

Topic	Subtopic	Comment	EPA Response
Allowable Product Variations	-	<p>While allowable product variations were not covered in Draft 1, several stakeholders requested additional product variations to be included in the specification.</p> <p>Some stakeholders suggested that the test data generated from one lamp model could be shared among the manufacturer's product family with specific construction variations as long as all other components of the lamp are the same and if in-situ temperature testing showed that the temperature at the lamp's TMP was not impacted by the change. Recommended allowable variations included:</p> <ul style="list-style-type: none"> • Heat Sink • Lamp Base • Lamp Beam Angle • Correlated Color Temperature (CCT) • Light Source • Color Rendering <p>The noted tests suggested by stakeholders for data sharing included:</p> <ul style="list-style-type: none"> • Lumen Maintenance • Reliability (Lifetime) • Rapid Cycle Stress Test • Transient Protection 	<p>EPA's intent is to ensure that all models labeled as ENERGY STAR meet the requirements of the specification and is open to exploring ways of ensuring compliance while also reducing the testing burden for manufacturing partners. Draft 2 reflects the results of exploration of the characteristics best suited for this approach. EPA has analyzed stakeholder suggested product variations and developed the allowable product variations guidance in Draft 2. This guidance will enable manufacturing partners to certify multiple products when test results are applicable to a variety of models. This includes allowing many of the variations requested by manufacturers such as beam angle and base type to be represented by the tested model. Additional variations, including paint color, envelope shape and envelope finish were added to further decrease testing burden. EPA is open to exploring additional areas for reducing testing burden and continues to request additional data sufficient to expand the section for allowable product variations for shared test data.</p>
Correlated Color Temperature (CCT)	6500K Lamps	<p>Draft 1 proposed limiting the selection of lamp CCTs to 2700K, 3000K, 4000K/4100K, and 5,000K. This added the 5000K color temperature option that was not present in the Integral LED Lamps specification V1.4 for LEDs, but omitted the 6500K CCT that was present in the Compact Fluorescent Lamps v4.3 specification.</p> <p>Stakeholders suggested that the specification should include higher CCT levels, and argued that 6500K lamps are in high demand and drive a significant portion of lamp sales.</p>	<p>After considering the comments from stakeholders regarding current consumer interest in 6500K lamps, the Agency has added this CCT as an allowable value in Draft 2.</p>

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	<p>4-Step Vs. 7-Step</p>	<p>Draft 1 proposed a color requirement for lamps to fall within a 4-step MacAdam ellipse of the targeted CCT to address a consumer dis-satisfier of poor CCT consistency among lamps, which could result in lamps with noticeably different shades or tints across makes, models and technologies.</p> <p>Many stakeholders expressed the desire to keep the existing 7-step MacAdam ellipse requirement from the Compact Fluorescent Lamps v4.3 and Integral LED Lamps v1.4 specifications. Many expressed concern that if the new specification were to require a 4-step MacAdam ellipse as was included in Draft 1, costs would be driven up without significant benefits to consumers due to the high costs of phosphor.</p> <p>Some stakeholders commented that meeting the 4-step ANSI MacAdam Ellipse would be difficult, and confirmed that products would have to be designed to a 2-step tolerance in order to achieve a 4-step result.</p> <p>One stakeholder recommended delaying the change to 4-steps but tightening the requirement over time in future drafts.</p> <p>Some stakeholders supported the move to a 4-step MacAdam ellipse requirement as a method of addressing a color consistency problem that has been present with compact fluorescent lamps. Of these stakeholders, one stated that a move to a 4-step ellipse would be acceptable if the price implication did not hinder adoption.</p>	<p>Due to comments received from stakeholders reflecting concern about the ability of manufacturing partners to meet such a requirement while maintaining the cost effectiveness of qualified lamps for consumers, the proposal in draft 2 adjusts the CCT requirements to those found in the existing specifications but with no samples permitted to fall outside the 7 steps. EPA is sensitive to the issues with phosphor pricing and the impact on the consumer in tough economic times but also seeks to improve consumer dissatisfaction with “the color appearance” of CFLs. EPA will continue to monitor the situation and determine at a later date when moving towards better and more consistent color might be appropriate.</p>
<p>Color Angular Uniformity</p>	<p>-</p>	<p>Several stakeholders expressed concern with the referenced measurement standards and the availability of the necessary equipment (goniophotometers with a spectrometer) to perform the color angular uniformity test as outlined in Draft 1.</p>	<p>The known testing and measurement issue is being explored by the IES LM-79 working group developing the latest revision to the method of measurement. The issue is also being explored through round-robin testing by the Lamp Testing Engineers Conference (LTEC). The Agency will continue to follow the work of these groups and will in a subsequent draft issue further supplemental testing guidance intended to mitigate these issues.</p>

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Color Maintenance	-	<p>Draft 1 proposed a requirement for lamps to have color maintenance fall within 0.004 over the 6,000 hour lumen maintenance test to address concerns of color shift over LED lamp lifetime.</p> <p>Some stakeholders expressed concerns that tightening the color maintenance requirement in Draft 1 to 0.004 (as compared to 0.007 in Integral LED Lamps v1.4) has cost implications, citing:</p> <ul style="list-style-type: none"> • Decreased LED manufacturing yield available to support ENERGY STAR qualification. • Reduction in target CCT production area by approximately 50%. <p>Others expressed concern about meeting this increased requirement while simultaneously meeting other proposed changes to the specification, specifically the 10,000 hour minimum life, which would likely not be cost effective while meeting the color maintenance requirement.</p> <p>Other stakeholders supported the tightening of color maintenance over time as technology improves, but not in this version of the specification.</p>	<p>In consideration of stakeholder comments that the proposed requirement would hinder product availability and result in a higher cost product without significant benefit to the consumer, the Agency adjusted the proposed requirement to carry forward the requirement detailed in the Integral LED Lamps specification and the Luminaires specification in an effort to help maintain the cost effectiveness of LED lamps and have consistency across ENERGY STAR specifications.</p>
Color Rendering	R₉	<p>The proposed R₉ requirement of > 0 for all lamps in Draft 1 was an existing specification requirement from Integral LED Lamps v1.4, and was intended to address a specific color rendering deficiency common to phosphor based products.</p> <p>Some stakeholders suggested that the requirement has the potential to increase costs significantly for CFLs and have negative effects on efficacy and lumen output due to the reformulation costs and additional phosphors that would be required to consistently meet the requirement.</p> <p>Other stakeholders were supportive of the requirement to improve color quality, suggesting it may help eliminate a consumer dis-satisfier of “color”, and higher R₉ lamps better simulate the rendering of an incandescent lamp.</p>	<p>In light of information provided by stakeholders, coupled with the color quality benefit to consumers regardless of technology, the Agency has proposed to carry forward the proposed requirement for all lamps to have a positive R₉ in Draft 2. EPA seeks specific information of proposed cost increases to the consumer as a result of this requirement for CFLs to better evaluate whether the added cost to the consumer outweighs the benefit and move towards better “color appearance”.</p>

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	R _a	<p>The majority of stakeholders stated the R_a requirement of ≥ 80 as proposed in Draft 1, was acceptable.</p> <p>Some stakeholders suggested that a tighter R_a requirement of 85 and 90 should be implemented in a few years to improve consumer sentiment about the quality of the light, and to continue improving the ENERGY STAR brand perception.</p> <p>Other stakeholders cautioned against increasing the R_a requirement, citing increased cost and reduced efficacy if the requirement were increased beyond R_a of 80.</p>	<p>In Draft 2, the Agency decided to carry forward the proposed requirement of 80, with no change from the CFL and Integral LED Lamps specifications. EPA seeks to improve consumer dissatisfaction with “the color appearance” of CFLs through requiring a positive R_a. EPA will continue to monitor the market and determine if at a later date moving towards better color rendering might be appropriate.</p>
Dimensional Requirements	Lamp Shape and Lamp Base	<p>The proposed requirements for lamp shape dimensions and tolerances in Draft 1, referencing ANSI standards for minimum and maximum length and maximum lamp diameter, were generally accepted by stakeholders, with a suggestion to consider referencing IEC documents for line voltage MR16 lamps utilizing a GU10 base.</p> <p>One stakeholder noted that CFL shapes often do not meet the ANSI outlines and some currently qualified products may have trouble meeting this requirement.</p>	<p>Because EPA administers the ENERGY STAR program for the United States only, and lamp dimension and fit are key criteria for proper installation, the Agency looks to reference, where appropriate, standards from U.S. standards organizations (ANSI, NEMA) not international standards such as IEC. EPA maintained the dimensional requirements for lamp shape, while clarifying the applicability to ANSI standard lamps, and removed the Lamp Base Dimensions and Tolerances requirements as they are already captured in ANSI/UL 1993.</p> <p>The Agency recognizes that line voltage MR-16 lamps with GU10 bases have become more prevalent in the residential market segment in recent years and decided to add this lamp type to the scope in Draft 2 pending the resolution of dimensional standards with U.S. standards organizations or industry consensus through NEMA.</p>

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Dimming	-	<p>While dimming requirements were not covered in Draft 1, there were comments from stakeholders on a number of dimming related topics:</p> <ul style="list-style-type: none"> • Requiring dimmers to be compatible with legacy dimmer switches instead of next generation dimmers. • Lack of consumer knowledge regarding what type of dimmer they have. • Limitations of phase-cut dimming when controlling products with an electronic ballast or driver. • Impact of dimming on product life. • Audible noise in a dimmed state. • Flicker in a dimmed state. • Lamp starting in a dimmed state. <p>The efficiency community expressed support of developing a dimming definition and method of measurement, noting that poor dimming performance is a consumer dis-satisfier and hinders adoption of energy efficient lighting technology.</p>	<p>EPA is working with industry stakeholders, including the National Electrical Manufacturers Association (NEMA), Natural Resources Defense Council (NRDC) and the Lighting Research Center (LRC) to develop a definition, method of measurement, and compatibility metric for dimmable lamps. The Agency seeks to establish a definition of dimming which emphasizes quality, ensuring that qualified dimmable lamps dim down to levels meeting consumer expectations, are compatible with the majority of the installed base of dimmers, and are free from noise and flicker, among other criteria.</p>
Effective Date	-	<p>One stakeholder proposed that a Version 1.0 effective date be chosen that will provide manufacturers 24 months to comply with the new requirements.</p>	<p>When revising ENERGY STAR specifications, EPA generally provides manufacturers with a nine month transition period to update product literature and marketing materials for affected models. EPA also takes into consideration product development cycles and new testing requirements, as applicable to each product category. EPA intends to continue discussions with stakeholders regarding an effective date that allows for a smooth transition between specifications while more immediately rewarding more efficient, higher quality designs.</p>

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Efficacy	-	<p>Draft 1 contained limited increases in efficacy due to the already strict performance requirements contained in the Compact Fluorescent Lamps v4.3 and Integral LED Lamps v1.4 specifications.</p> <p>A majority of stakeholders supported the proposed efficacy levels. However, several stakeholder suggested that the directional lamp category should have higher efficacy levels because:</p> <ul style="list-style-type: none"> • LED Directional Lamps currently qualified under the Integral LED Lamps specification had a significantly higher efficacy (stating an average of 51.4 lumens per watt). • Utilities are not able to capture the energy savings of lamps that perform much better than the 40 to 45 lumens per watt in the draft. 	<p>Citing the limited ability for the technologies to meet stricter requirements at this time and the need for cost effective options for consumers, the luminous efficacy requirements remain unchanged from the proposed requirements in Draft 1.</p>
	Alternate Groupings	<p>A few stakeholders suggested alternate lamp groupings for the efficacy requirement. The suggested groupings included:</p> <ul style="list-style-type: none"> • Separating out dimming CFL lamps to account for the reduced efficacy due to extra circuitry required for dimming • Dividing omnidirectional lamps into “covered” and “non-covered” and reducing the efficacy requirement for covered lamps to account for an efficacy reduction due to the cover. • Removing “G” and “T” lamp shapes from omnidirectional back to the decorative category, as these shapes have a difficult time meeting the efficacy requirements as CFL lamps. <p>Some stakeholders suggested the efficacy passing test language needed clarification regarding unrestricted orientation lamps.</p>	<p>Acknowledging industry feedback, EPA has made minor revisions to the groupings of lamps in Draft 2, but the general groupings remain the same. Efficacy levels remain the same for both CFL and LED lamps, and the shapes added to omnidirectional in Draft 1 remain in Draft 2.</p> <p>EPA has clarified the passing test language and reporting details for units tested as both base-up and base-down.</p>

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Elevated Temperature Test	-	<p>Draft 1 proposed applying elevated temperature testing to lamps greater than or equal to 5 watts, requiring these lamps to undergo lumen maintenance and reliability testing in an elevated temperature environment to simulate airflow restrictive fixtures.</p> <p>Some stakeholders requested that the elevated temperature test apply to lamps 10 watts and above, as required in the Integral LED Lamps specification.</p> <p>Other stakeholders suggested that the elevated temperature test only apply to lamps that will be used in recessed can fixtures.</p> <p>Some stakeholders raised concerns about the impact of the increased proportion of lamps required to go through the elevated temperature testing such as:</p> <ul style="list-style-type: none"> • Laboratory capacity for testing • LED lamps sensitivity to heat • Increased testing costs • Increased redesign and product costs to meet the requirement <p>Some parties commented that it was not the Program's role to influence the way consumers use their lamps, and it should be the manufacturers' responsibility regarding application design and labeling.</p>	<p>Originally employed in the Compact Fluorescent Lamp specification and later referenced in the Integral LED Lamps spec, the Elevated Temperature Test has proven an effective means to evaluate the robustness of a lamp in the thermal environments created by luminaires. EPA continues to receive a steady stream of consumer complaints on early failures and in most cases it was confirmed that the products were installed in the proper application. EPA has also observed that despite existing requirements to list incompatible application information, packaging often fails to include sufficient information on proper use.</p> <p>Premature failure has also been observed as a persistent problem through EPA's third party testing program for CFLs and feedback through the ENERGY STAR hotline.</p> <p>In response to these concerns and seeking a balance between increasing product reliability and consumer satisfaction with efficient lighting, and practical matters related to such testing, EPA has adjusted the requirement in Draft 2. The Elevated Temperature Test is now proposed for all directional and semidirectional lamps, and all omnidirectional lamps of 10 watts or greater. For all other lamps including decorative, the proposal is to test at room temperature with the Ambient Temperature Test. Decorative lamps are least likely to be misapplied because they are for very specific decorative applications that typically allows adequate airflow.</p>
Lamp Toxics Reductions	-	<p>In Draft 1, EPA proposed lamps to meet maximum mercury content values based on lamp wattage and restricts the concentration of other materials by weight.</p> <p>A few stakeholders suggested that ENERGY STAR defer to the EU RoHS requirements that are referenced in the Luminaires V1.1 specification rather than outlining requirements that include reduced mercury content.</p>	<p>The requirements stated in the draft specification for mercury content are based upon analyses of what is technically feasible today for compact fluorescent lamps in the U.S. market. Beyond the mercury requirements, and in the interest of transparency, the Agency decided to maintain the relevant toxics reduction requirements in the specification draft, rather than simply a reference to EU RoHS resources.</p>

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Labeling & Packaging	Packaging	<p>In Draft 1, the proposed packaging requirements included several changes when compared to the packaging requirements in the existing specifications. These enhancements were targeted at improved consumer education and decision making, including the proposed Color Spectrum Tool and labeling requirement for non-dimmable lamps.</p> <p>Many stakeholders expressed concern over some of the proposed packaging requirements in Draft 1. More specifically, stakeholders commented that requiring the three color names (warm white, neutral white, and cool white) would cause confusion as different manufacturers use different CCT names as part of their branding. One stakeholder suggested that it is not necessary to specify the front panel location for the dimming capability requirement.</p> <p>Some stakeholders suggested that ENERGY STAR should defer to the FTC label to satisfy labeling requirements.</p> <p>Stakeholders shared that the proposed Color Spectrum Educational Tool has the potential to cause confusion among consumers, and initially may increase packaging costs due to packaging reconfiguration. Manufacturers suggested that it would take up packaging space and was unnecessary due to the new FTC Lighting Facts label. One stakeholder suggested that the tool should indicate where an incandescent lamp would lie on the spectrum to assist consumer understanding.</p>	<p>The Agency has decided to remove labeling requirements and defer to FTC labeling with a few exceptions so as to avoid any duplication of government roles. The Agency has elected to maintain the requirement to list non-dimmable on the front of packaging, as many consumers do not realize that not all lamps have dimming capabilities.</p> <p>While EPA sought to educate consumers about lamp color in a consistent fashion through color on the front of the package, the Agency has decided to remove the Color Spectrum Educational Tool requirement in lieu of the existing federal labeling required by FTC for screw base lamps, which contains similar information in black and white on the back of packaging.</p>
	Lamp Labeling	<p>In Draft 1, the lamp labeling requirements proposed by EPA contained several items, such as rated lumens, application suitability, and a phone number for complaint resolution.</p> <p>Many stakeholders commented that in some cases the lamp itself has very little room to include additional information beyond what is already required by law and safety certifications.</p>	<p>The Agency has revised the lamp labeling requirements to avoid duplication of information required by the safety listing and FTC but maintains requirements for additional essential information useful to the consumer after the packaging has been disposed of.</p>

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Lifetime	-	<p>In Draft 1, EPA proposed a minimum life claim of $\geq 10,000$ hours for both LED and CFL lamp technologies. The proposed requirement was a reduction in lifetime for LED lamps and an increase in lifetime for CFL lamps.</p> <p>Stakeholders submitted comments both for and against the new minimum lifetime requirement. Some stakeholder comments were very supportive, citing reduced manufacturing costs opportunities for LED lamps which could encourage more rapid adoption of the technology by providing consumers a greater range of options from which to choose. Other stakeholders suggested reducing the requirement could be perceived by some consumers as reducing the quality of ENERGY STAR certified LED lamps. Some energy efficiency advocates expressed concern that a reduction in the minimum life requirement would create a trend of lower life ratings across all certified models.</p>	<p>After further industry discussions and data analyses, EPA concluded that while reducing the minimum life requirement for LED lamps to 10,000 hours could present new opportunities for less expensive products brought more quickly to market, among other benefits, the associated cost reductions may not be compelling. In addition, as noted by utility partners, ENERGY STAR minimum performance requirement values often serve as the basis for public service commission evaluations of program cost effectiveness. Therefore, a dramatic reduction in the minimum life requirement would significantly undercut utilities' ability to claim savings from programs providing incentives for certified LED lamps. For these reasons the Agency has reverted to the 15,000 and 25,000 hour minimum life requirements in the existing specification (see next page). The proposed increase for CFL minimum life requirements, from 8,000 hours to 10,000 hours, remains unchanged from Draft 1.</p> <p>The agency will continue to explore and evaluate if longer lifetimes are necessary for residential lighting, and if longer lifetimes would prevent a more efficient lamp from replacing a currently installed, qualified lamp in the future.</p>
Lumen Maintenance	Tolerances	Stakeholders commented on the lack of an acceptable measurement variation, referring to an allowed 3% tolerance or measurement error that had been allowed for certain test measurements in CFL v4.3 and Integral LED Lamps v1.4.	In response to stakeholder information regarding the measurement uncertainty of test equipment, EPA has established a 3% measurement tolerance to be applied to lumen maintenance measurement averages in Draft 2 as existed in the existing lamp specifications.
	Passing Test Language	Stakeholders suggested changes to lumen maintenance "passing test" language, including building in a tolerance for 1 CFL lamp to fail, and clarifying whether the average refers to all 10 samples, regardless of failures, or if the test is based on the average of the surviving lamps.	This comment was carefully considered and wording for passing language has been clarified.

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Noise	-	<p>In Draft 1, EPA proposed that a noise requirement would be included in a subsequent draft of the specification.</p> <p>Stakeholders generally commented that noise requirements should not be included in the specification, citing low noise levels for LED lamps and suggesting that lamp noise is not a major complaint from consumers.</p>	<p>Historically ENERGY STAR lighting specifications have included requirements for noise/sound ratings. EPA has observed that some qualified lamps do emit audible noise when operating, including those operating in keyless sockets without resonating fixture components. The Agency will continue to explore options for noise requirements of lamps marketed as dimmable, to be included in a subsequent draft, with the intent of minimizing testing burden.</p>
Operating Frequency	-	<p>In Draft 1, the proposed operating frequency requirements for CFL lamps aligned with the existing requirements in the Compact Fluorescent Lamp specification. The Agency opted to leave the operating frequency requirements for LED lamps to be determined.</p> <p>Some stakeholders suggested that LED lamps should be exempt from the operating frequency requirements as some drivers provide true DC power without flicker, and would operate at 0Hz, while another stakeholder suggested the exemption of LED lamps from frequency requirements because most drivers operate at frequencies of >100kHz which are imperceptible.</p> <p>Other stakeholders suggested the removal of the operating frequency requirement from the specification.</p>	<p>Light source flicker and associated discomfort is a consumer dis-satisfier that can hinder adoption of energy efficient lighting technologies, therefore EPA is working with the IEEE PAR 1789 working group, IES, and the Alliance for Solid-State Illumination Systems and Technologies (ASSIST) to identify appropriate performance requirements and methods of measurement to ensure that qualified lamps do not produce visible flicker, stroboscopic effects, or adverse health effects. Operating frequency requirements and methods of measurement will be refined in a subsequent draft.</p>

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Power Factor	-	<p>The Agency proposed 0.7 as the power factor requirement in Draft 1 for all lamps except lamps $\leq 5W$. EPA aligned the power factor level with the existing Integral LED Lamps specification, and increased the power factor level for CFL lamps, while seeking feedback on the feasibility having all qualified lamps meet the proposed requirement.</p> <p>Stakeholders provided comments in support of and against the proposed power factor levels.</p> <p>A number of stakeholders claimed that 0.7 is too high for CFLs, and will result in a complete redesign of CFL ballast circuitry, an increased lamp size, reduced reliability, increased prices and limited availability of products. Other stakeholders argued that the reduction in overall wattage consumption from energy efficient lighting had enough impact to make power factor negligible.</p> <p>Some stakeholders suggested raising the requirement to 0.9 citing the benefit of increased efficiency to the power grid and noting that improvements in technology have made high power factor solutions in LED driver circuitry less expensive.</p>	<p>EPA's intent in addressing power factor in this specification is to ensure that ENERGY STAR qualified lamps help to support utility partner efforts to improve power factor. In choosing the Draft 1 levels, EPA based its proposal on an understanding of available technologies in the marketplace. However, to better represent product availability today and harmonize with the Luminaires specification, EPA has adjusted the requirements in this section to minimum power factors of 0.5 for residential CFL, 0.7 for residential LEDs, and 0.9 for all commercial products where high power factor is in higher demand. EPA believes that these levels ensure a balance between cost and performance.</p>
Rapid Cycle Stress Test	-	<p>In Draft 1, the Agency proposed an increase in the number of cycles from one cycle per every two hours of rated lamp life to one cycle per hour of rated life. EPA also proposed aligning the cycling time across technologies to cycles of 5 minutes on and five minutes off. Several stakeholders commented that the increase in the number of cycles and the increase in cycling frequency would increase testing costs and test time.</p> <p>Other stakeholders, including utilities and energy efficiency programs, suggested the proposal addresses concerns about reliability and consumer satisfaction.</p>	<p>EPA has maintained the proposed cycling with a cap for the maximum cycling to 15,000 cycles so as to thoroughly stress lamps but not unnecessarily prolong testing. EPA also received input that aligning the cycling could help keep testing costs lower because labs would not need to build systems to accommodate the technologies differently.</p>

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Run Up Time	-	<p>In Draft 1, the proposed run-up time requirements included multi-tiered run-up times and a tightened run-up time for covered CFL lamps.</p> <p>Some stakeholders expressed concern with the financial costs associated with increases to the proposed requirements, while other stakeholders expressed concern with the cost of consumer dissatisfaction with slow run-up times, and the resulting difficulty in further engaging consumers with efficient lighting products.</p>	<p>One of the ENERGY STAR Guiding Principles emphasizes that performance be maintained with improved energy efficiency. Therefore, it is important to EPA that the proposed requirements not only deliver energy savings to the consumer but also meet their expectations with regard to performance. With this in mind, EPA has elected to retain the run-up time requirements as proposed in Draft 1.</p> <p>EPA has thoroughly analyzed existing qualified products and found that the majority of them already meet the proposed run up time.</p> <p>Additionally, the CFL Technical and Research Working Group has developed a draft of the ENERGY STAR Run-Up Time Test outlined in the proposed Annex E.</p>
	Full Stabilized Light Output	A few stakeholders requested clarification of the definition of "full stabilized light output."	EPA recognizes the potential confusion regarding the term, and the draft of the ENERGY STAR Run-Up Time Test outlined in the proposed Annex E clarifies "full stabilized light output."
Scope	Low-Voltage MR16 Lamps	<p>In Draft 1, the proposed requirements did not include low-voltage MR16 lamps in the scope of the specification, citing inconsistent energy-savings based on the system configuration and optimization.</p> <p>Several stakeholders requested that low-voltage MR16 lamps be covered by the specification scope. One stakeholder argued that regardless of the power supply used, a low-voltage LED lamp will significantly reduce the lighting system's power consumption, while another stakeholder commented that MR16 lamps are very popular in the professional channels of residential and commercial lighting applications.</p>	Recognizing the energy savings potential for MR16 lamps used in commercial applications, lack of energy efficient alternatives, and acknowledging a higher confidence in proper installation and energy savings in commercial applications, EPA has included this product type within the scope of the specification for Draft 2 for commercial use. These lamps must meet new commercial grade requirements detailed in the specification, including higher power factor, longer rated life, and longer warranty requirements.

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	<p>Line-Voltage MR16 Lamps with GU10 Bases</p>	<p>In Draft 1, the Agency did not include line-voltage MR16 lamps with GU10 bases lamps in the scope of the proposed specification, acknowledging that GU10 bases are commonly employed with lamp shapes that do not have ANSI-standardized maximum overall length (MOL) and may not fit properly into luminaires.</p> <p>Several stakeholders requested that line-voltage MR16 lamps with GU10 bases be included in the scope and commented that the lamp types represent a growing share of the consumer market, and are taking the place of low-voltage MR16 lamps in many residential luminaires.</p>	<p>Pending resolution of dimensional standards, line voltage MR16 lamps with GU10 bases have been preliminarily added to the scope of the specification.</p>
	<p>Non-Standard Lamps</p>	<p>In Draft 1, the Agency sought stakeholder feedback on a sensible approach to handling lamps not fitting within the relevant ANSI limits or performing like ANSI standard incandescent lamps, i.e. non-standard lamps, and did not incorporate non-standard lamp requirements.</p> <p>Stakeholders submitted comments both in support of and against the inclusion of non-standard lamp provisions. Some stakeholders commented that the non-standard category should include non-standard shapes in both CFL and LED technologies.</p> <p>A number of stakeholders suggested that non-standard requirements should not be included in the lamps specification, noting it is a less accountable category, and existence of qualified non-standard lamps may lead to consumer dis-satisfaction.</p>	<p>EPA has more clearly defined non-standard lamps, and has proposed additional requirements for non-standard lamps to help consumers understand these products.</p>
<p>Start Time</p>	<p>-</p>	<p>In Draft 1 EPA proposed a start time of 0.5 seconds. Several stakeholders requested that EPA reinstate the 1 second start time currently required in the CFL Version 4.3 specification. The stakeholders commented that it would be difficult to decrease start time while increasing rapid cycle stress testing for CFL lamps.</p>	<p>EPA has adjusted the requirement to one second in Draft 2, acknowledging manufacturers' comments noting a conflict between increasing this requirement and the proposed increases in rapid cycle stress testing requirements and weighing early failure as a larger barrier to adoption than a one second start time.</p>

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Technology Neutrality	-	<p>Some stakeholders commented that Draft 1 did not achieve technology neutrality because the specification includes testing and performance requirement differences that purportedly allow unfair advantages to some technologies. Requirements outlined by stakeholders included:</p> <ul style="list-style-type: none"> • Color Maintenance • Reliability (Lifetime) • Lumen Maintenance • Early Interim Qualification • Dimensional 	<p>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 qualified 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.</p>