

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OFFICE OF
AIR AND RADIATION

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Dear ENERGY STAR® Lighting Partner or Other Interested Stakeholder:

After nearly a year of working with stakeholders, the Environmental Protection Agency (EPA) is pleased to announce the release of the final draft of the ENERGY STAR Lamps Version 2.0 Specification (“the specification”), intended to replace the lamps version 1.1 specification on January 2, 2017.

In February 2015, EPA released the first specification draft. The development process has included two additional drafts and an interim proposal. Lively discussions about the latest LED market developments during the annual ENERGY STAR Products Partner Meeting highlighted new opportunities for the ENERGY STAR program. Following the meeting, EPA held a webinar to facilitate a focused stakeholder discussion on the current market developments. In light of these opportunities and in lieu of a fourth draft, EPA released interim proposals in November informed by stakeholder input, additional research and interviews with manufacturer and technology experts. Following the release of the interim proposal, EPA held four 90-minute stakeholder calls to provide ample time and opportunity for discussion.

EPA thanks partners and stakeholders for their review of draft three and the recent interim proposals, and for the comments submitted. All materials related to the development of this specification are posted to the ENERGY STAR Lamps Specification Development website at www.energystar.gov/lamps.

The primary goals for the ENERGY STAR Lamps Version 2.0 Specification include:

1. Increase efficacy levels.
2. Broaden the scope and the features.
3. Provide for use of DOE’s pending test procedures.
4. Improve harmonization between ENERGY STAR lighting specifications.

The proposed changes for version 2.0 are intended to avoid the need for partners to retest products, however they do reflect updated industry standards and alignment with a final Department of Energy (DOE) test procedure for integrated LED lamps. The following summarizes proposed changes in this draft; more information on EPA’s rationale for these changes is detailed in note boxes located throughout the specification.

Overview of Key Changes

1. Efficacy

This draft reflects the luminous efficacy requirements introduced in the interim proposal which accounts for ongoing improvements in ENERGY STAR certified lamps. During the recent stakeholder discussions around the interim proposal, and in the subsequent written comments, stakeholders expressed support for the proposed efficacy requirements.

2. Product Scope

EPA seeks to help consumers capture greater energy savings with ENERGY STAR lamps while maintaining a broad selection of products that meet their expectations. Recent developments in the LED lamp market highlight an opportunity for the ENERGY STAR label to be associated with a broader range of high-quality products at lower price points and with increased energy savings. The specification broadens the scope for lamps to earn the ENERGY STAR, allowing for greater consumer choice for energy saving bulbs and for exciting product features such as color tuning and remote control, as well as new lamp shape and base combinations. The specification strikes a careful balance between features desired by consumers, affordability, performance, quality, and energy savings. The following changes to the specification came from the interim proposal with the goal to broaden the scope of affordable ENERGY STAR LED lamps.

Rated Life: since the ENERGY STAR Products Partner Meeting, EPA has heard a range of viewpoints, with many stakeholders advocating for a shorter minimum rated life for LED lamps. During calls with stakeholders and in subsequent written comments in response to the interim proposals, EPA continued to hear a variety of viewpoints on lifetime for omnidirectional LED lamps, while most stakeholders supported the 15,000 hour minimum lifetime proposal, some suggested the lifetime requirement should be reduced to 10,000 hours; and few stakeholders suggested the lifetime requirement should remain at 25,000 hours. Considering stakeholder market research suggesting that consumers don't necessarily value a product that lasts more than 20 years, and that they are most concerned about first cost and energy use, EPA has determined that 15,000 hours strikes the correct balance of affordability, energy savings, quality, and performance.

This draft incorporates the 15,000 hour minimum rated life requirement for omnidirectional solid-state lamps referenced in the interim proposal, which matches the current requirement for decorative solid-state lamps; the existing 25,000 hour minimum rated life requirement for directional solid-state lamps remains in place. At the same time EPA is tightening the requirements for life and lumen maintenance: all units must remain operational throughout the duration of life testing (versus the current 9 of 10 survival requirement).

Omnidirectionality: ENERGY STAR distribution requirements have played an important role in providing a positive consumer experience with LED lamps. Since the early days of the poorly designed "snow-cone" lamps, designs have evolved to deliver light more uniformly in every direction. New LED lamp designs have emerged that distribute light very closely to the current ENERGY STAR omnidirectional requirement at notably less cost. Therefore, EPA explored whether a slight modification to the current requirements would be possible to allow cost reductions without impacting consumer experience.

To help assess whether this change would adversely impact consumer experience, EPA conducted a [blind experiment](#) asking consumers to compare the acceptability and readability of two general purpose light bulbs. The results of this experiment suggest no discernable difference in consumer satisfaction for these emerging new designs which meet the requirement for omnidirectional lamps detailed in the interim proposal and incorporated into this draft.

Power Factor: EPA’s interim proposal was to revise the solid-state power factor requirement to 0.5 to align with the longstanding CFL requirement and allow for further cost reductions – without directly impacting consumer experience. EPA heard from multiple stakeholders; many stakeholders supported the proposal but more than a few expressed concerns.

EPA re-evaluated available product data and carefully considered stakeholder comments shared on the calls and in comment letters and has decided to retain a minimum power factor of 0.7 for all solid-state lamps with the exception of omnidirectional lamps with input power greater than 5 watts but less than or equal to 10 watts, for which the minimum requirement has been adjusted to 0.6. EPA will continue to monitor this issue and will consider further power factor adjustments as needed in future specifications.

3. Accommodate DOE’s pending test procedures

This specification will allow use of DOE’s test methods as a pathway to ENERGY STAR certification, following its final publication, combined with additional test requirements specific to certain lamp types (e.g. elevated light output ratio etc.). To further harmonize with pending DOE rulemakings, EPA has included adjustments throughout the specification including reporting guidance and passing rate requirements for rated lifetime. Based on the current DOE proposal, EPA has removed the tolerance on initial luminous flux values. Manufacturer partners should take note of this when evaluating products for recertification.

4. Improve harmonization with ENERGY STAR Luminaires Version 2.0 Specification

The following requirements reflected in the final draft specification now align with the recently completed Version 2.0 Luminaires specification.

- Methods of measurement for color maintenance and color angular uniformity
- Start time
- Run-up time
- Connected criteria
- Test criteria for color tunable products

Other Notable Changes from Draft 3

- Expanded the definition of Color Tunable Lamps to identify three common features—Dim-to-Warm, Full-Color-Tunable, and White-Tunable—to allow a basis for manufacturers to clearly and consistently identify color tuning features on the ENERGY STAR qualified products list
- Added a Fidelity Index (R_f) and Gamut Index (R_g) reporting requirement for all light sources. The previous CRI and R_9 requirements remain unchanged.
- Clarified which lamps are subject to specific temperature testing environments based on lamp type and restriction language that applies throughout the specification.
- Revised the labeling requirement for rated lumen output or lamp nominal beam angle.
- Removed application exception language from the labeling section because it covered in other sections of the specification.
- Adjusted the language in Sections 12.7-12.10 based on stakeholder feedback that some lamps rely on additional equipment (e.g., home gateway or network controller) to provide connected functionality and that it was not necessary to require open protocols for all communication layers.

- Added recommendations for clearly communicating application restrictions.
- Adjusted the warranty information requirement to allow manufacturers to publish the full warranty on their website rather than product packaging.
- Removed 2200K and 2500K correlated color temperatures (CCTs) due to insufficient input for establishing consistent terminology and the limitations of the current lumen maintenance guidance, these CCTs may be considered for a future revision.
- Added a general requirement reminding partners that packaging and marketing claims shall represent the product consistent with its certification.

Other Notable Changes from ENERGY STAR Lamps Version 1.1 Specification

- Removed the four-lamps-per-dimmer sample size requirement for dimming performance testing. The one-lamp-per-dimmer sample size requirement remains unchanged.
- Clarified that an anechoic chamber is not required for noise testing.
- Removed the rapid cycle stress test requirement for solid state products.
- Added standby power consumption requirements, including a limit of 0.5 watts for lamps with integral controls that draw power in standby or network modes.
- Added two additional lamp toxics exemptions based on stakeholder feedback.
- Added recommended color terms for product packaging for consistent terminology.

The effective date for lamps version 2.0 is January 2, 2017. Stakeholders wishing to provide additional comments should submit them to lighting@energystar.gov by **December 18, 2015**. Please note that comments received will be posted to www.energystar.gov/lamps unless marked “Do Not Post.” With the final specification, EPA will share additional information related to its implementation.

The strength of the ENERGY STAR Program is in large part derived from the active interest and participation of our partners. EPA appreciates your contribution to the development of this specification and welcomes individual inquiries; please contact me with questions, comments or concerns any time at (202) 343-9042 or Jantz-Sell.Taylor@epa.gov or Daniel Rogers, ICF International, at (908) 233-0554 or Lighting@energystar.gov. For questions pertaining to the U.S. Department of Energy test procedures, contact Lucy Debutts, DOE, at (202) 287-1604 or Lucy.Debutts@ee.doe.gov.

As always, thank you for your support of ENERGY STAR.
Sincerely,



Taylor Jantz-Sell
ENERGY STAR Lighting Program Manager
U.S. Environmental Protection Agency