

Topic	Subtopic	Comment	Response
Allowable Product Variations		<p>A few stakeholders commented that while the lumen maintenance test for correlated color temperature (CCT) variations has been omitted in the Final Draft, manufacturers still must conduct the long term color maintenance testing for each LED lamp variant. Pointing to data trends that demonstrate a negligible color shift between 0-hr and 6000-hrs testing, one stakeholder suggested conducting the Color Maintenance Test on only the lamp with the lowest CCT to further reduce testing time.</p> <p>One stakeholder requested the removal of the color maintenance testing, a requirement for LED lamps, from the Lamps specification since it is not a requirement for CFLs and increases the testing cost and time to market. One stakeholder commented that LM-80 data for the LEDs can be leveraged in lieu of color maintenance testing.</p>	<p>EPA considered each request for allowable variations where technical justification was provided. While the data received by the Agency did not support a worst case scenario representative CCT lamp for all performance metrics, the data did show that lumen maintenance and color maintenance performance over time is fairly consistent among the same lamp construction with only a change to the phosphor mix. As a result, EPA has expanded the test data that may be shared for variations in CCT to include color maintenance testing and leaves the worst case designation up to the manufacturer and their certification body with the reminder that the partner must be careful in assessing their risk and assumes the responsibility when it comes to verification testing. EPA is open to working with partners to collect data in support of additional test sharing for variations that could potentially be included in future revisions.</p>
Dimming	Light Output on a Dimmer – Testing	<p>One stakeholder requested an allowance for testing laboratories to leverage the pre-set levels on a dimmer to confirm the light output level needed for stabilization during the testing for flicker and audible noise.</p> <p>Another stakeholder suggested removing the requirement for measuring Total Harmonic Distortion (THD) during dimming testing, stating that the test is not a typical measurement taken during integrated sphere testing, and as such would require specialized equipment.</p>	<p>The use of a dimmer's pre-set levels during testing is not prohibited by the recommended practices, and these levels may be used. However, light output stabilization must be confirmed for dimming performance testing in accordance with method(s) in the recommended practices.</p> <p>THD, one of the electrical measurements required for the test report for light output on a dimmer, can be measured using an analyzer or notch filter incorporated into the test setup, similar to an oscilloscope.</p> <p>The energy efficiency program has shown a strong interest in THD data. Rather than placing a requirement on it, e.g. <20% THD, the Agency will monitor the data to better understand the impact dimming has on a lamps' THD value.</p>
Dimming	Flicker	<p>One stakeholder recommended clarifying the wording of the flicker requirement, indicating they found the phrase "...when evaluated at dimmer's maximum setting and dimmed conditions shall be reported" to be confusing and not aligned with the dimmed conditions in the test procedure guidance.</p>	<p>Acknowledging inconsistent language between the flicker requirement and the recommended practice for flicker, EPA has revised the requirement to indicate the lamp average light output periodic frequency, highest percent flicker, and highest flicker index shall be reported. The conditions for these measurements, which include the lamp without dimmer, the lamp on the dimmer at the maximum setting, and the lamp on the dimmer at the minimum light output value, have been removed from the requirement and are specified in the recommended practice.</p>

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Dimming	Noise Testing	<p>A stakeholder group commented that the flexibility of noise testing at one (1) meter or less, while included in the noise requirement in the Final Draft, is not reflected in the recommended practice language.</p> <p>One stakeholder recommended clarifying in the testing guidance that a photodetector is not necessary in the noise testing room if the dimmer setting is repeatable in the noise chamber without it. The stakeholder also recommended making sure this change is reflected in the test method guidance.</p> <p>One stakeholder suggested clarifying that the measurement is made on a single lamp with the other 3 lamps outside the chamber for the 4-lamp circuit noise testing.</p> <p>Another stakeholder recommended updating the definition of peak noise from “the highest noise level recorded at a measurement point” to “time-averaged value taken during stable operation of the UUT (unit under test)” so that the definition aligns with the terminology in the standards referenced in the recommended practice.</p>	<p>EPA has revised the test distance for audible noise to 1 meter or less, in both the specification requirement and the recommended practice, allowing testing flexibility without compromising limits on sound levels.</p> <p>The measurement points for the noise test were designed to coincide with the measurement points for flicker and light output on a dimmer. Without any evidence behind what point is worst case, EPA will look at the data that comes in, including results of any additional measurement points not outlined in the recommended practice and will consider adjusting the recommended practice in the future.</p> <p>The recommended practice for noise has been updated to reiterate that the noise measurement is taken on one lamp during the 4-lamp testing condition.</p> <p>The definition of peak noise/sound has been updated in the recommended practice to be the highest time-averaged sound value recorded at a measurement point during stable operation of the DUT, to align with terminology in the ISO standards for sound values.</p>
Effective Date		<p>A few stakeholders commented that a 12 month transition period was insufficient for redesigning and re-testing products because of the time requirements for research and design, approbation, tooling, internal testing and new manufacturing processes and controls, and production ramp-up. They recommended an 18 month transition period with an effective date of March 1, 2015. In addition, one stakeholder stated that NVLAP laboratories will be inundated with new products.</p> <p>Another stakeholder asked for a confirmation of the date at which products will no longer be able to be qualified to Integral LED Lamps V1.4.</p>	<p>Typically, EPA allows nine months for manufacturers to update product literature and other materials while transitioning to new specification requirements. Given the new Lamps Version 1.0 will require additional testing, EPA has chosen a date that allows manufacturers more time to work with their certification bodies to meet the new requirements with existing products. The Version 1.0 will take effect on September 30, 2014. Manufacturers are encouraged to begin testing and certifying products to this specification as soon as it is final. EPA-recognized bodies will be asked to stop certifying new product submittals to the Compact Fluorescent Lamps V4.3 and the Integral LED Lamps V1.4 specifications after May 20, 2014. The Agency recognizes that manufacturers may have an interest in redesigning lamps to meet the new requirements, which will require additional time, and these can be added to the program as they become available and certified. As of the Version 1.0 effective date, only those products that have been certified to the new requirements will appear on the Qualified Product List.</p>

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Elevated Temperature Light Output Ratio		<p>One stakeholder commented that measuring the Elevated Temperature Light Output Ratio should not be limited to using Elevated Temperature Life Testing Option A or Option B. The stakeholder suggested that the ANM NA's labs have a different approach which has been found to be reproducible, easily automated, and does not use equipment required for other testing protocols for ENERGY STAR qualification. The stakeholder requested that EPA make clear that the testing method guidance is not a requirement and that alternative approaches are acceptable as long as the specified test conditions are met.</p>	<p>The Elevated Temperature Light Output Ratio test, introduced with Draft 2 of the specification along with four other test methods, is an existing test method, established in the Compact Fluorescent Lamps V4.0 specification. EPA is open to updating the test method to include additional optional test setups and will consider the suggestion for a future revision.</p>
Federal Standards and DOE Rulemaking		<p>One stakeholder expressed concern about the guidance indicating that reported values must be the same for U.S. Department of Energy (DOE) and ENERGY STAR, and that these values must be based on the same test data, and requested that the guidance be removed from the specification. The stakeholder confirmed that the testing for DOE regulatory compliance and ENERGY STAR may not occur in parallel and if the data generated for DOE compliance is used for ENERGY STAR at a later date, it is up to the EPA-recognized certification body (CB) to determine if the data can be used. The stakeholder emphasized that linking the testing creates an unnecessary burden, will require manufacturers to re certify values with DOE based on new test data for the Lamps specification, and will reduce the flexibility manufacturers have in determining the "basic model" for DOE reporting. The stakeholder noted that DOE reported value requirements allow a manufacturer to report a more conservative value than ENERGY STAR which gives the manufacturer greater flexibility for determining basic models.</p> <p>Another stakeholder indicated that they are concerned that EPA and DOE reporting requirements and sample sizes are not aligned. They state that DOE is now requiring reporting results using test procedures different from the ones adopted by DOE in 2006 after review by the Secretary, which could lead to models being tested under either procedure. The stakeholder also requested that EPA revisit the requirement that ten models be tested (five base-up and five base-down) since the stakeholder believes that data may show that testing base-down is redundant.</p>	<p>EPA and DOE have been working closely throughout the specification development process, resulting in the inclusion of guidance language to direct manufacturers to the appropriate references, to clarify where data should be shared, and to highlight where testing for the ENERGY STAR specification may differ. In response to stakeholder questions, the guidance indicating that reported values must be the same has been removed in favor of a general statement encouraging manufacturers to consult with DOE when it comes to reporting for DOE standards.</p> <p>EPA has also included in the front of the specification a reminder to manufacturers that lamps within the scope of the ENERGY STAR Lamps specification are covered by U.S. federal laws governed by other federal agencies, such as DOE, U.S Federal Trade Commission (FTC), and U.S Federal Communications Commission (FCC) and that compliance with these laws is mandatory to sell products in the U.S. Partners are encouraged to contact the respective agency with their comments and questions regarding sampling, testing and reported values for products covered by the federal regulations.</p>
Labeling & Packaging	Lamp Labeling	<p>EPA received a comment expressing concern with the lamp labeling requirement in which the model number on the lamp must agree with the model number of the product on the ENERGY STAR Qualified Product List. The stakeholder commented that the model number or retail SKU will vary with packaging types and this requirement has the potential to greatly slow down the packaging process since workers will have to look at each lamp model number before determining the correct packaging box and it will be easy to get boxes mixed up. The stakeholder suggested that the model number or retail SKU number only be required to be placed on the packaging as specified in the existing specifications.</p>	<p>EPA has clarified the language in the specification to properly reflect the intent of the lamp labeling requirement, which is to ensure consumers can identify certified products in-store and in ENERGY STAR listings of certified models after the packaging has been discarded. The information displayed in the list of certified products allows for flexibility in model identifying information to simplify fulfillment of this requirement. The model identifier on the lamp does not have to match the packaging identifier.</p> <p>The updated requirement language is as follows: Lamp model or retail SKU number consistent with model number or identifying information in the ENERGY STAR listing of certified models.</p>

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Lifetime		A stakeholder commented that the consumer will experience a sizable gap in lifetime performance between ENERGY STAR certified CFLs with a minimum lifetime rating of 10,000 hours and ENERGY STAR certified LED lamps with a minimum 25,000 hours rated life. The stakeholder noted that CFL is a legacy technology, but recommended reducing the lifetime gap between the two technologies by specifying a CFL minimum lifetime of greater than 15,000 hours to 70% of the initial lumens.	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. There are significant recognized differences in lamp life between technologies with large cost implications. In this specification, EPA has increased the lifetime requirements for CFLs substantially, going from 6,000 hours to 10,000 hours. The Agency believes that this level achieves the appropriate balance between cost, performance and availability and that the suggestion to raise the bar even higher, to 15,000 hours for CFLs would be impractical at this time. EPA will, however, continue to monitor the market for both CFLs and LEDs to see if future changes are warranted.
Light Output		<p>EPA received a comment that the supplemental testing guidance for CFLs should be the same for the Light Output requirement as it is for the Luminous Efficacy requirement.</p> <p>One stakeholder commented that the light output levels referenced for equivalency claims do not correlate to actual light output values of the incandescent lamps being referenced. The stakeholder stated that a survey of commonly available incandescent lamps showed numerous examples of 60W frosted lamps with total lumens from 650 to 830 and that after 25,000 hours, the lumen output of LED bulbs would far exceed the performance of commonly available 60W incandescent bulbs. The stakeholder recommended aligning the light output ranges in the specification to more closely represent the incandescent bulbs on the market today.</p> <p>EPA received one comment requesting clarification about why BR30 products rated for 55 or 60 watts are required to have >11x the lamps rated wattage or requesting that this requirement be changed. The stakeholder questioned if this was an oversight that BR30 type bulbs in this range are also required to have light output >10x the lamps rated wattage since moving forward with this requirement will necessitate that 60W replacement products with 600 lumens be delisted from the ENERGY STAR qualified product listing.</p>	<p>Supplemental testing guidance that appears in the Luminous Efficacy requirement and denotes differences in testing and reporting references for CFLs covered by DOE's regulatory program, is not identical to the guidance in the Light Output requirement because the DOE regulations do not have limitations for light output. Some of the lamps are regulated by FTC, and the reference to 16 CFR § 305.2 is included in the supplemental testing guidance for the Light Output requirement. Partners are encouraged to contact DOE and FTC with their comments and questions regarding sampling, testing and reported values for products covered by the federal regulations.</p> <p>Light output levels for general purpose replacement lamps have been in place for equivalency claims to common incandescent lamps since the inception of various ENERGY STAR lamp specifications, and EPA, DOE, partners, and stakeholders have worked diligently to educate consumers on the new way to shop for light bulbs. While challenging, having simple and consistent light output levels will go a long way to help consumers choose the right energy efficient light bulbs for their homes. The Agency is open to considering this topic at a later date with broader stakeholder input.</p> <p>In regards to directional lamps, Lamps V1.0 provides light output values for equivalency of E, ER and BR lamp in line with federal legislation. In line with federal legislation exemptions, the specification allows an exception for certain types and wattages. Throughout the drafts, EPA requested stakeholder input on these levels, and adjustments have been made accordingly due to feedback received during this process.</p>

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Lumen Maintenance	Elevated Temperature Life Test	<p>One stakeholder requested clarification about the need for a purge to restore lamps to ambient conditions in the Option B test method.</p> <p>EPA received a few comments requesting that EPA consider allowing directional lamps the same cut-off point for low wattage products (<10W) as omnidirectional lamps rather than requiring all directional lamps to undergo elevated temperature life testing. One stakeholder commented that consumers, not EPA, choose the bulb type (omnidirectional or directional) when replacing a bulb in a residential downlight fixture and noted that low wattage products (5W to 9W) produce little heat, and that requiring elevated temperature testing only adds to the cost of these products without adding value. Another stakeholder expressed similar sentiments and also noted that the UL safety standard for lamps does not differentiate by lamp type and requires testing under the same test conditions.</p>	<p>The purge, a part of the test method designed by DOE, is consistent with the existing test method used by Compact Fluorescent Lamps V4.3 (since version 4.0) and accelerates the restoration of lamps to ambient temperature, adding additional simulation of thermal cycling. Partners are encouraged to review the documents associated with the development process for CFL 4.0 for information on the development of the apparatus test method (Option B).</p> <p>The ENERGY STAR Lamps V1.0 specification allows manufacturers to identify and label lamps based on their intended use, and has aligned lumen maintenance and rated life testing requirements accordingly. Partners have the option to label directional lamps "not for use in recessed fixtures" and bypass lumen maintenance in an elevated temperature environment. However, if a low wattage directional lamp is intended to be operated in a recessed can, the Agency believes it should be tested in an elevated temperature environment.</p>
Lumen Maintenance	Ambient Temperature Life Test	<p>EPA received comments requesting clarification about the increased temperature range for the ambient temperature during the ambient temperature life testing from $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ to $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$. One stakeholder expressed concern that NVLAP certification requires $\pm 5^{\circ}\text{C}$ and a gap of $\pm 10^{\circ}\text{C}$, particularly at the lower limit of 15°C, may result in a loophole. The stakeholder also commented that because IES LM-65 does not specify the $\pm 5^{\circ}\text{C}$, EPA's claim of alignment with this standard is confusing. The stakeholders recommended restoring the $\pm 5^{\circ}\text{C}$ requirement.</p>	<p>The 2001 version of the IES LM-65-01 specifies a temperature range between 15°C and 35°C, the same as $25^{\circ} \pm 10^{\circ}\text{C}$, and latest version of IES LM-65-10 (issued in 2010) specifies a temperature range between 15°C and 40°C, with a clause that higher temperatures are allowed for lamps designed for high temperature scenarios. In response to comments EPA has revised the ambient temperature to reflect the range between 20°C and 35°C, rather than $25^{\circ} \pm 10^{\circ}\text{C}$, allowing a 5 degree lower bound and a slightly higher bound due to challenges for labs to maintain such a tight temperature range.</p>
Lumen Maintenance	Tolerances	<p>Stakeholder comments requested that EPA confirm that the 3% lumen maintenance tolerance applies to CFLs in addition to LED lamps, as the allowed tolerance in the Final Draft was located in the supplemental testing guidance for LED lamps only.</p> <p>One stakeholder commented that the note box language regarding the 3% tolerance for lumen maintenance in the Final Draft asserts that measurement error occurs in long-term testing, and does not occur at 0-hour measurement since the tolerance cannot be applied at that point.</p>	<p>EPA has extended a 3% tolerance to light output measurements for determining lumen maintenance for CFLs not covered by DOE standards. The tolerance accounts for equipment measurement error, and if needed, may be applied to any stage of light output measurements for lumen maintenance except the initial flux measurement. Adding a 3% tolerance to the initial flux measurement value lowers the calculated lumen maintenance ratio, and is not applied since it would not help in a situation where the calculated lumen maintenance value does not meet the requirement without the tolerance.</p>

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Luminous Intensity Distribution		<p>A few stakeholders commented that the solid-state industry has invested in conforming to the 20% uniformity requirement in the Integral LED Lamps specification, which surpasses the performance of incandescent lamps, and suggested that a relaxation to 25%, coupled with an allowance of 10% of measured values to vary up to 25% will allow the introduction of lamps that are inferior to commonly available LED omnidirectional lamps. One stakeholder requested adjusting the variation of the data points from 90% to 100% within 25% from the mean luminous intensity, while another stakeholder requested that the requirement remain the same as it currently is written in the Integral LED Lamps specification V1.4.</p>	<p>Like many of the performance requirements included in the Lamps specification, luminous intensity distribution is addressed in the interest of promoting a positive consumer experience with lamps that feature the ENERGY STAR label. EPA's goal is to protect the consumer experience without presenting unnecessary obstacles to innovation and cost reduction. To that end, in response to comments from testing laboratories that the intensity distribution data of some common incandescent A-lamps could not meet the current requirements for LED omnidirectional lamp performance, EPA performed additional research and analysis of A19 incandescent lamps and adjusted the allowed uniformity variance of the luminous intensity values for omnidirectional lamps to more closely align with the incandescent lamp data. These requirements, retained in the final specification, allow for greater flexibility compared to the existing specification for meeting omnidirectional requirements without compromise.</p> <p>Given its importance, and a range of interest on the topic, EPA intends to continue exploring this issue, starting with the initiation of third party research. EPA invites stakeholders to remain engaged, as we explore omnidirectional performance evaluation approaches for further comment this fall for potential adoption as part of a near-term revision.</p>
Rapid Cycle Stress Test		<p>EPA received comments that the European 244/2009 directive adopted 300 milliseconds (ms) as the differentiation point between instant start and preheat (cathode) lamps and stakeholders suggested that EPA adopt the same differentiation point (300 ms) for standardization purposes.</p> <p>Another stakeholder also noted that the 100 ms start was not consistent with the European directive and commented that requiring one cycle per hour of rated life will be technically challenging for CFLs and require substantial redesign and testing. The stakeholder recommended allowing lamps with start times \leq300 ms to cycle once per every two hours of rated life.</p>	<p>While the European Directive designates 300 ms as the differentiation point as it relates to cycling, the directive does not indicate why 300 ms is used and does not include 300 ms as a definition of instant start. The distinction of 100 ms as the definition of instant start is consistent for the U.S. market based on EPA research. The exemption, allowing a reduced number of cycles is based on the technical limitations and tradeoffs. As a reminder, the requirement of one cycle per hour of rated life introduced in Draft 1 is intended to increase reliability of CFLs through more switching, as research and CFL verification testing continues to show switching is a common cause of early failure.</p>

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Run-Up Time		<p>An industry stakeholder group disagreed with the Agency's statement that run-up time is critical to consumer satisfaction. A few stakeholders commented that the run-up time requirement (≤ 120 seconds) for covered CFLs would eliminate many covered CFLs. One stakeholder noted that due to manufacturing variations even lamps with run-up times of ≤ 120 seconds will need to be redesigned and are already pushing the limits of amalgam technology. Another stakeholder suggested that EPA should either follow European 244/2009 directive which prescribes run-up thresholds at 60% stabilized light output rather than 80%, or change the requirement to 80% stabilized light output in ≤ 150 seconds.</p> <p>One stakeholder requested that EPA remove the example of t90% from the definition of run-up time in the test method since the requirement is t80% and including t90% is confusing.</p>	<p>An assertion that run-up time is not critical to consumer satisfaction is inconsistent with trends in the market. There is clear indication in the market that the time it takes for a light to come on, as well as the time it takes for a light to come up to an acceptable brightness level, is important for consumer satisfaction. This is further evidenced by increased efforts of industry to continue to reduce both start and run up times, actively marketing products based on "instant on" features, and providing alternative ways of bringing instant light.</p> <p>Citing t90% is just one example, in addition to the t80% which appears in the specification as the requirements, of the various times in which run-up time could be defined.</p>
Shape Dimensions		<p>EPA received multiple comments requesting the removal of the 5% tolerance for maximum overall length for omnidirectional lamps. Stakeholders expressed concern that the tolerance would lead to consumer dissatisfaction with LED lamps because the lamps may not fit in existing fixtures or table lamps and that lamps that use the tolerance would be noncompliant with ANSI documents, which do not have a tolerance. One stakeholder suggested that EPA should continue to work the ANSI to create standards that reflect the variation in SSL technology like in the case of MR16 SSL lamps.</p>	<p>EPA believes that standardized size limitations are important and helpful but even those standards acknowledge that manufacturing variances occur and allows for 3% of a yield to fall outside the standard. Because only one sample is chosen at random testing for ENERGY STAR, the Agency believes a tolerance to this standard is warranted for general purpose LED products and that such extreme stringency does not serve the advancement of the technology. EPA also acknowledges that the specification allows CFLs to exceed ANSI outlines for incandescent lamps.</p> <p>EPA maintains that the dimensions of directional lamps, such as MR16 lamps, are application critical for recessed downlights and accent luminaires with a lamp mounting apparatus, and has not extended the tolerance to directional lamps.</p>
Start Time Testing		<p>One stakeholder requested that EPA clarify in the lamp storage section if the off time requirement for lamps off for more than 24 hours is applicable to CFLs only, LED lamps only, or both.</p> <p>The stakeholder also requested that EPA revise the general test procedure in Section 7 with language indicating that an integrating sphere is allowed to be used for the measurement.</p>	<p>EPA has clarified in the start time test method that the wait time prior to testing only applies to CFLs. EPA has also updated the test method to make it even clearer that the light output measurement taken in an integrating sphere is acceptable.</p>

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Tolerances		One stakeholder requested that the luminous flux measurement tolerance be applied only to each unit sample value that fails to meet the minimum requirement, and not allow the tolerance to be applied to all unit samples to reduce the inflation of the reported efficacy value.	If needed, the 3% tolerance for light output measurements is applied to the each unit's measured value to allow for consistent and repeatable application by the certification body determining compliance with the requirement. The 3% tolerance may be applied to initial flux measurements for efficacy and light output evaluation and to luminous flux measurements at points prescribed by lumen maintenance testing, such as 1000-hr, 3000-hr and 6000-hr readings, but may not be combined with any additional tolerances or adjusted for measurement uncertainty.
Toxics Reduction		EPA received a request from a stakeholder to include an additional exemption for lead in the glass of flares and exhaust tubes which is included in the RoHS 1 Directive adopted by the state of California. The stakeholder noted that the absence of the exemptions for lead in glass will increase product costs.	EPA has included in the final specification additional exemptions for lead to allow for the lead in the glass of flare and exhaust tubes, as well as in electrical components and fluorescent tubes.