA and DOE lamp data, which indicate LED lamps on the market today, can meet both the proposed efficacy requirement and color rendering of 90 or greater.</p>  |

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| <b>Labeling &amp; Packaging</b> | <b>Packaging</b>     | Draft 3 proposed replacing the Minimum Operating Temperature requirement with the Minimum Starting Temperature packaging requirement. In addition, the Draft requires lamps to state which applications would jeopardize the performance, such as dimmability and low voltage lamp transformer compatibility. Many stakeholders supported the proposed requirements, specifically the “dimmable” and “non-dimmable” requirement and suggested point of purchase materials be developed for this. One stakeholder commented that the Minimum Starting Temperature information is not needed and others claimed packaging space is too limited for the multiple possible application disclaimers.  | The intent of the packaging requirements is to help ensure that consumers have the information they need before they make a purchase. EPA recognizes that some product packaging space may be limited. The Agency seeks specific information on packaging size limitations.  |
|                                 | <b>Lamp Labeling</b> | <p>In Draft 3, EPA clarified that wattage or CCT values included in a model number can be used to satisfy lamp labeling requirements, and substituted beam angle for light output of directional lamps because it is more important to consumers selecting replacements for these products.</p> <p>While the majority of the proposed labeling requirements were well received, a number of stakeholders requested reduced lamp labeling for certain lamps (e.g. MR-16s and MR-11s) where there is minimal room on the lamp for additional information or for omnidirectional lamps where the labeling surface may impact the light distribution.</p> <p>One stakeholder commented that the light output value should be required on the lamp, even in cases when the beam angle is provided in order to provide consumers with vital lamp replacement information that may not be available after the packaging has been discarded.</p> | <p>EPA examined MR-16 lamps in determining the space needed for lamp labeling and believes these products have enough room for the limited labeling requirements since some manufactures are already including all the information on these small products. However, if manufacturers have specific products where this is not possible EPA asks that partners bring these cases to the Agency’s attention during the comment period following Draft 4.</p> <p>EPA reminds partners that light output values are required on lamps regulated by the U.S. Federal Trade Commission. Also that the model numbers or indicators that appear on the ENERGY STAR qualified product lists are generated by the manufacturer and allow for more than one model identifier. This allows manufacturers the flexibility for having different model indicators on lamps and packaging configurations.</p> |
| <b>Lifetime</b>                 |                      | Manufacturing stakeholders commented on the minimum lifetime requirement for covered CFLs, citing that it would be particularly difficult for those products to last 10,000 hours in elevated temperature testing.   | Lifetime requirements for CFLs remain unchanged from previous Drafts. However, EPA has offered tradeoffs in Draft 4 to accommodate decorative and covered CFLs, including a revised definition for decorative lamps. With decorative CFLs exempt from elevated testing, current qualified product data supports the capability of these products to last 10,000 hours.   |

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| <b>Light Output</b>           |  | <p>In Draft 2, EPA proposed light output requirements for R, BR and ER shaped lamps developed in consideration of final rules issued by the Department of Energy on June 26, 2009, pursuant to Energy Policy Act of 1992 amendments to the Energy Policy and Conservation Act of 1975. The proposed values were intended to ensure that light output from certified reflector lamps is consistent with expectations set by incandescent lamps meeting the rules which became effective July 12, 2012. In Draft 3, globe shaped lamps were moved under the decorative lamp section after further analysis on the performance and energy savings of these products compared to the incumbent technology.</p> <p>A few stakeholders commented that it is not appropriate to align directional lamps' wattages and lumen output values with EISA and DOE rulemakings, and suggested that the specification should reference light output of typical directional lamps. One stakeholder remarked that BR20 lamps should have exemptions just as BR30 and BR40 lamps.</p> <p>One stakeholder requested an expansion of the light output requirement for globe lamps, citing the need for differentiation in light output levels for globe lamps with medium bases versus globe lamps with candelabra bases.</p> | <p>In response to stakeholder concerns and after additional research and analysis, the Agency has proposed a multiplier table in order to benchmark to the light output values for traditional directional lamps.</p> <p>The definition for decorative products has been revised and a footnote was added to the decorative light output table to indicate applicability to lamps with candelabra bases.</p>   |
| <b>Lamp Toxics Reductions</b> |  | <p>In Drafts 1, 2, and 3, EPA included limits on mercury and other toxic material content in lamps. Mercury limits are slightly different than RoHS requirements, other toxic material requirements were harmonized with RoHS for consistency. One stakeholder commented that the mercury content, in milligrams, should be disclosed on the lamp label as consumer information. Another stakeholder requested that exemptions currently included in RoHS also be included in this specification.</p>   | <p>The agency reviewed and considered each request for exemption received and performed research on the applicability and alternatives. Draft 4 includes some additional exemptions consistent with RoHS and the ENERGY STAR Luminaires V1.2 specification. EPA encourages manufacturers to disclose mercury content for CFLs but is not requiring it on packaging at this time due in part to significant packaging costs associated with recent FTC regulations.</p>   |
| <b>Lumen Maintenance</b>      | <p><b>Elevated Temperature Life Test</b></p> | <p>In Draft 3, EPA updated the supplemental testing guidance for lumen maintenance and life testing, requiring all directional lamps <math>\leq 20</math> watts, and all omnidirectional lamps <math>\geq 10</math> watts to be tested in an elevated ambient of 45°C, and all directional lamps <math>&gt;20</math> watts in an elevated ambient of 55°C.</p> <p>Stakeholders commented that Elevated Temperature Life testing is not applicable to lamps that are labeled "not suitable for use in enclosed fixtures" or "not for use in recessed fixtures" since the lamp has not been safety tested for these applications.</p>   | <p>In Draft 4, EPA has updated the Supplemental Testing Guidance exempting omnidirectional lamps labeled "not for use in enclosed fixtures" and all lamps labeled "not for use in recessed luminaires" from lumen maintenance testing in an elevated temperature environment. The Agency reviewed the restrictive product markings required for lamp safety certification and believes they are intended to prevent consumers from installing lamps in incorrect luminaire types, thus minimizing the need for elevated temperature life testing for lamps with restrictive labeling</p> |

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|  |          | <p>One stakeholder requested a clarification on the application of the lumen maintenance tolerance.</p> <p>Another stakeholder requested the continued allowance of early initial qualification of 35,000-hours lamps at 3000-hours of lumen maintenance testing although the commercial tier requirements have been removed from the specification.</p> <p>Industry stakeholders reported that less than 3% difference in lumen maintenance between base up and base down operation is uncontrollable testing variation and requested that the method of calculating lumen maintenance be adjusted to account for this.</p>  | <p>In Draft 4 EPA removed the tolerance for lumen maintenance, and instead proposed an optional tolerance to be applied on initial luminous flux values of each unit, consistent with DOE regulations for medium base CFLs.</p> <p>The early initial pathway for life claims higher than 25,000 hours was only provided as part of the commercial tier proposal which was removed from the specification.</p> <p>The language for reported values was revised to allow the lumen maintenance value to be average of surviving units if the difference between the averages in each orientation is less than 3%.</p>                   |
| <b>Luminous Intensity Distribution</b> |          | <p>In Draft 3, EPA introduced luminous intensity distribution requirements for decorative lamps to move the performance of these lamp types closer to the performance of incumbent technology. One stakeholder requested an adjustment from the proposed 135° - 180° zone to 90°-180° zone for the 5% lumen output requirement in order to accommodate typical decorative lamp designs with the electronics located in the lower third of the lamp that prevents light from reaching the 135 degree zone or higher.</p> <p>In the omnidirectional A lamp category, one stakeholder commented that the intensity distribution data of several incandescent A-lamps is not consistent with 20% limits on average candela values for omnidirectional lamp performance.</p> | <p>After confirming the limitations on the location of the electrical components in energy efficient lamps with candelabra bases, the Agency adjusted the zone of interest for the 5% light output in Draft 4 for decorative lamps.</p> <p>For omnidirectional A lamps, EPA performed additional research and analysis of A19 incandescent lamps and has adjusted the allowed uniformity variance of the luminous intensity values for omnidirectional lamps. This update is likely to increase the availability of omnidirectional ENERGY STAR certified lamps that meet consumers' expectation for omnidirectional performance.</p> |
| <b>Power Factor</b>                    |          | <p>A few stakeholders requested a clarification of how to conduct power factor testing on low voltage lamps and also commented that low voltage lamps should be exempt from the power factor requirement as in the existing Integral LED Lamps V1.4 specification.</p>  | <p>EPA has provided additional guidance for evaluating the power factor of low voltage lamps at the lamp's rated voltage in Draft 4.</p>  |
| <b>Run Up Time</b>                     |          | <p>In Draft 3, EPA increased the time allowed for covered CFLs to reach 80% stabilized light output from <math>\leq 90</math> seconds in Draft 2 to <math>\leq 120</math> seconds based on stakeholder comment. EPA believes these levels will lead to continued improvement in lamp run-up time, while not placing an undo cost and technical burden upon manufacturers.</p> <p>A few stakeholders offered support for the increased run-up time for CFLs, citing consumer dissatisfaction with slow run up time. Some stakeholders expressed concern that the proposed 120 seconds run-up time requirement for covered CFLs is not sufficient for higher wattage lamps, necessitating the redesign of these lamps, and requested an increased to 150 seconds.</p>     | <p>After careful consideration and review of existing certified product data EPA confirmed that the proposed run up times are achievable even for higher wattage CFLs and maintains the requirements from Draft 3 in Draft 4.</p>   |

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| <b>Scope</b>                           | <b>Excluded Products</b>                   | Draft 3 carried forward the exclusion of products that incorporate power-consuming features in the on or off state, which several stakeholders comments should be included in the specification.   | EPA maintains that products that incorporate power-consuming features in the on or off state are a consideration for a future revision but will not be included in version 1.0.  |
|  | <b>Non-Standard/Semi directional Lamps</b> | Most comments from stakeholders continued to show support for excluding semi-directional and non-standards lamps. One stakeholder commented that the removal of the semi directional and non-standard category for SSL lamps will negatively impact the ENERGY STAR program with a decrease in market penetration. They requested the reinstatement of the category with potential loopholes addressed directly in the specification. Another stakeholder claimed the non-standard SSL category would allow for innovative new designs with higher efficacy values that satisfy consumers' needs. Other stakeholders remarked A-shaped lamps with no side or down light distribution should not be eligible for ENERGY STAR certification. | Due to stakeholder concerns and confusion surrounding the non-standard SSL and semi-directional category introduced in Draft 2, the Agency maintains exclusion of these products from the scope. After analysis of the current use of the non-standard SSL pathway it is clear that it is not being used as intended, and is being used as a loophole for products that cannot meet performance requirements. Recent market surveillance indicates packaging requirements are not an adequate solution to the challenges posed by these products.  |
| <b>Significant Digits and Rounding</b> |  | <p>In Draft 3, EPA updated the Significant Digits and Rounding guidance to align with rounding practices in U. S. Department of Energy Code of Federal Regulations CFR Title 10.</p> <p>One stakeholder commented that the rounding rule for CRI was missing from the specification.</p>   | In Draft 4 EPA clarified how values for each metric shall be calculated, rounded and reported.   |
| <b>Technology Neutrality</b>           |  | One stakeholder commented that Draft 3 did not achieve technology neutrality because the specification includes testing and performance requirement differences that purportedly allow unfair advantages to some technologies. The stakeholder requested that EPA audit the specification and modify requirements in an effort to ensure consistency for all technologies, citing power factor as an example in which additional money is spent on LED designs to ensure that higher levels are met.   | To the extent the ENERGY STAR label designates highly efficient models within a product category; the Agency's emphasis is on technology neutral efficiency requirements. The Agency strives to set appropriate performance levels in a technologically neutral way to the greatest extent possible to ensure consumers have a consistent experience with an ENERGY STAR certified product. Ensuring that product performance is not traded off against gains in efficiency does require in some cases establishing testing and performance requirements that are tailored for a given technology. |

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| <b>Start Time</b> |          | In Draft 3, EPA introduced the ENERGY STAR Start Time Test Method.<br>One stakeholder remarked that there is little benefit in evaluating the Start Time requirement on 10 samples in multiple orientations and recommended a reduction in sample size. | The Agency has continued to seek opportunities to reduce sample size and testing burden where appropriate, to that end, in Draft 4, EPA has reduced the required sample size and removed lamp orientation for the start time test after confirming that start time values for the same lamp, whether CFL and LED, are independent of the lamp's test orientation and very consistent from sample to sample. |