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Project Title:	Appliance Efficiency Standards Rulemaking for Computers and Light-Emitting Diode Lamps
TN #:	221135
Document Title:	Test Procedures for Integrated Light Emitting Diode Lamps; Final Rule, 81 Federal Register 43404, 43419-43420 (July 1, 2016)
Description:	Document relied upon. Test Procedures for Integrated Light Emitting Diode Lamps; Final Rule, 81 Federal Register 43404, 43419-43420 (July 1, 2016). Regarding LED lifetime testing.
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10 CFR Parts 429 and 430
Energy Conservation Program: Test Procedures for Integrated Light-Emitting Diode Lamps; Final Rule

DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE–2011–BT–TP–0071]

RIN 1904–AC67

Energy Conservation Program: Test Procedures for Integrated Light-Emitting Diode Lamps

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule.

SUMMARY: This final rule adopts a test procedure for integrated light-emitting diode (LED) lamps (hereafter referred to as LED lamps) to support the implementation of labeling provisions by the Federal Trade Commission (FTC), as well as the ongoing general service lamps rulemaking, which includes LED lamps. The final rule adopts test procedures for determining the lumen output, input power, lamp efficacy, correlated color temperature (CCT), color rendering index (CRI), power factor, lifetime, and standby mode power for LED lamps. The final rule also adopts a definition for time to failure to support the definition of lifetime. This final rule incorporates by reference four industry standards, including two recently published industry standards that describe a process for taking lumen maintenance measurements and projecting those measurements for use in the lifetime test method.

DATES: The effective date of this rule is August 1, 2016. The incorporation by reference of certain publications listed in this rule was approved by the Director of the Federal Register as of August 1, 2016. Representations must be based on testing in accordance with the final rule starting December 28, 2016.

ADDRESSES: The docket, which includes **Federal Register** notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at *regulations.gov.* All documents in the docket are listed in the *regulations.gov* index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

A link to the docket Web page can be found at: *www1.eere.energy.gov/buildings/appliance_standards/rulemaking.aspx/ruleid/18.* This Web page will contain a link to the docket for this notice on the *regulations.gov* site. The *regulations.gov* Web page will contain simple instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact Ms. Lucy deButts at (202) 287–1604 or by email: *Lucy.deButts@ee.doe.gov.*

FOR FURTHER INFORMATION CONTACT: Ms. Lucy deButts, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE–2J, 1000 Independence Avenue SW., Washington, DC 20585–0121. Telephone: (202) 287–1604. Email: *light_emitting_diodes@ee.doe.gov.*

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SUPPLEMENTARY INFORMATION: This final rule incorporates by reference into part 430 the following industry standards:

1. IEC [1] 62301, ''Household electrical appliances—Measurement of standby power'' (Edition 2.0, 2011–01).

2. ANSI [2]/IES [3] RP–16–2010, ''Nomenclature and Definitions for Illuminating Engineering,'' approved July 15, 2005.

3. IES LM–79–08, ''Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products,'' approved December 31, 2007.

4. IES LM–84–14, ''Approved Method: Measuring Luminous Flux and Color Maintenance of LED Lamps, Light Engines, and Luminaires,'' approved March 31, 2014.

5. IES TM–28–14, ''Projecting Long-Term Luminous Flux Maintenance of LED Lamps and Luminaires,'' approved May 20, 2014.

You may purchase a copy of IEC 62301 from International Electrotechnical Commission, available from the American National Standards Institute, 25 W. 43rd Street, 4th Floor, New York, NY 10036, (212) 642–4900, or go to *http://webstore.ansi.org.*

Copies of IES standards may be obtained from the Illuminating Engineering Society of North America, 120 Wall Street, Floor 17, New York, NY 10005–4001, 212–248–5000, or go to *http://www.iesna.org.* Industry standards can also be reviewed in person at U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza SW., Suite 600, Washington, DC, 20024. For further information on accessing IBR standards, contact Ms. Lucy deButts at (202) 287–1604 or by email: *Lucy.deButts@ee.doe.gov.*

See section IV.M for a further discussion of these standards.

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I. Authority and Background

Title III of the Energy Policy and Conservation Act of 1975 (42 U.S.C. 6291, *et seq.;* ''EPCA'') sets forth a variety of provisions designed to improve energy efficiency. (All references to EPCA refer to the statute as amended through the Energy Efficiency Improvement Act of 2015

[1] International Electrotechnical Commission.

[2] American National Standards Institute

[3] Illuminating Engineering Society.

CCT values in order for manufacturers to make consistent representations of CCT on product labels and marketing materials. When measuring CCT, the represented value of the sample is equal to the mean of the sample. DOE notes that in this final rule, DOE has removed rounding requirements for individual units and maintained rounding requirements for only represented values. As DOE is requiring the represented value to be rounded to the nearest 100 K, this should account for the potential range of values cited by the Republic of Korea.

2. Power Factor

In the July 2015 SNOPR, DOE proposed that power factor be rounded to the nearest hundredths place, consistent with common usage in industry literature. 80 FR at 39657.

NEMA noted a discrepancy in two sections of the test procedure language in the July 2015 SNOPR, indicating DOE proposed to round power factor for individual test units to the nearest tenths place in 10 CFR 430.23(dd)(7) and to the nearest hundredths place in 10 CFR 429.56(c)(6). NEMA recommended rounding power factor to the nearest tenths place. (NEMA, No. 42 at pp. 7–8)

The proposal to round an individual unit value to a lower degree of specificity than what was required for the larger sample was an unintended error. However, DOE notes that it has removed the requirement to round individual test units in this final rule, thus no longer requiring individual test units to be rounded to the nearest tenths place. DOE is maintaining the proposal from the July 2015 SNOPR to round power factor for the sample to the nearest hundredths place to be consistent with common usage in industry literature and other lighting test procedures. DOE notes that these rounding requirements are consistent with the CFL test procedure rulemaking. 80 FR 45723, (July 31, 2015).

H. Interaction With ENERGY STAR

In the June 2014 SNOPR, to reduce test burden, DOE proposed allowing measurements collected for the ENERGY STAR Program Requirements Product Specification for Lamps (Light Bulbs) Version 1.0 to be used for calculating represented values of lumen output, input power, lamp efficacy, CCT, CRI, and lifetime. In the July 2015 SNOPR, DOE proposed a new test procedure for lifetime that was largely based on the IES LM–84–14 and IES TM–28–14 industry standards and provided a simple, straightforward, and flexible test procedure to account for potential future changes in the lifetime of LED products. DOE noted that the proposal in the July 2015 SNOPR projected time to failure based on data obtained for each individual LED lamp rather than assuming the same relationship between test duration and lumen maintenance applies to every LED lamp. Because DOE revised its approach for lifetime measurement and projection, there was no longer significant similarity between the DOE and ENERGY STAR lifetime test procedures. DOE noted it will work with ENERGY STAR to revise the test procedures for lifetime accordingly. 80 FR at 39657–58.

DOE received comments from NEMA regarding differences between the LED lamps test procedure and the ENERGY STAR Lamps Specification V2.0. NEMA requested that DOE analyze the increased burden of the LED lamps test procedure with respect to potential deviations from existing practices (*e.g.,* ENERGY STAR). NEMA noted that a test procedure with significant differences from existing methods will affect existing products, in addition to new products, and many products on the market would have to be retested. Therefore, NEMA asked DOE to minimize changes between the ENERGY STAR Lamps Specification V2.0 and DOE's LED lamps test procedure. (NEMA, No. 42 at p. 2) NEMA also cautioned that because the ENERGY STAR program accommodates DOE test procedures in its specifications, any additional revisions to the LED lamps test procedure will delay the finalization of the ENERGY STAR Lamps Specification V2.0. (NEMA, No. 42 at pp. 5–6)

As mentioned in section III.D.4.a, ENERGY STAR has stated that it will reference DOE's test procedure upon completion.[16] DOE further notes that measurements collected for the ENERGY STAR Lamps Specification V1.1 and ENERGY STAR Lamps Specification V2.0 (when it requires compliance) can be used for calculating represented values of energy efficiency or consumption metrics covered by the DOE test procedure as long as those measurements were collected in accordance with the DOE test procedure. Manufacturers must make representations in accordance with the DOE test procedure and represented value determination method beginning 180 days after publication of the final rule in the **Federal Register**.

I. Laboratory Accreditation

Regarding the National Voluntary Laboratory Accreditation Program (NVLAP) accreditation, in the July 2015 SNOPR DOE proposed to require lumen output, input power, lamp efficacy, power factor, CCT, CRI, lifetime, and standby mode power (if applicable) testing be conducted by test laboratories accredited by NVLAP or an accrediting organization recognized by the International Laboratory Accreditation Cooperation (ILAC). NVLAP is a member of ILAC, so test data collected by any laboratory accredited by an accrediting body recognized by ILAC would be acceptable. DOE also proposed to state directly that accreditation by an Accreditation Body that is a signatory member to the ILAC Mutual Recognition Arrangement (MRA) is an acceptable means of laboratory accreditation. 80 FR at 39658.

DOE received comments on a possible issue with test laboratories achieving accreditation to the DOE test procedure. NEMA recommended that DOE adopt industry standards and test procedures without modification, citing that this would reduce burden and prevent issues with laboratory accreditation to the LED TP. NEMA also commented that labs accredited to an industry standard by NVLAP must conduct testing using that particular standard rather than a test procedure styled after an industry standard. (NEMA, No. 42 at p. 4) DOE notes that laboratories and other testing bodies can obtain accreditation directly to a DOE test procedure through NVLAP (*e.g.,* the fluorescent lamp ballast test procedure), thus DOE maintains the lab accreditation requirements from the July 2015 SNOPR.

J. Certification

In the July 2015 SNOPR, DOE proposed certification requirements for LED lamps. Manufacturers will not have to certify values to DOE unless standards are promulgated for LED lamps as part of the rulemaking for general service lamps. However, DOE provided certification requirements and the ability to certify by CCMS to enable FTC to allow manufacturers to submit data through DOE's Compliance Certification Management System (CCMS) related to FTC labeling requirements. *Id.*

DOE recognized that testing of LED lamp lifetime can require considerably more time than testing of other LED lamp metrics. Therefore, DOE proposed to allow new basic models of LED lamps to be distributed prior to completion of the full testing for lifetime. Similar to treatment of GSFLs and incandescent reflector lamps in 10 CFR 429.12(e)(2), DOE proposed that prior to distribution of a new basic model of LED lamp, manufacturers must submit an initial

certification report. If testing for time to failure is not complete, manufacturers may include estimated values for lifetime and life. If reporting estimated values, the certification report must describe the prediction method and the prediction method must be generally representative of the methods specified in appendix BB to subpart B of part 430. Manufacturers are also required to maintain records per 10 CFR 429.71 of the development of all estimated values and any associated initial test data. If reporting estimated values for lifetime and life, the certification report must indicate that the values are estimated until testing for time to failure is complete. 80 FR at 39665. If, prior to completion of testing, a manufacturer ceases to distribute in commerce a basic model, the manufacturer must submit a full certification report and provide all of the information listed in 10 CFR 429.12(b), including the product-specific information required by 10 CFR 429.56(b)(2), as part of its notification to DOE that the model has been discontinued. 80 FR at 39664. For any metrics covered by the LED lamps test procedure, manufacturers must make representations in accordance with the DOE test procedure and represented value determination method beginning 180 days after publication of the final rule in the **Federal Register**.

DOE received comments on the quality of LED lamps entering the market. EEAs illustrated this concern to DOE, noting the LED lamps test procedure should ensure that poor quality LED lamps cannot be sold to consumers. They presented a series of CFL verification tests, known as the Program for the Evaluation and Assessment of Residential Lighting (PEARL), which determined compliance rates of ENERGY STAR qualified CFLs. The program tested commercially-available CFLs from 2000–2009, ultimately concluding there were a significant amount of non-compliant CFLs that were ENERGY STAR qualified. EEAs paired this with a discussion of CFL early failure rates, emphasizing that there were high early failure rates in the PEARL results for products that should have long lifetimes. The full discussion of the PEARL analysis can be found in EEAs' public comment on *regulations.gov* under docket number EERE–2011–BT–TP–0071. Ultimately, EEAs urged DOE to learn from prior experiences, such as this issue with CFLs, to prevent similar issues from occurring with LED lamps. EEAs emphasized that LED lamps are rapidly developing products and continually demanded at lower prices, which may lead manufacturers to release poor quality products. (EEAs, No. 43 at pp. 4–6)

DOE understands EEAs' concern regarding the prevention of poor quality LED lamps entering the market. DOE's adoption of a reliable, repeatable test procedure helps to ensure that the performance characteristics of integrated LED lamps are accurately represented. DOE's general service lamp rulemaking addresses energy conservation standards for certain metrics (*i.e.,* lamp efficacy and power factor). Lastly, DOE has the Compliance Certification and Enforcement (CCE) program to ensure manufacturers are testing their products and making accurate representations.

K. Effective and Compliance Date

The effective date for this test procedure will be 30 days after publication of this test procedure final rule in the **Federal Register**. Pursuant to EPCA, manufacturers of covered products must use the applicable test procedure as the basis for determining that their products comply with the applicable energy conservation standards adopted and for making representations about the efficiency of those products. (42 U.S.C. 6293(c); 42 U.S.C. 6295(s)) For those energy efficiency or consumption metrics covered by the DOE test procedure, manufacturers must make representations, including certification of compliance with an applicable standard, in accordance with the DOE test procedure beginning 180 days after publication of this final rule in the **Federal Register**.

Philips expressed concern in response to the July 2015 SNOPR that the 180 day period is not sufficient based on the current LED lamp lifetime projection methods in the test procedure. Philips noted that DOE is not taking into account the additional time required to expand existing test infrastructure, estimating this expansion would take at least four months to complete. Therefore, Philips suggested that DOE modify the certification period to one year. (Philips, No. 41 at p. 3) The Republic of Korea followed with a similar concern, claiming the test duration for some lamps will require a test period of ten months and also requested that DOE set its certification period to one year. (Republic of Korea, No. 45 at p. 2)

DOE did not modify the 180 day certification period in this final rule. If the in-house testing infrastructure expansion has not been completed in sufficient time, DOE has accounted for any third party testing costs that may be required for manufacturers that are unable to test their products themselves. Further, DOE notes that there is no minimum test duration for the time to failure test procedure. While DOE agrees that some tests would take at least ten months to project certain LED lamp lifetimes, DOE notes that manufacturers may submit certification reports with estimated values of lifetime until time to failure testing is complete. See section III.J for a more detailed description of the certification process.

L. Ceiling Fan Light Kits Using LED Lamps

DOE proposed to harmonize the test procedures for lamps, including LEDs, used in ceiling fan lights kits in a notice published on October 31, 2014. 79 FR 64688 (Docket EERE–2013–BT–TP–0050). The comments received as part of that docket were generally supportive of this approach and are discussed as part of that rulemaking docket. In the July 2015 SNOPR, DOE proposed to add the appropriate cross-references in the ceiling fan light kit test procedures at 429.33 and 430.23 to the integrated LED lamp test procedures. 80 FR at 39659; 39664–65. DOE received no comments on these cross references and therefore adopts them in this final rule.

IV. Procedural Issues and Regulatory Review

A. Review Under Executive Order 12866

The Office of Management and Budget (OMB) has determined that test procedure rulemakings do not constitute ''significant regulatory actions'' under section 3(f) of Executive Order 12866, Regulatory Planning and Review, 58 FR 51735 (Oct. 4, 1993). Accordingly, this action was not subject to review under the Executive Order by the Office of Information and Regulatory Affairs (OIRA) in OMB.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (IRFA) for any rule that by law must be proposed for public comment, and a final regulatory flexibility analysis (FRFA) for any such rule that an agency adopts as a final rule, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' 67 FR 53461 (August 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the